Report n.92

The "OLIVAR" Survey.
Methodology and Quality.

M. Bottai - M. Caputo - L. Lecchini

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CHAPTER 1

THE "OLIVAR" SURVEY.

1.1 Territorial Representativity of the Survey

The area in which the survey takes place is North-Western Tuscany the four provinces of Pisa, Livorno, Lucca and Massa-Carrara to be exact. As a whole the area spreads out over 6590 kmq, has a population of 1,289,805 inhabitants according to the 1991 census and is subdivided administratively into 111 municipalities. Even though it doesn't have any real metropolitan area, the territory forms a good sample area because it contains quite a variegated and complete assortment of realities, both from a geographical-urbanistic and a hierarchical-funcional point of view.

There are urban areas of a large dimension, with important historic centres and with quite differenciated economical characteristics: Pisa is a typically tertiary city, Lucca a centre with a strong commercial propensity, Livorno a port and industrial city, Viareggio a tourist resort, Massa, Carrara, Pontedera and Piombino are industrial centres. The largest urban centres are close to and interlaced by a dense surburban structure which comprises a number of medium to small centres. The whole zone almost designs a metropolitan area linked along the Arno valley to that of Florence. The development penetrates the valleys where surburban centres have grown. At the margins we find agricultural and mountainous zones which have experienced the phenomena of depopulation and demographic ageing.

In our work we have taken into consideration two convictions.

The first is that the area we are able to cover with our sample survey was representative, both in general (the Italian human landscape is strongly characterised by a poorly specialised polycentrism) and for the specific object of analysis (the family arrangement of the elderly) In other words:we can consider the structural variability and functions between the populations of different Italian urban systems to be scarse and that a great part of the variability can be found between the localities which constitute each system.

The second conviction is that the geographical arrangement and the role in the urban system of the place of residence are an important determinant in the family, migratory and professional history of the elderly and of their living arrangements and that therefore we had to take into consideration this presumable territorial variabilty determining within the area groups of similar municipalities and stratifying the sample among these groups.

Nevertheless it is certainly interesting to refer to a socio-demografic picture of Tuscany in relation to the other Italian regions. Among the many variables which can be used here we have considered the small number of 8, limiting ourselves to the more significant ones among which we could and wanted to adopt as the basis of a multivaried classification:

1 - Rate (in %) of variation of the resident population between the 1981 census and the 1991 census (Δ-81-91).
2 - Rate (in %) of variation of migratory movement between the 1981 census and the 1991 census (Δ-MIGR)
3 - Percentage of the population of 65 or over (%ANZ)
4 - Percentage of people employed in the primary sector (ADD1)
5 - Percentage of people employed in the secondary sector (ADD2)
6 - Percentage of people employed in the tertiary sector (ADD3)
7 - Total fertility rate in 1989 (TFR)
8 - Percentage of the population without educationalqualifications (NEQ).

Tab. 1.1 - *Italian Regions Data Absolute Value*

REGIONS	Δ 81-91	Δ MIGR	% ANZ	ADD1	ADD2	ADD3	TFR (1989)	NEQ (a)
PIEMONTE	-3.53	0.05	17.20	6.70	41.30	52.00	1.08	15.60
VALLE D.A.	2.43	4.59	15.20	9.40	24.60	66.00	1.09	14.80
LOMBARDIA	-0.76	0.10	14.40	3.10	43.30	53.60	1.14	13.70
TRENTINO A.A.	1.89	0.55	14.30	10.80	24.40	64.80	1.36	9.80
VENETO	1.24	1.75	14.70	7.30	41.00	51.70	1.11	18.10
FRIULI V.G.	-2.96	2.32	18.60	5.40	31.30	63.30	1.00	15.30
LIGURIA	-7.28	-0.75	20.90	4.40	23.30	72.30	0.98	14.30
EMILIA R.	-1.02	3.05	18.90	8.80	35.10	56.10	0.95	20.50
TOSCANA	-1.70	2.15	18.70	5.30	33.60	61.10	1.02	20.20
UMBRIA	0.01	2.08	18.20	8.80	33.00	58.20	1.14	24.50
MARCHE	1.30	2.36	17.70	9.70	36.20	54.10	1.14	24.70
LAZIO	1.22	-0.23	13.70	4.60	20.20	75.20	1.24	18.00
ABRUZZO	2.35	1.48	15.80	11.70	29.80	58.50	1.28	27.80
MOLISE	0.97	0.20	16.50	19.60	24.90	55.50	1.38	31.70
CAMPANIA	3.35	-4.03	10.80	11.90	24.00	64.10	1.74	26.50
PUGLIA	3.55	-2.52	11.80	16.30	24.50	59.20	1.55	29.40
BASILICATA	0.33	-3.85	13.90	20.20	25.90	53.90	1.61	34.40
CALABRIA	0.37	-5.64	12.80	19.10	20.60	60.30	1.68	32.60
SICILIA	2.01	-3.08	12.90	14.10	20.90	65.00	1.70	30.60
SARDEGNA	3.26	-0.01	12.00	14.30	23.70	62.00	1.16	27.70
ITALIA	**0.29**	**-0.43**	**14.80**	**8.4**	**32.0**	**59.6**	**1.30**	**21.30**

Source: Istat
a) values according to the 1981 census

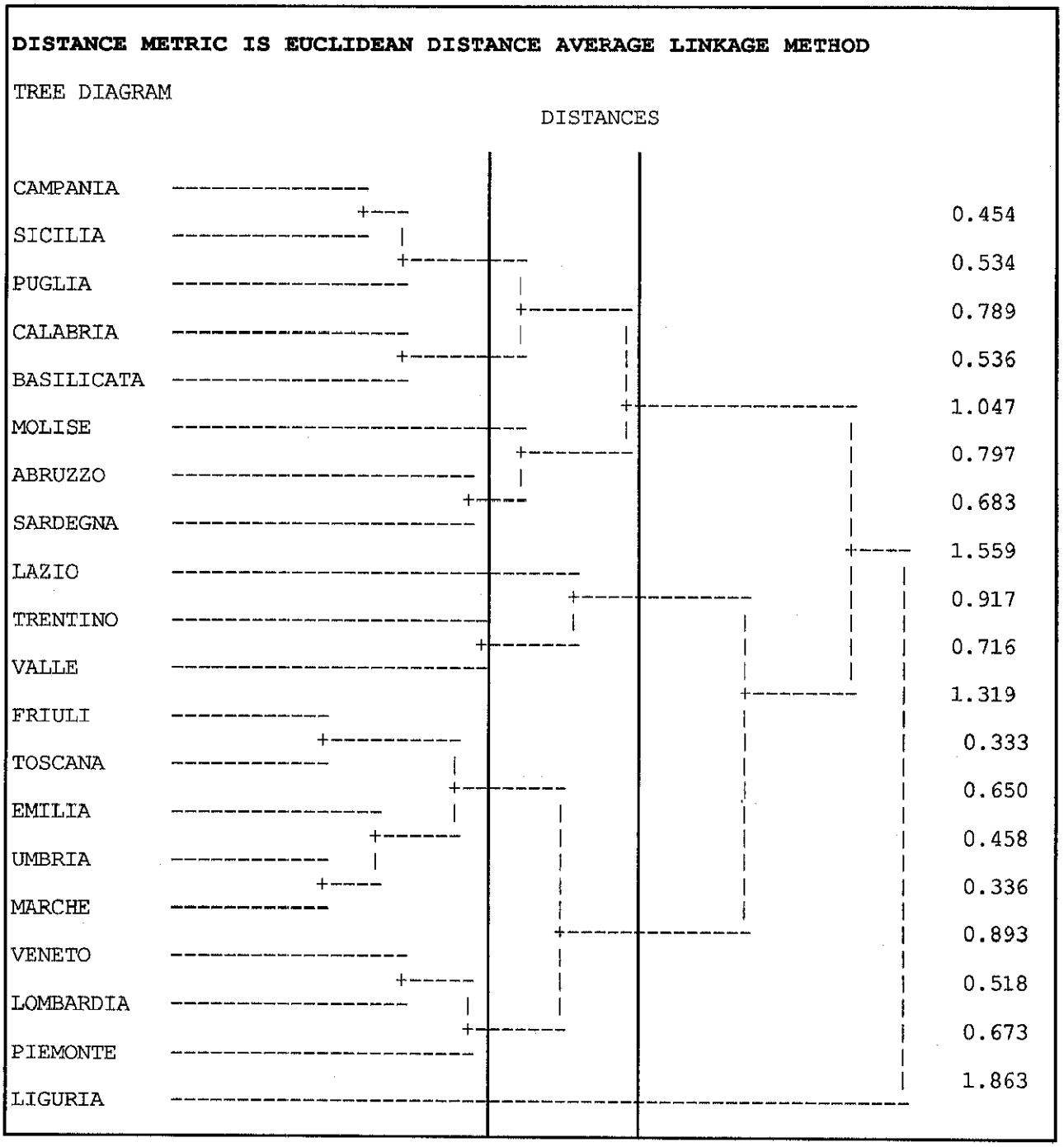
Tab. 1.2 - *Italian Regions Data Standardized Variables*

REGIONS	Δ 81-91	Δ MIGR	% ANZ	ADD1	ADD2	ADD3	TFR (1989)	NEQ (a)
PIEMONTE	-1.452	0.009	0.627	-0.735	1.669	-1.299	-0.726	-0.936
VALLE D.A.	0.777	1.710	-0.090	-0.223	-0.612	0.880	-0.687	-1.045
LOMBARDIA	-0.415	0.026	-0.376	-1.419	1.943	-1.050	-0.494	-1.194
TRENTINO A.A.	0.575	0.195	-0.412	0.043	-0.639	0.693	0.358	-1.722
VENETO	0.333	0.645	-0.269	-0.622	1.628	-1.345	-0.610	-0.597
FRIULI V.G.	-1.239	0.858	1.129	-0.982	0.303	0.460	-1.036	-0.977
LIGURIA	-2.856	-0.293	1.953	-1.172	-0.790	1.861	-1.113	-1.112
EMILIA R.	-0.514	1.134	1.237	-0.337	0.822	-0.661	-1.229	-0.272
TOSCANA	-0.769	0.795	1.165	-1.001	0.617	0.118	-0.958	-0.313
UMBRIA	-0.128	0.769	0.986	-0.337	0.535	-0.334	-0.494	0.270
MARCHE	0.355	0.875	0.806	-0.166	0.973	-0.972	-0.494	0.297
LAZIO	0.324	-0.097	-0.627	-1.134	-1.213	2.312	-0.106	-0.611
ABRUZZO	0.748	0.545	0.125	0.214	0.098	-0.287	0.048	0.717
MOLISE	0.232	0.064	0.376	1.713	-0.571	-0.754	0.436	1.245
CAMPANIA	1.123	-1.520	-1.667	0.251	-0.694	0.584	1.829	0.541
PUGLIA	1.198	-0.956	-1.308	1.087	-0.626	-0.178	1.094	0.933
BASILICATA	-0.009	-1.454	-0.556	1.827	-0.434	-1.003	1.326	1.611
CALABRIA	0.006	-2.124	-0.950	1.618	-1.158	-0.007	1.597	1.367
SICILIA	0.621	-1.166	-0.914	0.669	-1.117	0.724	1.674	1.096
SARDEGNA	1.089	-0.015	-1.237	0.707	-0.735	0.258	-0.416	0.703

a) values according to the 1981 census

In order to point out the affinity a cluster analysis among the regions has been applied. The following dendrogram summerizes the system.

Fig. 1.1 *Dendrogram of the regions affinity*



It is interesting to analyse the grouping into four groups coordinating it with a subdivision at a level of 7 groups.

Since the techniques of hierarchical agglomerative cluster analysis available on SYSTAT, do not supply an output of analysis of variance, which is of absolute utility for the evaluation of the quality of a classification, a cluster type kmeans has backed up the join hierarchic cluster. The former, required from the disaggregation in 4 groups, has supplied exactly the same groups which can be split on the dendrogram. The stabilty of the classification from one technique to another gives an indirect confirmation of the existence of internal homogeneous groups, heterogeneous externally.

Tab 1.3 - *Cluster of Italian regions in 4 groups with the k.means method*

SUMMARY STATISTICS FOR 4 CLUSTERS

VARIABLE	BETWEEN SS	DF	WITHIN SS	DF	F-RATIO	PROB
Δ81-91	14.058	3	4.942	16	15.173	0.000
ΔMIGR	9.933	3	9.067	16	5.842	0.007
%ANZ	12.454	3	6.546	16	10.148	0.001
ADD1	14.040	3	4.960	16	15.098	0.000
ADD2	15.090	3	3.910	16	20.580	0.000
ADD3	11.778	3	7.222	16	8.698	0.001
TFR	13.058	3	5.942	16	11.720	0.000
NEQ	15.205	3	3.795	16	21.368	0.000

CLUSTER NUMBER: 1

MEMBERS			STATISTICS			
CASE	DISTANCE	VARIABLE	MINIMUM	MEAN	MAXIMUM	ST.DEV.
ABRUZZO	0.78	Δ81-91	-0.01	0.63	1.20	0.47
MOLISE	0.66	ΔMIGR	-2.12	-0.83	0.54	0.87
CAMPANIA	0.67	%ANZ	-1.67	-0.77	0.38	0.66
PUGLIA	0.29	ADD1	0.21	1.01	1.83	0.61
BASILICATA	0.60	ADD2	-1.16	-0.65	0.10	0.37
CALABRIA	0.64	ADD3	-1.00	-0.08	0.72	0.57
SICILIA	0.45	TFR	-0.42	0.95	1.83	0.78
SARDEGNA	0.64	NEQ	0.54	1.03	1.61	0.35

CLUSTER NUMBER: 2

MEMBERS			STATISTICS			
CASE	DISTANCE	VARIABLE	MINIMUM	MEAN	MAXIMUM	ST.DEV.
VALLE	0.49	Δ81-91	0.32	0.56	0.78	0.19
TRENTINO	0.42	ΔMIGR	-0.10	0.60	1.71	0.79
LAZIO	0.56	%ANZ	-0.63	-0.38	-0.09	0.22
		ADD1	-1.13	-0.44	0.04	0.50
		ADD2	-1.21	-0.82	-0.61	0.28
		ADD3	0.69	1.30	2.31	0.72
		TFR	-0.69	-0.15	0.36	0.43
		NEQ	-1.72	-1.13	-0.61	0.46

CLUSTER NUMBER: 3

MEMBERS			STATISTICS			
CASE	DISTANCE	VARIABLE	MINIMUM	MEAN	MAXIMUM	ST.DEV.
PIEMONTE	0.55	Δ81-91	-1.45	-0.48	0.36	0.62
LOMBARDIA	0.66	ΔMIGR	0.01	0.64	1.13	0.38
VENETO	0.55	%ANZ	-0.38	0.66	1.24	0.60
FRIULI	0.62	ADD1	-1.42	-0.70	-0.17	0.39
EMILIA	0.36	ADD2	0.30	1.06	1.94	0.57
TOSCANA	0.40	ADD3	-1.35	-0.64	0.46	0.62
UMBRIA	0.41	TFR	-1.23	-0.75	-0.49	0.27
MARCHE	0.48	NEQ	-1.19	-0.47	0.30	0.53

CLUSTER NUMBER: 4

MEMBERS			STATISTICS			
CASE	DISTANCE	VARIABLE	MINIMUM	MEAN	MAXIMUM	ST.DEV.
LIGURIA	0.00	Δ81-91	-2.86	-2.86	-2.86	0.00
		ΔMIGR	-0.29	-0.29	-0.29	0.00
		%ANZ	1.95	1.95	1.95	0.00
		ADD1	-1.17	-1.17	-1.17	0.00
		ADD2	-0.79	-0.79	-0.79	0.00
		ADD3	1.86	1.86	1.86	0.00
		TFR	-1.11	-1.11	-1.11	0.00
		NEQ	-1.11	-1.11	-1.11	0.00

The dichotomy between North and South is very evident. A now long-standing problem from which if anything the outlines and the borders are growing indistinct.
In actual fact years of meridional policies, even if inefficient and not coordinated, have produced in the last post-industrial decades a tendential homogenization of the regional social picture. In these last few years the process has undergone a worrying deceleration, yet the regional differences, which however persist, are not as dramatic as up to the 60's, at the time of the great industrialisation and of the great internal migrations from the South to the North.

There is a large group (1) which includes all the 8 regions of Southern Italy and which is characterised - for those who are aware of the Italian reality it is rather taken for granted - by a rate of increase which is still positive associated to a rate of variation for migratory movement which is still negative and to a positive balance of the natural movement, as is also clear from the above average values of the rate of fertility. At an employment level: compared to the other regions, the structure still privileges the agricultural sector and is lacking in the secondary. Illiteracy remains at higher levels compared to the remaining regions.

The group (3) of the 8 North Italian regions is based above all on the industrial vocation of the occupational structure, on the very low fertility which, lasting through the years, is associated to a considerable ageing and to a negative rate of variation for natural movement with a larger absolute value than the positive one of the migratory movement. Tuscany is one of these regions.

There is then the formation of a smaller territorially discontinuous group (2) of 3 regions homogeneous above all because of the evident tertiary hallmark. In reality Val d'Aosta and Trenting A.A. are regions of a touristic vocation, Lazio is the public administration region. They are regions with rather young populations, with a low rate of illiteracy and which are increasing demographically.

Outlier we find Liguria (4). It is the region which has aged the most, (with a very negative rate of variation), and the most cultured and tertiary.

Although incomplete, because it is based on a small number of variables, this classifying approach points out the Italian regional difference in a synthesis which results acceptable also because it doesn't repel the global knowledge that we have. Nevertheless it's utility in the framework of this work is marginal because here we want to understand above all to what territorial precincts the results of our research on the living arrangement of the elderly are extensible.

In a previous work (MBottai, F.Bartiaux, 1993)[1] an analogous classification of the Italian regions had been used based on variables relating to the elderly living arrangement. The variables were the result of the distribution of relative frequency of two combined variables: living with spouse (yes, no) and type of ménage (without children or other people, with at least one child, at a child's house, with or at another person's house). A further distinction subdivided the elderly in three age classes (60-69, 70-79, 80 and+). The result was of 24 homogenous variables. The data found in Tab. 1.4 are the relative frequencies multiplied per thousand of the elderly belonging to the 8 categories of family arrangement. The cluster analysis applied to the 20 Italian regions produced a satisfactory grouping of four categories. It emerged that the distribution of the elderly according to the living arrangement in Tuscany is similar to that which can be found in a wide area of the Italian territory from Lombardy to Molise. In practice all of Central Italy and all the central-eastern section of Northern Italy.

We can therefore assert, in conclusion, that Tuscany constitutes a representative sample-area, both in general and for the specific object of analyasis of Central Northern Italy.

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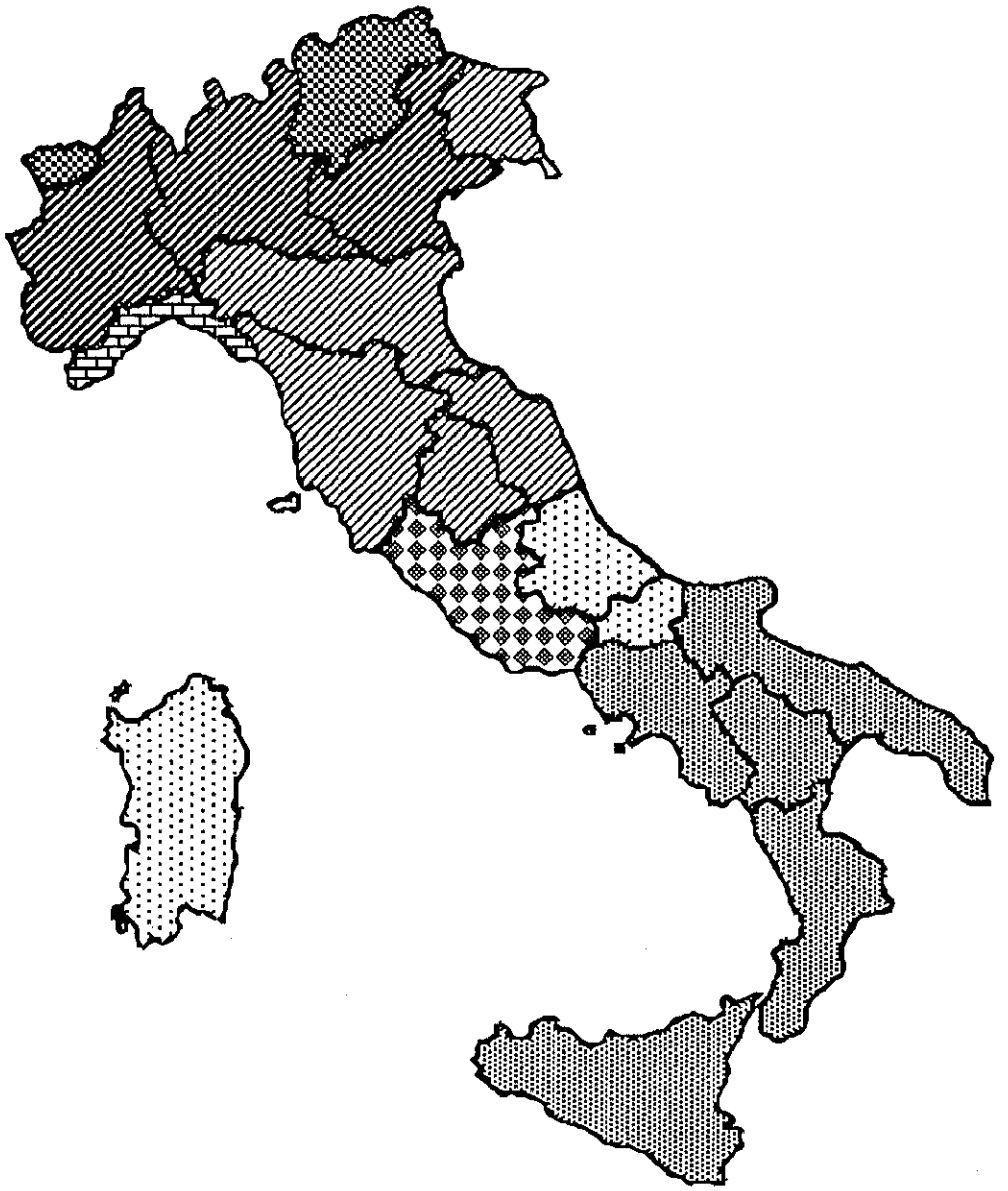
[1] Bottai M.-Bartiaux F.(1993), "Composizione familiare e mobilità delle persone anziane. Un'anali regionale" *Dipartimento di Statistica e Matematica applicata all'Economia Report n° 69*, Pisa.

ITALIAN REGIONS
SOCIO-DEMOGRAPHIC STRUCTURE



Tab. 1.4 - *Italian Regions Data*

REG	SV1	SC1	AV1	AC1	CV1	CC1	XV1	XC1	SV2	SC2	AV2	AC2	CV2	CC2	XV2	XC2	SV3	SC3	AV3	AC3	CV3	CC3	XV3	XC3
PIE	202	420	45	206	34	6	66	20	331	346	44	97	84	13	73	11	393	179	67	40	216	14	87	4
VAO	298	391	51	181	28	0	51	0	303	380	49	134	56	0	63	14	340	140	60	60	220	0	180	0
LIG	229	408	43	209	22	4	67	19	373	359	50	81	49	7	72	9	451	195	81	31	159	8	69	6
LOM	190	375	59	250	35	7	65	18	300	320	62	108	104	14	81	11	362	139	92	44	260	15	87	3
TAA	203	272	73	329	30	6	70	17	297	265	86	144	74	16	109	10	303	189	99	87	195	25	99	3
VEN	132	336	57	315	52	12	75	23	220	282	67	135	157	33	94	12	250	125	96	47	330	33	116	3
FVG	190	384	57	233	42	10	68	17	297	312	54	89	122	23	88	15	312	180	87	43	256	14	103	3
EMR	148	416	41	251	39	15	67	23	229	348	52	124	130	36	70	10	289	166	88	53	299	28	74	3
MAR	110	375	32	290	64	42	60	26	177	316	40	125	169	77	83	13	254	137	56	55	333	58	99	9
TOS	130	414	36	254	48	21	66	32	214	343	49	130	127	46	74	16	263	153	79	64	302	51	82	6
UMB	111	398	41	274	66	34	47	29	195	314	45	138	157	70	64	18	256	158	43	59	336	41	103	5
LAZ	157	391	49	269	37	13	65	19	239	378	52	98	108	19	89	16	297	192	67	37	281	17	99	10
ABR	142	403	35	255	50	28	61	26	227	341	42	108	131	55	79	17	292	190	79	29	285	47	65	14
MOL	134	464	33	251	32	19	41	27	236	446	43	75	104	24	65	8	357	181	11	66	280	33	71	0
CAM	144	329	59	343	21	7	84	13	267	362	59	127	61	12	104	9	396	171	73	56	171	4	125	4
PUG	138	373	53	340	16	5	65	12	261	404	63	143	49	9	64	7	402	207	106	52	135	12	83	3
BAS	135	421	47	296	23	13	49	17	266	421	47	133	55	9	52	16	398	176	74	59	207	8	70	8
CAL	164	362	51	320	23	6	64	10	262	404	50	123	61	10	78	12	422	230	69	70	119	5	78	6
SIC	159	373	54	319	18	4	58	14	283	390	63	132	44	8	67	13	409	229	81	54	140	11	69	7
SAR	148	232	77	410	20	3	91	18	244	280	85	228	60	5	90	7	284	168	155	84	200	7	94	8

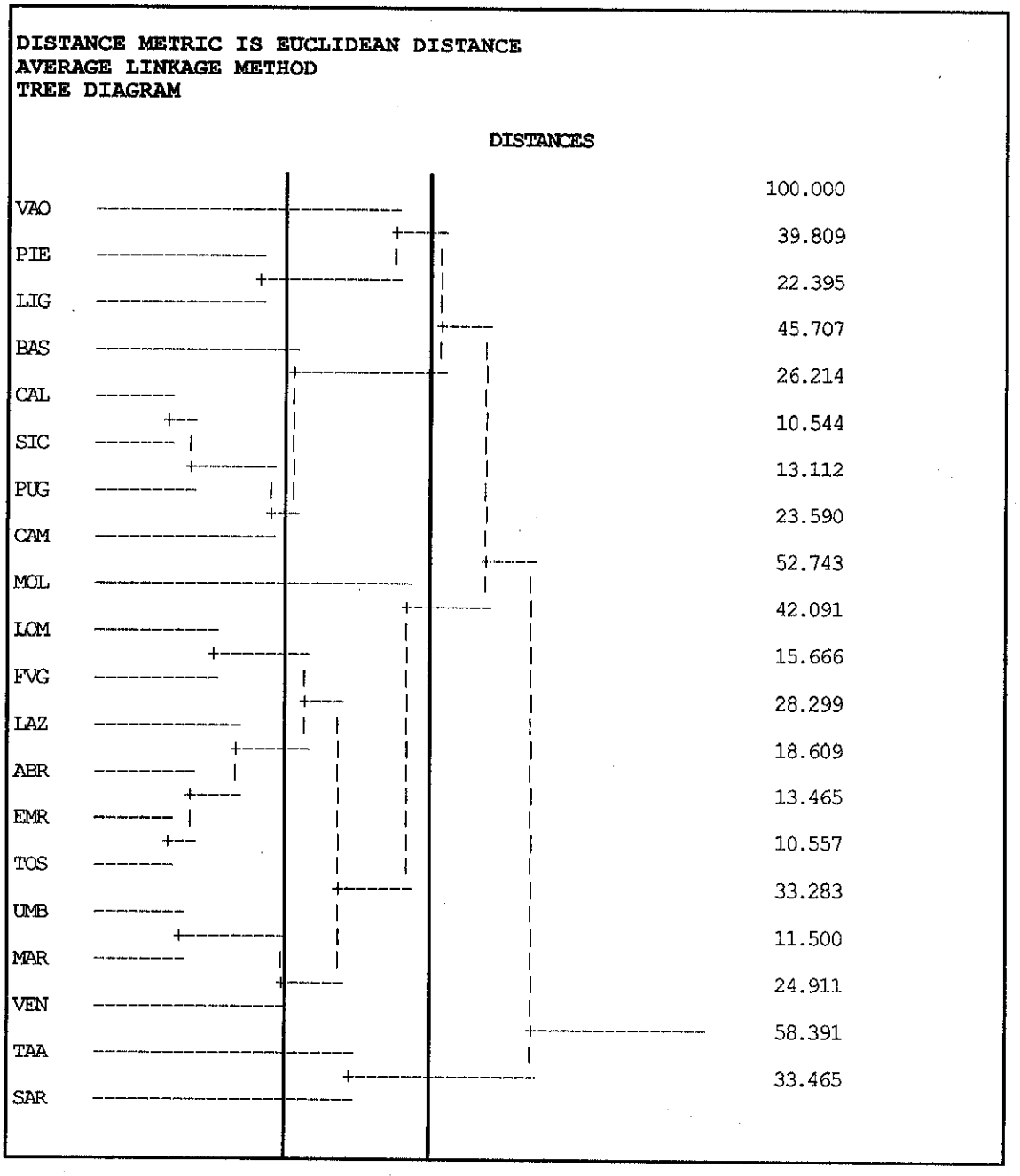
Legend:

1st label
S= without children or others
A=with children(child)
C=at children's(child's) home
X=at or with others

2nd label
V= without spouse
C=with spouse

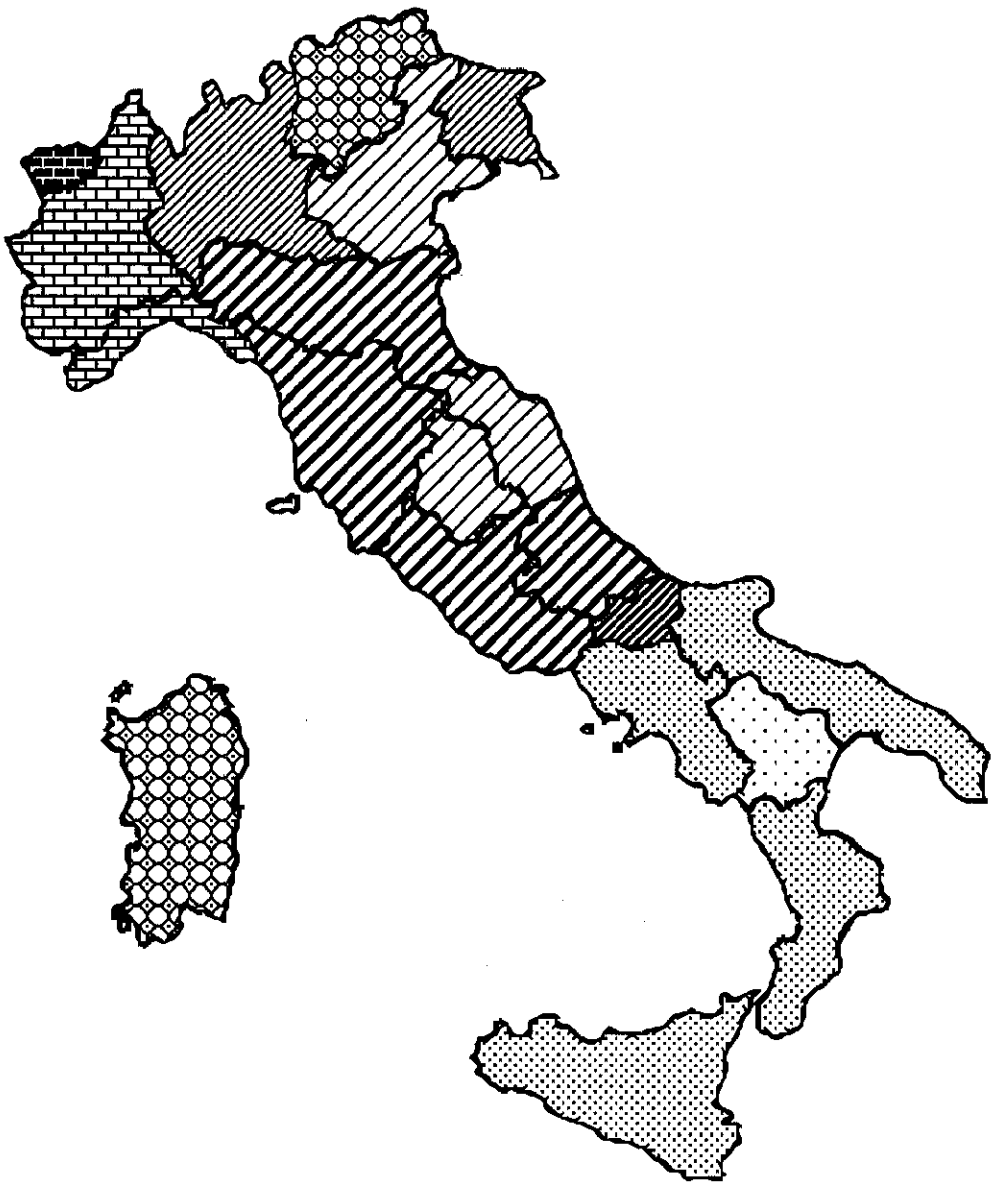
3rd label
1=60-70 yrs
2=70-80 yrs
3=80 and +

Fig.1.2 - *Dendrogram of the regions affinity*



Fonte: Bottai Marco - Bartiaux Françoise (1993)

ITALIAN REGIONS
CLUSTER ELDERLY LIVING ARRANGEMENT



1.2 Territorial stratification of the sample

As we have already indicated, with effective ends, it was useful to determine within the 111 municipalities which constituted the area of the survey homogeneous groups of municipalities with the double purpose of checking the environmental variability of behaviour and of living arrangements of the elderly, proportionally stratifying the interviews among groups of municipalities, and of reducing the number of municipalities involved in the survey, with obvious economy.

For the grouping of the municipalities, once again we resorted to the Cluster Analysis. For this purpose we collected 8 variables of a demographic and socio-economic nature: demographic potential, resident population according to the 1991 census, rate of variation of the population resident in the period between censuses 1981-91. percentage of elderly of the population, percentage of graduates, people employed in agriculture, people employed in the secondary and in the tertiary in percent.

If groups of similar municipalities exist and if the similarity is great it is legitimate to consider fungible the municipalities belonging to the same cluster and we have the advantage of being able to concentrate the survey on a limited number of municipalities.

The variables to use for the above mentioned classification were the geographical-urbanistic nature and the socio-economical nature (see Tab. 1.5).

It is clear that we cannot expect it to be all the variables which influence the family arrangement of the elderly, but they are however - among the more incisive ones - available in the official data.

The demographical dimension identified with the resident population according to the 1991 census (POP_91) couldn't not be considered, seeing as the web of family and social relationships, the housing and the demographical and socio-economical structure of the urban population are without doubt different from those of the rural population and of the smaller localities. Neverthless the resident population is, in our opinion, an unsatisfactory measure of the position and of the geographical role of the localities. A complementary indicator can be the demographic potential (POTENZ). By demographic potential (W_i) of the locality (i) of an urban system we mean a measure of the centrality obtained as follows:

$$W_i = P_i + \Sigma_{i \neq j} P_j * d_{ij}^{-\alpha}$$

where P_j is the resident population of the locality j and d_{ij} is the distance between i and j. The distance between locality i and all other localities of the system is measured in road-distances in km. The exponent α, which in the classical theory of gravitation is placed equal to 2, altering the theory of astronomical physics, here it has been estimated from the commuter flows for work in Tuscany in 1.12.

Tab 1.5 - *Variables adopted for the cluster analysis. Absolute data.*

MUNICIPALITY	POTENZ	POP_91	INC81_91	ANZ_PER	PER_LAU	ADD_AGR	ADD3	ADD2
Aulla	55409	10132	-2.700	18.0	1.4	5.1	45.5	49.4
Bagnone	39488	2250	-12.500	30.4	2.3	14.8	42.6	42.6
Carrara	130215	65945	-4.000	15.5	2.7	0.8	49.8	49.4
Casola in Lunigiana	36974	1340	-13.600	28.2	1.2	11.6	43.7	44.7
Comano	34876	861	-10.900	27.1	1.2	27.3	39.6	33.1
Filattiera	40279	2579	-6.700	24.8	0.8	13.1	49.1	37.8
Fivizzano	48663	10150	-1.300	23.2	1.1	12.5	42.3	45.2
Fosdinovo	55885	3907	-12.500	20.5	1.3	9.5	43.6	46.9
Licciana Nardi	43273	4426	-0.700	21.1	1.1	10.1	38.8	51.1
Massa	134675	65287	-0.600	12.3	2.5	2.2	46.9	50.9
Montignoso	103401	9043	3.500	12.2	1.6	2.2	44.0	53.8
Mulazzo	37210	2636	-9.100	25.2	0.7	13.8	39.3	46.9
Podenzana	46469	1661	19.300	23.3	0.6	3.8	38.2	58.0
Pontremoli	45694	8553	-15.400	25.7	2.9	7.9	55.7	36.4
Tresana	45144	2171	-3.300	30.2	1.1	12.3	38.5	49.2
Villafranca	44193	4735	5.300	20.8	1.8	5.9	48.2	45.9
Zeri	31068	1566	-12.700	28.1	0.6	30.9	38.2	30.9
Altopascio	114476	9976	4.100	16.9	1.0	8.8	31.7	59.5

Bagni di Lucca	67276	7323	-9.100	23.2	1.0	7.5	32.8	59.7
Barga	59589	10214	-5.700	20.0	1.8	5.0	37.5	57.5
Borgo a Mozzano	67825	7585	-2.100	17.4	1.0	6.7	28.7	64.6
Camaiore	100325	30275	-1.600	15.2	1.8	9.5	44.1	46.4
Camporgiano	43690	2460	-6.700	18.5	1.7	9.9	35.3	54.8
Capannori	143995	43042	-2.300	17.6	1.1	7.3	30.7	62.0
Careggine	39065	751	-11.000	18.0	0.6	15.6	22.1	62.3
Castelnuovo Garfagnana	53091	6319	-1.000	15.7	2.1	3.2	46.6	50.2
Castiglione	45108	2014	-4.500	21.2	0.9	18.0	32.9	49.1
Coreglia A.	52197	4753	-5.200	20.0	0.8	7.8	26.6	65.6
Fabbriche di	48412	591	-13.000	25.8	0.6	24.8	19.0	56.2
Forte dei Marmi	79743	9456	-8.400	16.0	3.2	2.5	60.6	36.9
Fosciandora	44633	688	-5.900	19.0	0.5	19.3	28.9	51.8
Gallicano	55810	3899	-5.500	19.7	0.7	4.4	28.2	67.4
Giuncugnano	37064	586	-9.800	25.2	1.2	29.6	32.0	38.4
Lucca	179383	86188	-5.500	17.8	3.4	3.6	53.7	42.7
Massarosa	95126	18876	6.100	15.2	0.8	7.7	35.3	57.0
Minucciano	38020	2670	-6.700	19.7	0.6	4.9	35.0	60.1
Molazzana	49214	1257	-10.700	20.0	0.9	15.4	24.3	60.3
Montecarlo	93948	4065	11.200	17.1	1.1	20.6	28.6	50.8
Pescaglia	59036	3764	-1.600	22.8	0.9	13.2	25.9	60.9
Piazza al Serchio	41592	2669	0.000	15.4	0.9	6.2	37.3	56.5
Pietrasanta	97311	24723	-2.600	16.2	2.1	4.5	45.7	49.8
Pieve Fosciа	48682	2431	-2.800	18.5	1.4	9.9	34.7	55.4
Porcari	105748	6816	1.700	15.0	1.0	5.7	29.3	65.0
S.Romano G	42132	1409	-2.200	20.7	1.1	9.1	35.7	55.2
Seravezza	80010	12641	-3.000	16.3	1.1	2.1	41.3	56.6
Sillano	36671	792	-10.100	27.0	0.8	18.7	39.0	42.3
Stazzema	58863	3637	-12.300	20.4	0.7	6.3	30.7	63.0
Vagli di sotto	38437	1334	-8.600	16.5	0.7	7.1	25.4	67.5
Vergemoli	45700	461	-18.000	25.4	1.1	17.8	38.4	43.8
Viareggio	134020	57099	-2.000	16.2	3.3	4.8	57.5	37.7
Villa Basili	72309	2029	-6.300	20.9	0.8	10.5	24.2	65.3
Villa Collem	42843	1351	-1.100	22.0	1.1	20.5	28.8	50.7
Bientina	94688	5293	7.800	15.9	1.3	5.8	26.3	67.9
Buti	85584	5206	-0.400	16.7	0.9	7.1	27.1	65.8
Calci	86149	5498	8.800	18.7	2.9	6.3	45.6	48.1
Calcinaia	97793	8103	12.600	16.7	0.9	1.9	28.6	69.5
Capannoli	75890	4937	2.800	15.8	0.9	6.6	27.1	66.3
Casale Mar.	49817	923	-1.500	21.2	2.0	21.4	36.7	41.9
Casciana T.	69261	3233	3.300	19.0	1.3	12.2	41.2	46.6
Cascina	117432	36006	1.600	16.8	1.5	4.0	37.5	58.5
Castelf. di	101556	10547	-2.100	16.1	0.8	5.1	21.8	73.1
Castellina M	59776	1808	-0.900	18.7	1.2	18.3	31.3	50.4
Castelnuovo Val di C.	44240	2617	-9.700	24.4	1.2	11.9	30.0	58.1
Chianni	64040	1612	-7.200	23.4	1.4	23.5	22.6	53.9
Crespina	72700	3237	1.600	17.7	1.7	19.4	28.1	52.5
Fauglia	73585	2871	10.300	19.2	2.1	17.1	35.9	47.0
Guardistallo	48695	938	-6.400	22.0	1.2	19.2	32.2	48.6
Lajatico	62192	1475	-7.000	24.2	0.9	26.2	29.6	44.2
Lari	74660	7693	5.200	19.8	1.2	11.8	28.2	60.0
Lorenzana	68926	1030	9.800	20.4	0.6	18.9	28.9	52.2
Montecatini Val di C.	52092	2171	-9.100	20.6	0.9	26.2	32.7	41.1
Montescudaio	49308	1367	12.800	21.5	2.0	25.4	30.5	44.1
Monteverdi M	39629	758	-10.500	23.0	1.3	23.0	30.0	47.0
Montopoli V.	90772	8782	-0.700	14.9	0.9	3.8	21.7	74.5
Orciano P.	67861	568	-3.400	17.7	0.2	30.5	21.0	48.5
Palaia	71002	4271	-7.500	20.0	1.3	11.4	27.0	61.6
Peccioli	70451	5012	-6.100	18.5	1.0	16.6	22.0	61.4
Pisa	178952	98006	-6.200	16.4	7.2	1.8	65.3	32.9
Pomarance	51892	7060	-7.900	21.1	1.2	10.7	25.4	63.9
Ponsacco	90775	12115	3.500	14.3	1.3	3.2	30.3	66.5
Pontedera	110491	26335	-6.000	15.2	2.7	2.6	42.5	54.9
Riparbella	52985	1319	-3.900	19.9	1.2	29.1	27.9	43.0
S.Giuliano T	114614	27999	4.900	16.0	2.2	6.3	50.8	42.9

S.Miniato	107901	25124	0.500	16.4	1.5	6.1	28.6	65.3
S.Croce sull'arno	105438	12335	-2.200	13.9	1.0	1.7	28.1	70.2
S.Luce	70678	1456	0.300	21.9	1.1	36.8	23.5	39.7
S.Maria a M.	94278	10384	0.000	15.2	0.6	5.5	18.5	76.0
Terricciola	73725	3800	-2.000	19.8	0.9	19.9	24.0	56.1
Vecchiano	98478	10412	7.600	18.0	1.2	7.9	44.7	47.4
Vicopisano	94630	7579	2.900	18.3	1.1	4.3	31.3	64.4
Volterra	67616	12885	-8.700	20.4	1.8	8.9	49.5	41.6
Bibbona	50928	2794	5.400	16.6	0.7	25.0	34.6	40.4
Campiglia M.	49748	12575	0.900	14.9	0.9	13.9	36.6	49.5
Campo nellElba	21211	4358	5.100	15.7	1.5	11.8	58.9	29.3
Capoliveri	19760	2097	-6.300	17.1	1.3	12.5	49.1	38.4
Capraia (iso)	3863	263	-33.400	7.3	2.8	2.4	71.9	25.7
Castagneto C.	49622	8166	-0.900	18.4	1.1	27.9	34.1	38.0
Cecina	76232	24565	0.900	17.6	2.1	5.5	50.4	44.1
Collesalvetti	85011	15086	5.200	14.2	1.3	6.0	46.9	47.1
Livorno	228488	167445	-4.700	15.5	3.6	1.1	64.2	34.7
Marciana	18732	2259	-2.000	22.5	1.3	14.3	43.4	42.3
Marciana M.	19063	1958	0.200	18.2	1.5	11.6	59.6	28.8
Piombino	72198	36527	-7.300	17.0	2.3	4.3	40.5	55.2
Porto Azzurro	20750	3089	0.500	14.9	1.8	8.7	65.0	26.3
Portoferraio	28838	11050	1.900	17.9	2.3	4.5	64.7	30.8
Rio Marina	18802	2041	-11.900	24.4	0.9	1.4	43.8	54.8
Rio nellElba	18252	870	-4.100	29.2	1.7	3.0	51.3	45.7
Rosignano M.	88656	29830	-0.500	17.3	2.0	6.2	40.1	53.7
S.Vincenzo	49428	7091	-6.20	16.4	1.4	6.5	41.3	52.2
Sassetta	40650	533	-8.90	24.8	1.0	19.0	36.2	44.8
Suvereto	40149	3057	-3.70	17.3	1.1	20.9	29.9	49.2

The demographical potential is therefore a measure of the centrality/accessibility of a center within the urban system, in that, for example, small localities situated in suburban areas have a much higher potential than their dimension in terms of population.

The demographic dynamics, gathered by means of rate of variation of the resident population during the period between censuses 1981 and 1991 (INC81_91), wants to differentiate, above all, vital localities from localities in demographic involution or even undergoing depopulation. It is obvious in fact that the livelier localities are also those which have aged less, with a higher rate of foreigners and the most mobile. The relative elderly population will therefore have a different history, probably a different family network and different existential perspectives.

A complementary aspect is taken into consideration by means of the percentage of the elderly in the population (ANZ_PER). We presume that where the incidence of the elderly is relevant, their social arrangement and their possibility of creating relationships of friendship and solidarity is larger than for those who live in the younger and more dynamic areas.

The percentage of graduates (PER_LAU) is a variable which has been adopted with the conviction that the kind of lifestyle changes with the educational level both at the individual level and at the social environmental one. The percentage of graduates acts as an indicator both of the level of education of the resident population and of other variables for which the official data available is not in the least reliable, such as the professional level and the income.

The latter in particular is a variable which is required in almost all economic and social studies, but which, unfortunately, in Italian statistics cannot even be considered an indicator because of the high tax evasion and the large differences in evasion according to category of income.

The last three variables used for the cluster (ADD_AGR, ADD2, ADD3) refer to the structure of the resident population according to sector of activity, respectively: agriculture, industry and tertiary. It is superfluous to talk at length and to explain the importance of the economical structure of the localities when marking a specific kind of lifestyle of the residents in general and also of the elderly population.

Conscious of the fact that the set of variables inserted is debatable and certainly not exhaustive with the aim of characterizing the localities, we have proceeded to choosing the method and the technique of the cluster analysis and the determination of the groups of localities. The variables adopted are not too strongly correlated to make us think of redundancies. Even the relevant correlation between the population up to 1991 (POP-91) and the potential (POTENZ) is

not, in our opinion, proof enough of the redundancies of one or the other.

In first place the variables have been standardized. This allows, in the presence of variables measured on different scales, all the variables to contribute with an analogous weight to the grouping of the unity of analysis.

The choice of the method of cluster isn't easy because there are at least four fundamental methods (hierarchical and non hierarchical, agglomerative and divisive) and within these there are several techniques. In general when the number of variables and the number of objects to be classified are not small, the application of the different techniques of analysis is a kind of testing if there really are natural categories or groups homogeneous enough within them and heterogenous among themselves in the set of elements to be classified.

We have chosen to use both an agglomerative hierarchical technique (Ward method) and a non hierarchical technique (k.means per 7 groups). The result is perfectly compatible, in that they stop the process of the first analysis after 104 passages the remaining 7 groups are made up of exactly the same municipalities of those which are obtained in the second analysis. (Tab 1.6)

Tab. 1.6 - *Cluster of the municipalities of the area in 7 groups with the k.means method.*

SUMMARY STATISTICS FOR 7 CLUSTERS

VARIABLE	BETWEEN SS	DF	WITHIN SS	DF	F-RATIO	PROB
POTENZ	64.051	6	42.647	104	26.033	0.000
POP_91	95.078	6	14.837	104	111.078	0.000
INC81_91	20.032	6	62.562	104	5.550	0.000
ANZ_PER	65.039	6	35.480	104	31.774	0.000
PER_LAU	80.905	6	25.978	104	53.983	0.000
ADD_AGR	79.464	6	32.363	104	42.560	0.000
ADD3	74.373	6	27.317	104	47.191	0.000
ADD2	67.455	6	37.125	104	31.494	0.000

CLUSTER NUMBER: 1

MEMBERS		STATISTICS				
CASE	DISTANCE	VARIABLE	MINIMUM	MEAN	MAXIMUM	ST.DEV.
Livorno	0.00	POTENZ	4.47	4.47	4.47	0.00
		POP_91	6.96	6.96	6.96	0.00
		INC81_91	-0.25	-0.25	-0.25	0.00
		ANZ_PER	-0.94	-0.94	-0.94	0.00
		PER_LAU	2.48	2.48	2.48	0.00
		ADD_AGR	-1.26	-1.26	-1.26	0.00
		ADD3	2.34	2.34	2.34	0.00
		ADD2	-1.48	-1.48	-1.48	0.00

CLUSTER NUMBER: 2

MEMBERS		STATISTICS				
CASE	DISTANCE	VARIABLE	MINIMUM	MEAN	MAXIMUM	ST.DEV.
Pisa	0.00	POTENZ	3.10	3.10	3.10	0.00
		POP_91	3.86	3.86	3.86	0.00
		INC81_91	-0.46	-0.46	-0.46	0.00
		ANZ_PER	-0.72	-0.72	-0.72	0.00
		PER_LAU	6.57	6.57	6.57	0.00
		ADD_AGR	-1.18	-1.18	-1.18	0.00
		ADD3	2.44	2.44	2.44	0.00
		ADD2	-1.65	-1.65	-1.65	0.00

CLUSTER NUMBER: 3

MEMBERS		STATISTICS				
CASE	DISTANCE	VARIABLE	MINIMUM	MEAN	MAXIMUM	ST.DEV.
Carrara	0.19	POTENZ	1.20	1.95	3.11	0.63
Massa	0.39	POP_91	0.66	2.17	3.33	0.87
Lucca	0.68	INC81_91	-0.43	-0.10	0.32	0.29
Viareggio	0.43	ANZ_PER	-1.72	-0.96	-0.37	0.44
Pontedera	0.70	PER_LAU	1.23	1.70	2.25	0.41
		ADD_AGR	-1.30	-1.06	-0.81	0.16
		ADD3	0.45	1.11	1.76	0.46
		ADD2	-1.21	-0.36	0.34	0.55

CLUSTER NUMBER: **4**

MEMBERS		STATISTICS				
CASE	DISTANCE	VARIABLE	MINIMUM	MEAN	MAXIMUM	ST.DEV.
Aulla	0.35	POTENZ	-1.34	-0.04	1.31	0.82
Montignoso	0.72	POP_91	-0.43	0.07	1.11	0.47
Villafranca	0.50	INC81_91	-0.80	0.42	1.63	0.70
Camaiore	0.51	ANZ_PER	-1.74	-0.59	0.36	0.47
Castelnuovo	0.35	PER_LAU	-0.25	0.50	2.02	0.58
Forte dei Ma	0.84	ADD_AGR	-1.13	-0.56	0.12	0.37
Pietrasanta	0.47	ADD3	0.24	1.04	2.41	0.66
Calci	0.68	ADD2	-2.24	-0.66	0.37	0.76
Casciana T.	0.50					
S.Giuliano T	0.61					
Vecchiano	0.59					
Volterra	0.54					
Campo nellEl	0.81					
Capoliveri	0.69					
Cecina	0.25					
Collesalvett	0.47					
Marciana M.	0.81					
Piombino	0.72					
Porto Azzurr	0.90					
Portoferraio	0.77					
Rosignano M.	0.55					
S.Vincenzo	0.55					

CLUSTER NUMBER: **5**

MEMBERS		STATISTICS				
CASE	DISTANCE	VARIABLE	MINIMUM	MEAN	MAXIMUM	ST.DEV.
Licciana Nar	0.63	POTENZ	-0.82	0.19	2.13	0.73
Altopascio	0.52	POP_91	-0.49	-0.13	1.40	0.39
Bagni di Luc	0.59	INC81_91	-1.30	0.12	2.15	0.75
Barga	0.53	ANZ_PER	-1.33	-0.34	0.95	0.59
Borgo a M.	0.11	PER_LAU	-0.94	-0.45	0.43	0.32
Camporgiano	0.57	ADD_AGR	-1.19	-0.46	0.62	0.46
Capannori	0.88	ADD3	-1.65	-0.67	0.34	0.47
Careggine	0.73	ADD2	-0.15	1.04	2.25	0.53
Coreglia A.	0.36					
Gallicano	0.39					
Massarosa	0.60					
Minucciano	0.54					
Mocazzana	0.66					
Pescaglia	0.53					
Piazza al Se	0.52					
Pieve Foscia	0.43					
Porcari	0.46					
S.Romano G.	0.51					
Seravezza	0.50					
Stazzema	0.59					
Vagli di sot	0.56					
Villa Basili	0.42					
Bientina	0.61					
Buti	0.23					
Calcinaia	0.83					
Capannoli	0.35					
Cascina	0.74					
Castelf. di	0.54					
Lari	0.44					
Montopoli V.	0.58					
Palaia	0.39					
Peccioli	0.50					
Pomarance	0.50					
Ponsacco	0.52					
S.Miniato	0.51					
S.Croce sull	0.59					

S.Maria a M.	0.67						
Vicopisano	0.36						
Campiglia M.	0.67						

CLUSTER NUMBER: 6

MEMBERS		STATISTICS				
CASE	DISTANCE	VARIABLE	MINIMUM	MEAN	MAXIMUM	ST.DEV.
Podenzana	0.00	POTENZ	-0.84	-0.30	0.74	0.37
Castiglione	0.34	POP_91	-0.49	-0.43	-0.15	0.07
Fabbriche di	0.87	INC81_91	-1.40	0.18	2.18	0.93
Fosciandora	0.44	ANZ_PER	-0.67	0.30	1.58	0.59
Giuncugnano	0.72	PER_LAU	-1.39	-0.34	0.77	0.51
Montecarlo	0.81	ADD_AGR	0.68	1.44	3.07	0.56
Villa Collem	0.25	ADD3	-1.61	-0.70	-0.06	0.38
Casale Mar.	0.47	ADD2	-1.18	-0.35	0.46	0.47
Castellina M	0.30					
Chianni	0.49					
Crespina	0.47					
Fauglia	0.81					
Guardistallo	0.35					
Lajatico	0.45					
Lorenzana	0.66					
Montecatini	0.46					
Montescudaio	0.81					
Monteverdi M	0.52					
Orciano P.	0.62					
Riparbella	0.31					
S.Luce	0.68					
Terricciola	0.41					
Bibbona	0.59					
Capraia (iso	0.00					
Castagneto C	0.44					
Suvereto	0.36					

CLUSTER NUMBER: 7

MEMBERS		STATISTICS				
CASE	DISTANCE	VARIABLE	MINIMUM	MEAN	MAXIMUM	ST.DEV.
Bagnone	0.59	POTENZ	-1.37	-0.83	-0.32	0.29
Casola Lun.	0.30	POP_91	-0.50	-0.40	-0.07	0.12
Comano	0.68	INC81_91	-2.10	-0.93	0.22	0.64
Filattiera	0.39	ANZ_PER	0.29	1.62	2.71	0.64
Fivizzano	0.51	PER_LAU	-0.94	-0.20	1.68	0.64
Fosdinovo	0.57	ADD_AGR	-1.23	0.32	2.36	0.87
Mulazzo	0.26	ADD3	-0.64	0.41	1.60	0.51
Pontremoli	0.92	ADD2	-1.83	-0.66	0.63	0.60
Tresana	0.54					
Zeri	0.91					
Sillano	0.30					
Vergemoli	0.47					
Castelnuovo V.C.	0.61					
Marciana	0.52					
Rio Marina	0.71					
Rio nellElba	0.73					
Sassetta	0.32					

Due to space requirements we are not presenting here the dendrogram of the hierarchical cluster but only the K.means result.

The value of the F-test is such for each of the variable used that the probability that the variance is distributed in a casual way both in and outside the group is practically nil, not noticeable within the third decimal figure. The F test is anyway variable as evidence of a different importance of each variable in the formation of the groups, or, in other words, of the different internal homogeneity and external heterogeneity of the groups in terms of the different variables.

In particular we can point out that the variable "demographic dimension of the municipalities (POP_91)" is well distributed outside the groups, or in other terms the groups are

very homogeneous from the point of view of this variable.

On the contrary the dynamic of the population (INC81_91) between the last two censuses is not very discriminating, this bear witness the fact that the demographic variation is poorly correlated to the variables linked to the dimensions of the municipalities and to those relative to the socio-economic structure.

The 7 resulting groups were quite characterized also for those who have a direct knowledge of the territory, (see Fig. 1.3).

The first two groups are made up of one single municipality each: they are the two largest municipalities Livorno and Pisa. As well as by the population (almost 170 thousand inhabitants in Livorno, 100 thousand in Pisa) and the centrality of the urban system, they are distinguished by a very strong economic specialization in the tertiary sector and by the high (particularly for the Pisan population) level of education.

The third group is made up of the other 5 urban municipalities in which we can find all the characteristics of the first two groups but in an attenuated form: demographic volume, centrality, level of education, importance of the tertiary sector. We can therefore define it the group of medium to large urban municipalities.

The following two groups include 22 and 39 comunities respectively. They are assimilable in dimension and centrality which vary around the mean values, they are infact semi-urban municipalities of medium dimensions and situated or in suburban areas or in corrispondance to the nodes of the urban system.

The reasons for the division lie in the socio-professional structure. Group 4 is made up of tertiary municipalities in which the population enjoys an above average level of education. Groups 5 instead has a less educated population and dedicated instead to industrial activities.

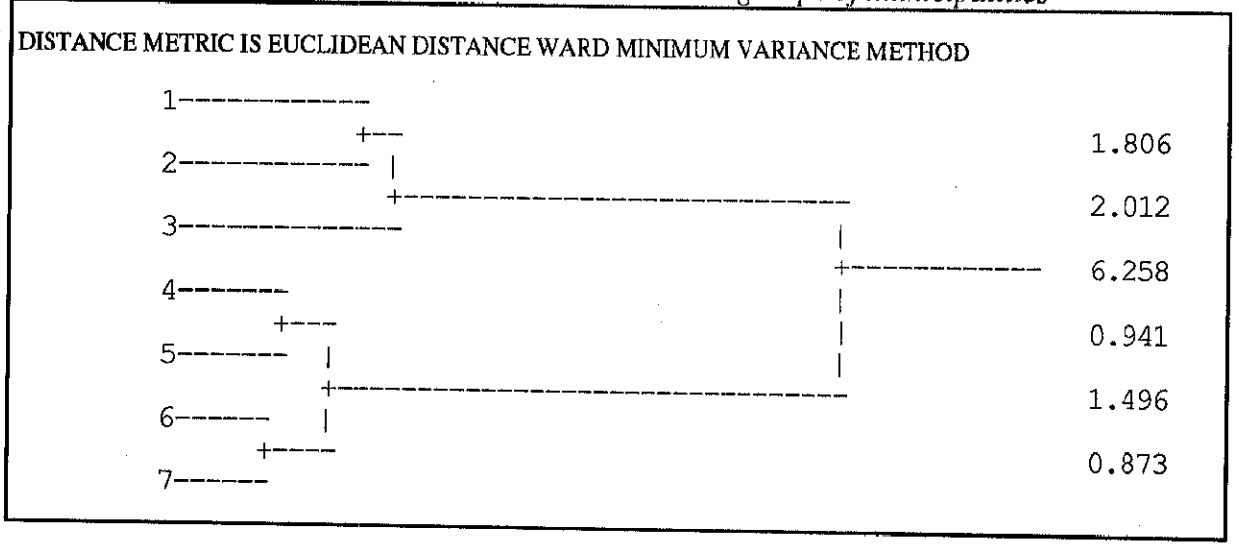
The last two groups are assimilable because they essentially bring together the small municipalities.

In group 6 we have put together all the small municipalities not too marginal in the context of the urban system and characterized by and evident agricultural vocation; the percentage of the elderly is relevant and well above average bearing witness to the strong emigration which has affected the rural areas in the recent past, while the rate of demographic variation in the last decade is above average.

But it is for the following group of municipalities (group 7) that the ageing of the residents depicts a situation of exodus of the population and the variation rate shows that the depopulation is still taking place. These are the minicipalities placed at the margins of the system and with the minimum values of the demographic potential.

The differences and the similarites among the described groups are synthesized in the upper part of the following dendrogram.

Fig. 1.3 - *Dendrogram of the similarities between the 7 groups of municipalities*



From the dendrogram we can deduce that it wouldn't be senseless to also imagine a more synthetic classification: the urban municipalities (groups 1, 2 and 3) and the non urban groups, which could be subdivided into two subcategories: that of semi-urban municipalities (groups 4 and 5) and that of rural and marginal municipalities (groups 6 and 7).

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1.3 Survey Technique

1.3.1 Sampling technique

The criteria for the stratification are actually two. One is geographical described above, the other foresees the assignation of a part of the interviews to an independent sample of elderly living in communities and taken from a number of rest-homes spread territorially and distributed qualitatively among the big and small, public and private.

Seeing at this second criterion has not been applied in a proportional way to the population, the majority of the results will be managed separately and, where it is the case of representing mean situations, we will weight. Apart from the elderly living with others drawn from the registers, which have resulted in 15, we have decided to assign another 100 interviews to rest-homes so as to have a subaggregate wide enough to allow reliable estimations of the different variables under study. This will permit us to compare the situation of the elderly lodging in collective structures and that of the elderly living with their family.

As far as the stratification on territorial base is concerned, at first we proceeded to the stratification of the interviews to be held among clusters of municipalities proportionally to the elderly population resident of each cluster (tab 1.7). At this point we choose a certain number of municipalites in each cluster on which to carry out the interviews. The choice was oriented, as well as to avoid having to include too many municipalities, in order to facilitate the material realization of the work in two ways: the first concerned the accessibility of the General Register Offices and their availability, the second, the possibility of having local points of support capable of facilitating the contact with the interviewees who we knew were mistrustful and reluctant to conceding interviews. Therefore we preferred the municipalities of residence of the interviewers or those where some kind of local authority (parishes, mayors) was prepared to guarantee the annonymity of the interview and the scientific purpose (see tab. 1.8).

In actual fact, because of a certain number of technical problems, there is a slight difference between the distribution per cluster of the foreseen interviews and those which were actually carried out. However the differences are not such as to seriously discredit the representativity of the sample. Infact χ^2 between the foreseen distribution and the one carried out is 9.178. The critical one of 6 degrees of freedom to a significativity level of 10% is 10.64 which proves that we cannot refuse the hypothesis that the sample does not differ significantly from the population.

Tab. 1.7 - *Resident Population of > 55 years of age per municipality cluster, foreseen interviews at family, rest-house, and intervirews carried out.*

Cluster	% Elderly	Interviews forseen in family	Interviews carried out in family	% Interviews carried out in family	Interviews carried out in rest-houses	Total interviews carried out
1	11.90	188	191	12.16	3	194
2	7.42	116	118	7.52	23	141
3	21.64	340	337	21.46	43	380
4	22.40	352	329	20.96	23	352
5	26.70	419	415	26.43	23	438
6	4.58	72	72	4.59	0	72
7	5.27	83	108	6.88	0	108
TOT.	100.00	1570	1570	100.00	115	1685

Tab. 1.8 - *Interviews carried out to elderlies living in family and in rest-house per municipality*

Municipality	Interviews carried out in family	% Interviews carried out in family	Interviews carried out in rest-houses	% Interviews carried out in rest-houses
TOT CL. 1	**191**	**12.16**	**3**	**2.61**
TOT CL. 2	**118**	**7.52**	**23**	**20.00**
Carrara	16	1.02	10	8.70
Massa	36	2.29	16	13.91
Lucca	103	6.56	1	0.87
Viareggio	149	9.49	15	13.04
Pontedera	33	2.10	1	0.87
TOT CL. 3	**337**	**21.46**	**43**	**37.39**
Aulla	28	1.78	0	0.00
Forte dei Marmi	54	3.44	1	0.87
Pietrasanta	0	0.00	12	10.43
Calci	25	1.59	0	0.00
San Giuliano T	137	8.73	10	8.70
Campo nell'Elba	14	0.89	0	0.00
Marciana Marin	4	0.25	0	0.00
Piombino	67	4.27	0	0.00
TOT CL. 4	**329**	**20.96**	**23**	**20.00**
Camporgiano	46	2.93	0	0.00
Seravezza	0	0.00	5	4.35
Bientina	24	1.53	0	0.00
Calcinaia	19	1.21	0	0.00
Cascina	98	6.24	17	14.78
Castelfrancosot	20	1.27	0	0.00
Lari	20	1.27	0	0.00
Pomarance	25	1.59	0	0.00
S.Miniato	55	3.50	0	0.00
Vicopisano	108	6.88	1	0.87
TOT CL. 5	**415**	**26.43**	**23**	**20.00**
Fauglia	40	2.55	0	0.00
Montecatini V.C	16	1.02	0	0.00
Capraia(isola)	6	0.38	0	0.00
Castagneto C.	10	0.64	0	0.00
TOT CL. 6	**72**	**4.59**	**0**	**0.00**
Pontremoli	35	2.23	0	0.00
Tresana	30	1.91	0	0.00
Sillano	28	1.78	0	0.00
CastelnuovoV.C	15	0.96	0	0.00
TOT CL.7	**108**	**6.88**	**0**	**0.00**
TOT	1570	100.00	115	100.00

1.3.2 Formation of the lists of elderlies to be interviewed

In each of the 33 municipalities chosen for the interview we contacted the mayor asking him for the authorisation to pick out a random sample of residents from and including 55 to 90 years of age, that is born between 1903 and 1937 from the registers, personal information included. The number of names was 2.5 times that of the foreseen interviews, since we hypothesized a strong rate of substitution due both to the impossibility of contacting the subject and to the refusal of the interview linked to the mistrust which especially elderly people have regarding strangers. The lists were divided into principle names and names of reserve and the eventual substitution took place in a sistematic way in that the reserve list was used in an ordinal

way regardless of the charactheristics of the person to be substituted and of the new interviewee. The interviewees were informed in advance with a letter in which we explained the object, purpose, period and procedure of the interview. Furthermore we tried to spread the news and win over their mistrust asking community leaders to inform and explain what had been written in the letter. All these cautions of an operative nature were necessary and if we had to repeat the operation we would resort to them in a greater measure, seeing as will be seen later on, the substitution rates were quite considerable. The difference between the readiness of the interviewees among the localities were this further work of awareness was carried out and the other localities was quite evident.

1.3.3 Selection and training of the interviewers

The extreme meagreness of our budget hasn't given us any choice on the type of interviewers to employ. There was no way of even considering professional collaborators. We have therefore involved the students attending the Statistics II, Social Statistics, Demography and Business Statistics courses which are part of the Degree in Business and Economy of the University of Pisa. Nevertheless we believe, especially in the light of the results, that students are the best kind of interviewers, since they are definitely more motivated, often more available and attentive. Furthermore it was possible to insert the survey work between the seminar activity of the students' courses, and therefore it was possible to carry out a long and attentive work of training on the object of the survey, on the nature of the questionnaire, on the difficult management of the latter and finally on the approach and behaviour to be used with the interviewee. After having followed the preparation courses on managing the questionnaire, the interviewers were called to carry out some trial interviews. We can assert without hesitation that the interviewers were extremely diligent and efficient. The only negative element of their performance is that having an obviously limited number of interviews each to carry out they haven't had time to improve the most effective technique of introducing to the interviewees and this has probably influenced the rate of refusal.

1.3.4 The questionnaire

The survey technique is the face to face interview at the home of the elderly person selected and informed in advance. The questionnaire - and this is a very innovative element - was not on paper support but on magnetic support. In short the interviewer recorded the interview directly into a personal portable computer in which the questionnaire had been inserted and was interactively available. The novelty worked as a stimulus to involve the interviewee who saw in it a sense of moderness; moreover it was obvious that there was no need of subscription on behalf of the interviewee. The questionnaire is made up of 21 groups of main questions with the aim of obtaining information on:

1) sex, date of birth, municipality of residence and other demographic variables of the interview
2) professional conditions of the interviewee
3) membership of a religious community of the interviewee
4) place of birth and nationality of the interviewee
5) main demographic variables of the interviewee's partner/spouse
6) level of education and professional conditions of the interviewee's partner
7) membership of a religious community of the interviewee's partner
8) people living with the interviewee
9) composition of the interviewee's household
10) characteristics of the interviewee's place of residence
11) interviewee's parents
12) interviewee's brothers and sisters
13) interviewee's children, grandchildren and greatgrandchildren
14) interviewee's state of health
15) interviewee's partner's state of health
16) interviewee's social participation
17) members of the interviewee's network
18) characteristics of the members of the interviewee's network
19) work history and income of the interviewee
20) interviewee's state of loneliness
21) interviewee's degree of satisfaction

CHAPTER 2

SAMPLING RESULTS

2.1 Interview Refusals

The interview refusal rate seems really high, even if we expected the elderly to be reluctant towards being interviewed.

The great difference between the interview refusal rate in the more urbanized areas (the first three clusters of municipalities) and that of the more provincial municipalities is obvious. There is a real dichotomy with refusals rate always larger than 40% in the cities and almost always less than 30% in the smaller, rural or surburban municipalities (see Tab.2.1 and Graf. 2.1).

The difference is more accentuated in the areas where the social security is less and where it is more difficult to approach and calm the interviewee through his network of acquaintances.

We could dwell on practical details not lacking in interest, like the incidence of the accomodation structure on the productivity of the contacts and on the facility of the approach with the interviewees: the indirect contacts (by telephone or intercom) facilitate the refusal, which seems more impolite when the interviewee is faced with the interviewer.

Certainly the interviewers had a different level of efficiency.

The elderly living in rest-homes have opposed less resistence to the interview in spite of the fact that on average they were older. This can be attributed to the influence that the managers of their institutes have exerted on their mistrust, having been conveniently contacted and made aware at the moment of the extraction of the names from the lists of hosts of such institutes. Here the refusal rate is a little more than a quarter and probably doesn't vary a lot from the level that can be considered physiological in the direct surveys (see Tab. 2.2).

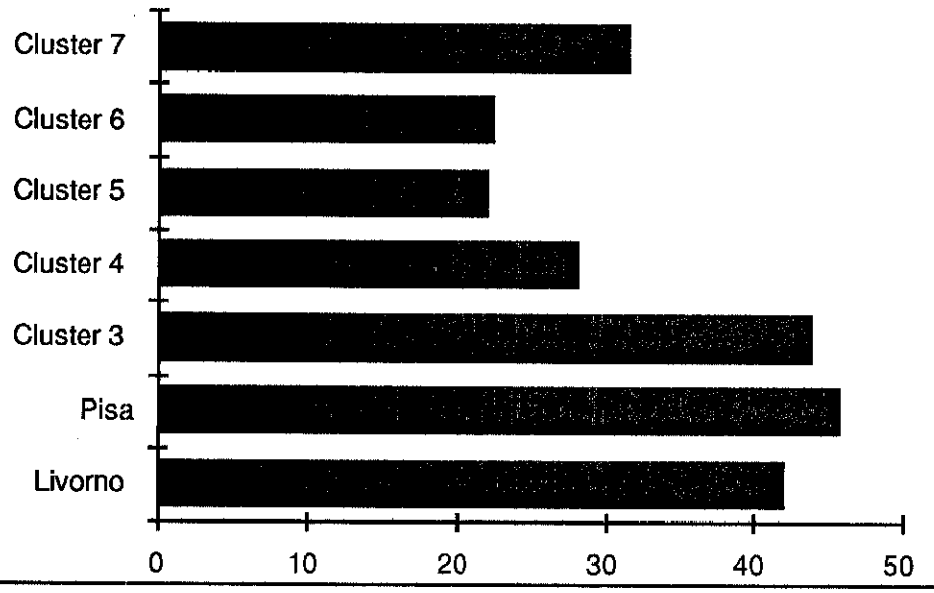
Tab 2.1 - *Interviews, refusals and refusal rate. Elderly who live with family*

Cluster	Interviews	Refusals	% Refusals / Contacts
Livorno	191	139	42.12
Pisa	118	100	45.87
Cluster 3	337	264	43.93
Cluster 4	329	130	28.32
Cluster 5	415	118	22.14
Cluster 6	72	21	22.58
Cluster 7	108	50	31.65
TOT	**1570**	**822**	**34.36**

Tab 2.2 - *Interviews, refusals refusals rate. Elderly who live in rest homes*

Cluster	Interviews	Refusals	% Refusals / Contacts
Livorno	3	0	0.00
Pisa	23	11	32.35
Cluster 3	43	10	18.87
Cluster 4	23	9	28.12
Cluster 5	23	14	37.84
Cluster 6	0	-	-
Cluster 7	0	-	-
TOT	**115**	**44**	**27.67**

GRAPH 2.1 - Refusal rate by territory
(elderly living with family)



Females, who feel weaker, are less available for the interview. In actual fact the argument is valid for elderly living with family. For those living with others it is quite the opposite and the fact can suggest hypothesises on how women are more psycologically flexible and they live their being commited to the rest homes in a less traumatic way than men.

The structure of the refusal reasons is nevertheless an interesting division between male and female psycology. Women, apart from being or declaring to be often unable because of health reasons, frequently give generic reasons; men instead often refuse because of lack of time or they allege explicit motivations of a relational type (privacy, uselessness, suspicion).

The lack of interest for the interview prevails over all the reasons, where the indifference doesn't consitute a cumulative declaration of reasons, it bears witness to a poor sensitivity towards statistics and their cognitive requirements on behalf of the Italian population and particularly of the elderly generations.

The illness refusals (see Tab. 2.3 and Graf. 2.2), which make up more than a quarter of the refusals, take on a specific importance because when analysed they shouldn't be considered refusals but impossibilities or impediments towards the interview, and it will be necessary to take them into account when the health of the elderly will be analysed. Obviously the reason of illness increases with age, from less than 10% of the total refusals for people between 55-60 years old to almost 40% of the elderly over 80 (see Tab. 2.4).

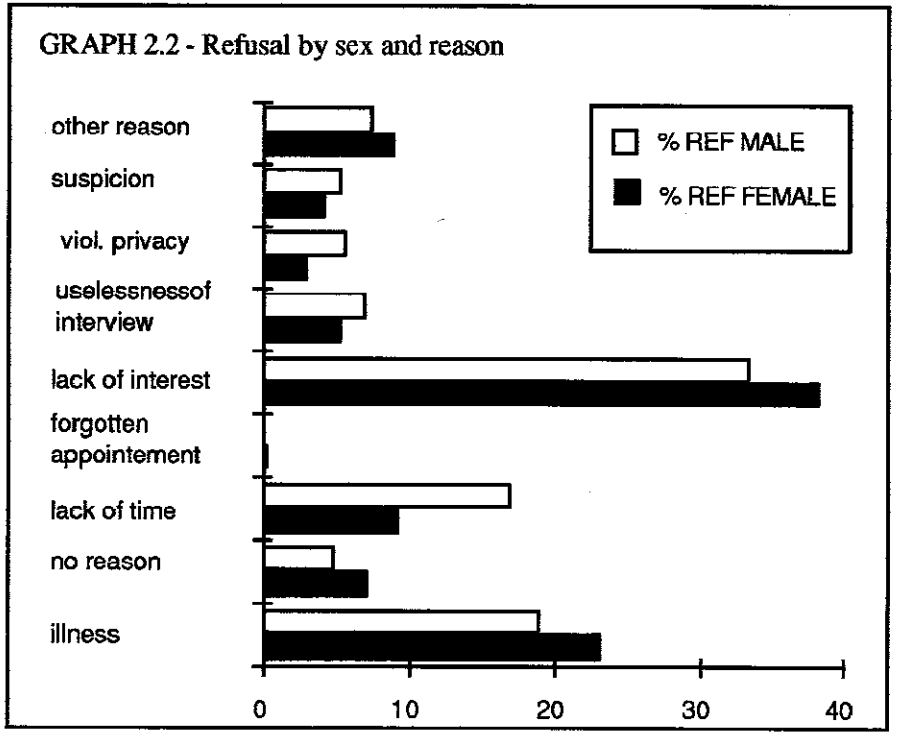
The continuous diminuition with the increase of age of the refusal percentage because of lack of time is also obvious. These refusals pass from a third to zero, with a sharp decrease in the first classes of age when there is still a relevant part of individuals in professional conditions.

In general - and this is also quite obvious - the refusal rate is tendentially on the increase with age. The trend coefficient of linear regression of 0.887 ($p=0.04$) measures the average growth of the refusal rate by year of age of the interviewee.

For a further clarification of what has been shown we present the following tables 2.5, 2.6, 2.7, and 2.8 and the graph 2.3

Tab. 2.3 - *Interviews - refusals and rate of refusals by sex and reason (elderly living with family or others)*

Reason/Sex	Female Family	Female Rest-houses	Tot. Female	% Tot. Female	Male Family	Male Rest-houses	Tot Male	% Tot Male	Tot.	% Tot
illness	102	18	120	23.3	57	10	67	19.1	187	21.6
no reason	37	0	37	7.2	17	0	17	4.8	54	6.2
lack of time	48	0	48	9.3	60	0	60	17.1	108	12.5
forgotten appointment	2	0	2	0.4	0	0	0		2	0.2
lack of interest	197	1	198	38.4	117	1	118	33.6	316	36.5
uselessness of interview	27	0	27	5.3	23	1	24	6.9	51	5.9
violation privacy	16	0	16	3.1	18	2	20	5.7	36	4.2
suspicion	19	2	21	4.1	18	1	19	5.4	40	4.6
other reason	43	3	46	8.9	21	5	26	7.4	72	8.3
total refusal	491	24	515	100.0	331	20	351	100.0	866	100.0
Interviews carried out	824	79	903	-	746	36	782	-	1685	-
refusal rate	37.33	23.3	36.32	-	30.7	35.7	30.98	-	33.95	-



Tab 2.4 - *Interviews, refusals and refusal rate by age (cohorts) and reason*

Cohorts	03-07	%	08-12	%	13-17	%	18-22	%	23-27	%	28-32	%	33-37	%	Tot.
illness	32	38.1	35	41.2	37	32.2	28	20.4	29	16.6	16	11.2	10	7.9	**187**
no reason	2	2.4	7	8.2	7	6.1	10	7.3	15	8.6	6	4.2	7	5.6	**54**
lack of time	0	-	2	2.3	9	7.8	7	5.1	23	13.1	26	18.2	41	32.5	**108**
forgotten appointment	0	-	0	-	0	-	0	-	1	0.6	1	0.7	0	-	**2**
lack of interest	32	38.1	22	25.9	37	32.2	53	38.7	68	38.8	63	44.0	41	32.5	**316**
uselessness of interview	2	2.4	8	9.4	3	2.6	10	7.3	11	6.3	10	7.0	7	5.6	**51**
violation privacy	3	2.4	1	1.2	9	7.8	7	5.1	7	4.0	6	4.2	3	2.4	**36**
suspicion	6	7.1	5	5.9	5	4.3	5	3.7	8	4.6	8	5.6	3	2.4	**40**
other reason	8	9.5	5	5.9	8	7.0	17	12.4	13	7.4	7	4.9	14	11.1	**72**
total refusal	**85**	**100.0**	**85**	**100.0**	**115**	**100.0**	**137**	**100.0**	**175**	**100.0**	**143**	**100.0**	**126**	**100.0**	**866**

Tab. 2.5 - *Interviews, refusals and refusal rate by sex and age (cohorts). Absolute values*

Cohorts	Interviews			Refusals			Refusal rate		
	Male	Female	Tot.	Male	Female	Tot.	Male	Female	Tot.
03-07	12	37	**49**	29	56	**85**	70.73	60.22	**63.43**
08-12	57	111	**168**	24	61	**85**	29.63	35.47	**33.59**
13-17	69	100	**169**	34	81	**115**	33.01	44.75	**40.49**
18-22	117	163	**280**	57	80	**137**	32.76	32.92	**32.85**
23-27	170	151	**321**	68	107	**175**	28.57	41.47	**35.28**
28-32	182	181	**363**	67	76	**143**	26.91	29.57	**28.26**
33-37	175	160	**335**	72	54	**126**	29.15	25.23	**27.33**
Tot.	**782**	**903**	**1685**	**351**	**515**	**866**	**30.98**	**36.32**	**33.95**

Tab 2.6 - *Interviews and refusals by sex and age (cohorts). Percentage values.*

Cohorts	Interviews			Refusals		
	Male	Female	Tot.	Male	Female	Tot.
03-07	1.53	4.10	2.91	8.26	10.87	9.82
08-12	7.29	12.29	9.97	6.84	11.84	9.82
13-17	8.82	11.07	10.03	9.69	15.73	13.28
18-22	14.96	18.05	16.62	16.24	15.53	15.82
23-27	21.74	16.72	19.05	19.37	20.78	20.21
28-32	23.27	20.04	21.54	19.09	14.76	16.51
33-37	22.38	17.72	19.88	20.51	10.49	14.55
Tot	100.00	100.00	100.00	100.00	100.00	100.00

Tab. 2.7 - *Interviews, refusals and refusal rate by accomodation and age (cohorts) Absolute values*

Cohorts	Interviews			Refusals			Refusal rate		
	Family	Rest-houses	Tot.	Family	Rest-houses	Tot.	Family	Rest-houses	Tot.
03-07	35	14	**49**	75	10	**85**	68.18	41.67	**63.43**
08-12	129	39	**168**	72	13	**85**	35.82	25.00	**33.59**
13-17	147	22	**169**	105	10	**115**	41.67	31.25	**40.49**
18-22	262	18	**280**	132	5	**137**	33.50	21.74	**32.85**
23-27	306	15	**321**	170	5	**175**	35.71	25.00	**35.28**
28-32	359	4	**363**	142	1	**143**	28.34	20.00	**28.26**
33-37	332	3	**335**	126	0	**126**	27.51	0.00	**27.33**
Tot.	**1570**	**115**	**1685**	**822**	**44**	**866**	**34.36**	**27.67**	**33.95**

Tab 2.8 - *Interviews and refusals by accomodation and age (cohorts). Percentage values*

Cohorts	Interviews			Refusals		
	Family	Rest-houses	Tot.	Family	Rest-houses	Tot.
03-07	2.23	12.17	**2.91**	9.12	22.73	**9.82**
08-12	8.22	33.91	**9.97**	8.76	29.55	**9.82**
13-17	9.36	19.13	**10.03**	12.77	22.73	**13.28**
18-22	16.69	15.65	**16.62**	16.06	11.36	**15.82**
23-27	19.49	13.04	**19.05**	20.68	11.36	**20.21**
28-32	22.87	3.48	**21.54**	17.27	2.27	**16.51**
33-37	21.15	2.61	**19.88**	15.33	0.00	**14.55**
Tot.	100.00	100.00	**100.00**	100.00	100.00	**100.00**

To give emphasis to the net effect of some of the variables on the success of the survey we have carried out an analysis of variance of the success of the approach to the interviewee codified in a dummy variable (1 = interview carried out, 0 = interview not carried out).

We have wanted to measure the effect of the following four variables: locality of residence of the interviewee recodified into urban and non urban, sex, age recodified into three large classes and the accomodation with family or others (see Tab. 2.9).

In the first instance we took into consideration each of the variables individually.

The variable which contributes less to explaining the variance of the success of the approach is the family accomodation, not so much because there isn't a relevant difference between the availability of the elderly living with others and those with family (in favour of the former), but because the subaggregate of the elderly living with others is too small.

Very significant results are supplied by the analysis of variance of the three remaining variables: sex, with men being less mistrustful than women; territory, with the urban elderly a lot more inclined to refusing than the non urban; age, with a large increase in the refusal rate with the increase of age.

These analyses, however, show the gross influence of single variables. To point out the net one we have used a multivariated analysis of variance, introducing the three most incisive explanatory variables.

The three variables show a very significant influence on the variable success also at the net. The interaction effect between the three explanatory variables is not negligible. While the other interaction effects are negligible, except perhaps for sex and age, because in changing the classes of age the difformity between the male and female rates refusal rates undergo slight modifications.

Tab. 2.9 - *Interviews carried out, refusals due to illness or other reasons, according to four category variables*

Territory	Sex	Accomodation	Age	Interviews	Refusals	Refusals due to illness	Refusals due to other reasons
0	0	0	1	145	91	8	83
0	0	0	2	118	69	8	61
0	0	0	3	57	50	20	30
0	0	1	1	4	1	0	1
0	0	1	2	9	3	1	2
0	0	1	3	9	7	2	5
0	1	0	1	128	75	8	67
0	1	0	2	118	120	21	99
0	1	0	3	80	98	24	74
0	1	1	1	0	0	0	0
0	1	1	2	12	2	1	1
0	1	1	3	35	8	5	3
1	0	0	1	206	47	4	43
1	0	0	2	155	51	11	40
1	0	0	3	65	23	6	17
1	0	1	1	2	0	0	0
1	0	1	2	5	2	1	1
1	0	1	3	7	7	6	1
1	1	0	1	212	55	6	49
1	1	0	2	177	62	11	51
1	1	0	3	109	81	32	49
1	1	1	1	1	0	0	0
1	1	1	2	7	3	3	0
1	1	1	3	24	11	9	2
Tot.				**1685**	**866**	**187**	**679**

Legend:
Territory: urban environment (clusters 1-2-3) = 0 non urban environment (clusters 4-5-6-7) = 1
Sex: male =0 female =1
Accomodation: family = 0 rest-houses =1
Age: cohort 28-37 = 1 cohort 18-27 = 2 cohort 03-17 = 3

If, as seems right in view of an efficiency control of the interviewers and of the organisation of the survey, we exclude the refusals due to illness from the number of refusals, the influence of the variables adopted on the refusal rate doesn't result that different (see Tab. 2.10).

It is worth underlining how age is a variable which influences less significantly. In other words, the refusal rate seems to increase with age also because the risk of not being available because of illness increases.

Tab. 2.10 - *Analysis of variance of success of contact with the interviewee (excluding refusals due to illness) Category variables reclassified*

LEVELS ENCOUNTERED DURING PROCESSING ARE:
TERRITOR
SEX
AGE

ANALYSIS OF VARIANCE

SOURCE	SUM-OF-SQUARES	DF	MEAN-SQUARE	F-RATIO	P
TERRITOR	13.653	1	13.653	69.113	0.000
SEX	0.899	1	0.899	4.550	0.033
AGE	0.692	2	0.346	1.751	0.174
TERRITOR *SEX	0.018	1	0.018	0.091	0.763
TERRITOR*AGE	0.139	2	0.070	0.352	0.703
SEX*AGE	0.528	2	0.264	1.336	0.263
TERRITOR *SEX*AGE	0.476	2	0.238	1.206	0.300
ERROR	464.622	2352	0.198		

LEAST SQUARES MEANS.

			LS MEAN	SE	N
TERRITOR	=	0.000	0.630	0.014	1141
TERRITOR	=	1.000	0.791	0.014	1223
SEX	=	0.000	0.731	0.015	1066
SEX	=	1.000	0.690	0.012	1298
AGE	=	1.000	0.734	0.015	941
AGE	=	2.000	0.703	0.015	856
AGE	=	3.000	0.694	0.020	567
TERRITOR	=	0.000			
SEX	=	0.000	0.654	0.021	524
TERRITOR	=	0.000			
SEX	=	1.000	0.607	0.018	617
TERRITOR	=	1.000			
SEX	=	0.000	0.808	0.021	542
TERRITOR	=	1.000			
SEX	=	1.000	0.773	0.017	681
TERRITOR	=	0.000			
AGE	=	1.000	0.648	0.022	428
TERRITOR	=	0.000			
AGE	=	2.000	0.617	0.022	420
TERRITOR	=	0.000			
AGE	=	3.000	0.626	0.027	293
TERRITOR	=	1.000			
AGE	=	1.000	0.821	0.020	513
TERRITOR	=	1.000			
AGE	=	2.000	0.789	0.021	436
TERRITOR	=	1.000			
AGE	=	3.000	0.761	0.029	274
SEX	=	0.000			
AGE	=	1.000	0.734	0.020	484
SEX	=	0.000			
AGE	=	2.000	0.732	0.022	391
SEX	=	0.000			
AGE	=	3.000	0.727	0.032	19
SEX	=	1.000			
AGE	=	1.000	0.735	0.021	457

SEX	=	1.000			
AGE	=	2.000	0.674	0.021	465
SEX	=	1.000			
AGE	=	3.000	0.661	0.023	376
TERRITOR	=	0.000			
SEX	=	0.000			
AGE	=	1.000	0.639	0.029	233
TERRITOR	=	0.000			
SEX	=	0.000			
AGE	=	2.000	0.668	0.032	190
TERRITOR	=	0.000			
SEX	=	0.000			
AGE	=	3.000	0.653	0.044	101
TERRITOR	=	0.000			
SEX	=	1.000			
AGE	=	1.000	0.656	0.032	195
TERRITOR	=	0.000			
SEX	=	1.000			
AGE	=	2.000	0.565	0.029	230
TERRITOR	=	0.000			
SEX	=	1.000			
AGE	=	3.000	0.599	0.032	192
TERRITOR	=	1.000			
SEX	=	0.000			
AGE	=	1.000	0.829	0.028	251
TERRITOR	=	1.000			
SEX	=	0.000			
AGE	=	2.000	0.796	0.031	201
TERRITOR	=	1.000			
SEX	=	0.000			
AGE	=	3.000	0.800	0.047	90
TERRITOR	=	1.000			
SEX	=	1.000			
AGE	=	1.000	0.813	0.027	262
TERRITOR	=	1.000			
SEX	=	1.000			
AGE	=	2.000	0.783	0.029	235
TERRITOR	=	1.000			
SEX	=	1.000			
AGE	=	3.000	0.723	0.033	184

2.2 Rates of Refusal per Interviewer

One of the quality controls which are carried out almost as routine is the control which concerns the interviewers' effect on the interview result, in the case that the interviewer in his role of intermediary between the questionnaire and the interviewee may, in some way, influence, direct and condition the answers.

These, like other data quality controls, would be appropriate for every variable deduced from the survey, or at least for a large number of them.

The efficiency of the interviewer can also be worked out by a low refusal rate and consequently by a low substitution rate of the interviewees. This is important because the substitutions can bring about a structural imbalance of the sample and a distortion of the estimates.

We must admit that the substitution rate of the interviewees in our research is not so limited. Beyond the generic extenuating circumstances that the elderly are tendentially mistrustful there is a specific reason, linked to the narrowness of our budget: we have had to enrol many interviewers and to each one we have assigned a very low, too low, number of interviews.

The 1685 interviews carried out were distributed between 118 interviewers, who have carried out from a minimum of 5 to a maximum of 31. All the interviewers were, in our opinion, well prepared and very motivated. Nevertheless it is clear that their efficiency in the approach with the interviewee must have been imperfect at the beginning and increased as the work proceeded. There ensues an inverse relationship between number of contacts and refusal rate. The variable "success of approach" is a dichotomous variable (0=refusal, 1=interview) whose average

is the proportion (p) of interviews compared to the total approaches, whose variance is given from the product p * (1-p).

It is therefore easy to set out an analysis of variance in order to point out the interviewer effect. Instead in practice some problems arise because the categories of the variable criterion (interviewer) are too numerous for the standards of the common statistical packages. After all the same statistics tables do not reproduce the critical values of the F-test for 117 and 2246 degrees of freedom. Therefore the analysis of variance with more than one variable is definitely impracticable. It would be important to eliminate in particular the influence of the territory variable because it is totally not interpenetrable with the interviewers. In simpler terms: we can perhaps suppose that the randomness of the extraction of the names is capable of attenuating the differences between interviewers in terms of distribution by sex, age, level of education etc., while in terms of the distribution by municipalities, the assignment of the names to the interviewers was carried out in territorially homogenous blocks, so that the majority of the interviewers carried out interviews in one single locality.

Tab 2.11 - *ANOVA on the success of the approach per interviewer*

	DF	Sum of Squares	Mean Square	F-Value	P-Value
Interv	117	99.751	0.853	4.984	< 0.0001
Residual	2246	384.224	0.171		

The ANOVA result (F=4.984, p<0.0001) in short tells us that, at least with reference to the success rate of the contact with the interviewee, the interviewer was influential.

In itself the observation is not particularly allarming and on the other hand was undoubtedly forseeable since each interviewer had few interviews to carry out and little time to improve an appropriate technique of approach.

It is necessary however to always remember in the course of the analysis the interviewer effect as a variable to be kept under control.

A control of the relationship between interviewer effect and territory effect can be made taking into consideration refusal rates of individual interviewers and analysing the variance among the territorial environments in which each one has carried out the survey.

Tab. 2.12 - *ANOVA of the refusal rates of the interviewers according to the type of area of survey.*

LEVELS ENCOUNTERED DURING PROCESSING ARE:

CLUSTER
1.000 2.000 3.000 4.000 5.000 6.000 7.000

DEP VAR:TASSORIF N: 135 MULTIPLE R: 0.342 SQUARED MULTIPLE R: 0.117

ESTIMATES OF EFFECTS $B = (X'X)^{-1} X'Y$

		TASSORIF
CONSTANT		26.001
CLUSTER	1.000	9.806
CLUSTER	2.000	8.281
CLUSTER	3.000	7.086
CLUSTER	4.000	-2.355
CLUSTER	5.000	-8.839
CLUSTER	6.000	-10.075

ANALYSIS OF VARIANCE

SOURCE	SUM-OF-SQUARES	DF	MEAN-SQUARE	F-RATIO	P
CLUSTER	7317.524	6	1219.587	2.82	0.013
ERROR	55283.214	128	431.900		

LEAST SQUARES MEANS.

			LS MEAN	SE	N
CLUSTER	=	1.000	35.807	5.366	15
CLUSTER	=	2.000	34.282	5.040	17
CLUSTER	=	3.000	33.087	3.794	30
CLUSTER	=	4.000	23.646	4.076	26
CLUSTER	=	5.000	17.162	3.733	31
CLUSTER	=	6.000	15.926	9.294	5
CLUSTER	=	7.000	22.097	6.266	11

The territory effect significantly explains the variance of the failure rates of the interviewers in the approach with the interviewee. The interviewers who operated in urban areas in general have encountered more interview refusals than those working in towns and in the country. This observation considerably plays down the problem of the interviewer effect. We can therefore conclude that it is important to keep under control the interviewer variable in the course of the analysis, but aboveall the territory variable which descriminates in this research and probably not only regarding the refusal rates. It is however consoling to remember that the territory variable is the only one which has been employed with the criterion of proportional stratification of the sample, and therefore its effects on the estimates deduced from the whole series of observations can be considered neutralizing.

2.3 Representativity of the sample

The corrispondence between the structure of the sample of interviewees and the universe below is, apart from a guarantee of the sample plan, a necessary condition in order that the mean values of the different variables to be gathered can be estimated correctly. Where this corrispondence does not exist the researcher is faced with two possible solutions. One consists on carrying out an integrative survey to reproportion the sample; the other, on calculating different estimates for the subaggregations which are not equally represented and finding the mean with the proportions existing in the universe.

Naturally this control can be done on a limited number of characters for which information relative to the universe is available.

We will now propose a synthetic exam of conformity regarding the population of the four provinces of western Tuscany as tosome fundamental characters.

Tab. 2.13 - *Interviews carried out and resident population of ≥ 55 years of age per sex.*

Sex	Interviewees	%Interviewees	Pop Area	% Pop Area.
Males	782	46.4	180770	43.4
Females	903	53.6	235884	56.6
Totals	1685	100.0	416654	100.0

Source: 13th General census of the population 1991 provincial files Table 4.2 - Resident population of 6 years of age onwards according to level of education, age group, professional and non professional level and sex.

$\chi^2 = 6.28$

Critical values of χ^2 concerning specified levels of significativity 1 degree of freedom

significativity	χ^2
2.5%	5.02
1%	6.63

As we have already been able to underline the women's refusal rate was decidely superior than the men's. Seeing as the technique for the substitution of names was totally by chance and did not foresee any qualitative selection or per quota, the distortion, even though statistically significant, is not of drammatical importance.

Tab 2.14 - *Interviews carried out and resident population of ≥ 55 years of age per level of education.*

Education	Interviewees	%Interviewees	Pop Area	% Pop Area.
Low Level	1301	77.3	331638	79.6
Medium Level	334	19.7	75123	18.0
High Level	50	3.0	9893	2.4
Totals	1685	100.0	416654	100.0

Source: 13th General census of the population 1991 provincial files Table 4.2 - Resident population of 6 years of age onwards according to level of education, age group, professional and non professional level and sex.

$\chi^2 = 6.338$

Critical values of χ^2 concerning specified levels of significativity 2 degrees of freedom

significativity	χ^2
5%	5.98
2.5%	7.38

The education is reclassified here in three levels: low, up to the primary school diploma (5 scholastic years), medium, up to the upper secondary school diploma (up to 13 scholastic years); high, degree and others. Even if statiscally significant, the deformity between the level of education of the sample and that of the population below does not seem worrisome. After all it was imaginable that those who have lower levels of education are also less sensitive towards the cognitive needs of the research and therefore are more inclined to not concede the interview.

Tab. 2.15 - *Interviews carried out and resident population of ≥ 55 years of age per age group.*

Age Group	Interviewees	%Interviewees	Pop Area	% Pop Area.
55-59	335	19.88	81548	19.57
60-64	363	21.54	84523	20.29
65-69	321	19.05	82323	19.76
70-79	449	26.65	107521	25.81
80 e più	217	12.88	60739	14.57
Totals	1685	100.00	416654	100.00

Source: 13th General census of the population 1991 provincial files Table 4.2 - Resident population of 6 years of age onwards according to level of education, age group, professional and non professional level and sex.

$\chi^2 = 5.446$

Critical values of χ^2 concerning specified levels of significativity 4 degrees of freedom

significativity	χ^2
10%	7.78

As for the structure per age of the sample we can consider ourselves satisfied. The diffformities compared to the population from which it is extracted are of little importance.

Tab 2.16 - *Interviews carried out and resident population of ≥ 55 years of age per accomodation*

Accomodation	Interviewees	%Interviewees	Pop Area	% Pop Area.
Family	1570	99.05	410786	98.59
Rest-houses	15	0.95	5868	1.41
Totals	1585	100.00	416654	100.00

Source: 13th General census of the population 1991 provincial files Table 2.8 Population resident in rest-houses according to age group, professional level, type of accomodation and sex.

$\chi^2 = 2.258$

Critical values of χ^2 concerning specified levels of significativity 1 degree of freedom

significativity	χ^2
10%	2.71

Analogous considerations are valid for the sample structure relating to the distribution of subjects interviewed according to if they lived with family or in institutes: we can consider the structure of the sample satisfactory. In spite of this. scarce relative importance of the elderly who don't live with family, we have thought it better to add 100 interviews to the sample for the elderly who live in institutes, with the aim of having a numerically sufficient aggregation which will allow us to complare the living conditions of the latter compared to the elderly who live with family.

Tab. 2.17 - *Interviews carried out and resident population of ≥ 65 years of age per married status*

Marital Status	Interviewees	%Interviewees	Pop Area	% Pop Area.
Never married	113	11.45	22081	8.81
Married	512	51.87	134322	53.60
Divorced	12	1.22	2952	1.18
Widows	350	35.46	91228	36.41
Totals	987	100.00	250583	100.00

Source: 13th General census of the population 1991 provincial files Table 2.2 Population resident according to age group, marital status and sex.

$\chi^2 = 8.541$

Critical values of χ^2 concerning specified levels of significativity 3 degrees of freedom

significativity	χ^2
5%	7.815
2,5%	9.348

The control of the structural conformity of the sample as far as married status is concerned is limited to the age groups from 65 years onwards because the 1991 census data for quinquennial age groups of the provincial population was not available at the moment of the analysis. The check on the subset shows a slight overrepresentation of the singles and a slight underrepresentation of the married couples.

To conclude, we consider ourselves satisfied on the whole of the composition of the sample. The variable which must be taken into consideration with most caution is sex and some attention must also be given to level of education and marital status, when it is a question of estimating the relative mean values of the whole sample for the different important characters.

Moreover we do not exclude the eventuality of a small additional survey stratified by quotas, intended to perfect the representativity of the sample.