

Session Number: Session 4B

Session Title: Child Poverty

Session Organizer(s): Miles Corak, Statistics Canada, Ottawa, Canada

Session Chair: Miles Corak, Statistics Canada, Ottawa, Canada

*Paper Prepared for the 29th General Conference of
The International Association for Research in Income and Wealth*

Joensuu, Finland, August 20 – 26, 2006

**POVERTY AND DEPRIVATION OF ITALIAN CHILDREN: EVIDENCE FROM
THE EU-SILC SURVEY**

Cristina Freguja and Isabella Siciliani,
ISTAT
(Italian National Statistical Institute)

For additional information please contact:

Author Name(s) : Cristina Freguja
Author E-Mail(s) : freguja@istat.it

Author Name(s) : Isabella Siciliani
Author E-Mail(s) : Sicilian@istat.it

This paper is posted on the following websites: <http://www.ariw.org>

IARIW 29th General Conference
Joensuu, Finland 20-26 August, 2006

Parallel session 4b 'Child poverty and well-being'

**POVERTY AND DEPRIVATION OF ITALIAN CHILDREN:
EVIDENCE FROM THE EU-SILC SURVEY**

Cristina Freguja - Isabella Siciliani
ISTAT
(Italian National Statistical Institute)

1. Introduction

Children represent a particular population group, about which the attention is particularly high as their success in later life is an important factor for the future progress of a society. Moreover, children are a weak subgroup of population as they cannot influence their own economic condition. Several studies have proved a significant negative impact of poverty on children's educational achievements (Duncan G.J. *et al.*, 1998) and therefore on their ability to have a well-off life.

With reference to the Italian context, there are some evidences of a higher risk of being poor for children. According to the *Joint inclusion report, year 2003* by the Commission of the European Communities (European Commission, 2003), based on ECHP data, if the at-risk poverty rate for all age groups in Italy is 19% in 2001, the same rate concerning people below 16 years old is 25%, that is children have 1.3 times the risk of being poor than the average, a little above than the risk European children have as a whole: in 2001 in the UE the at-risk poverty rate for aged 0-15 years is 19%, 1.2 times the one for all ages group (15%).

The aim of the paper is to investigate the level and the causes of child poverty in Italy. As the multidimensional nature of poverty is universally acknowledged, not only the monetary and more traditional approach to poverty analysis is used, but a multidimensional approach is adopted. Poverty is not just "depleted wallets" but a wider concept which can be referred to as "impoverished lives" (Sen, 2000). Income, of course, is one of the most important aspects of the problem but it is not the sole outcome to take into account. The recent literature emphasises the idea of deprivation as a complementary term of the income poverty to deeply describe the marginalization processes. Within this kind of studies, the present work tries to investigate both child poverty and deprivation since other deprivation indicators are explored apart from that one based on household income. First of all, some important dimensions of deprivation for the Italian socio-economic context have been identified: in that way a large set of indicators has been summarised

into few synthetic indicators. The approach used is based on the fuzzy-sets theory which allows to determine the degree of deprivation for the main identified dimensions of deprivation. The analysis of the average degree of deprivation along with all the proposed dimensions and the analysis of the average degree of poverty, investigated in accordance with the fuzzy-sets approach as well, is proposed for subgroups of population to emphasise the relative risk of deprivation and poverty for children against the other categories. Moreover, by focusing on children, the level of deprivation and poverty is analysed across several groups identified by the characteristics of children's households, in order to highlight the factors more related to child deprivation and poverty.

The source of data used for the analysis is the first wave of the Longitudinal Italian Income and Living Conditions Survey conducted under the EUSILC (European Union Statistics on Income and Living Conditions) project. Additional details on the source and the indicators used are available in the second section. The methodology is contained in the third section and the results obtained are shown in the fourth section.

2. The data source

The data source used to explore children deprivation and poverty is the Italian Income and Living Conditions Survey conducted to collect data for the EUSILC project, launched on the basis of the Framework Regulation of European Parliament and Council N. 1177/2003.

EU-SILC is expected to become the reference source for comparative statistics on income distribution and social exclusion at European level. It represents a tool to encourage cooperation between Member States to combat poverty and social exclusion with the productions of structural indicators on social cohesion for the annual spring report to the European Council. It provides both cross-sectional and longitudinal data in order to measure individual-level changes over time.

The Italian SILC is based on a survey conducted on a sample of 32.000 households (over 60.000 individuals) for the cross-sectional component. 75% of them are re-interviewed in the successive wave while 25% of the sample is renewed each year. In that way the total period of permanence in the panel is 4 years for each 25% of the cross-sectional sample.

The data used in the present work are related to the first wave (2004).

The main characteristic of the survey is exploring a wide range of topics: income, housing, living conditions, health, education, employment. Besides the objective aspects, some subjective questions allow to know the perception of the interviewed concerning their economic household situation.

In this paper, on the basis of per-adult equivalent household income¹, the traditional poverty indicators are analysed. Moreover non monetary deprivation indicators are also

¹ The per-adult equivalent household income is computed using the OECD modified equivalence scale, which assigns 1 to the first adult in the household, 0.5 to each other adult (aged 14 years and more) and 0.3 to each child (aged up to 13 years) in the household. The total net household income is divided for the equivalent household size in order to obtain the per-adult equivalent household income.

taken into account in order to explore deprivation from a multidimensional point of view. Among those, a distinction is introduced between the objective indicators and those which are constructed from subjective questions.

Further in details the items selected for the analysis of non monetary material deprivation of objective nature are listed below²:

1. inability to keep the home adequately warm;
2. inability to pay for a week long holiday;
3. inability to eat chicken meat or fish every second day;
4. inability to afford health expenses (during last 12 months);
5. inability to afford education fees (during last 12 months);
6. inability to afford transport fees (during last 12 months);
7. inability to afford paying taxes (during last 12 months);
8. inability to afford buying clothes (during last 12 months);
9. inability to afford buying food (during last 12 months);
10. inability to meet payment of scheduled mortgage/rent;
11. inability to meet payment of scheduled utility bills;
12. inability to meet payment of scheduled hire purchase instalments;
13. enforced lack of a telephone;
14. enforced lack of a colour TV ;
15. enforced lack of a PC;
16. enforced lack of a washing machine;
17. enforced lack of a car or van;
18. enforced lack of a refrigerator;
19. enforced lack of a satellite antenna;
20. enforced lack of a dishwasher;
21. enforced lack of a video/dvd recorder;
22. enforced lack of a video camera;
23. absence of a bath or shower;
24. absence of an indoor flushing toilet;
25. absence of running warm water;
26. absence of a garden;
27. absence of a balcony;
28. damp walls, floors, foundation, rotten windows frames or floors;
29. too dark/not enough sun light;
30. noisy neighbours or outdoor noise ;
31. pollution, grime;
32. vandalism or crime;

The items used for the analysis of the subjective aspects are the following:

² The items from 4 to 9, from 18 to 22, from 25 to 27 are collected only in the Italian survey and absent among the EUSILC target variables.

1. capability to face unexpected expenses;
2. ability to make ends meet;
3. burden of housing cost;
4. burden of loans other than mortgage;

3. Methodology

The first aim is synthesising the 36 elementary indicators into few indicators able to measure the degree of deprivation in some specific domains.

According to previous works about material non monetary deprivation, some deprivation dimensions have been adopted. In particular, having considered the analysis Eurostat performed on ECHP data (Eurostat, 2002) we started from the five deprivation dimensions there identified. A confirmatory factor analysis had let to synthesise 24 ECHP elementary indicators into the following dimensions:

1. Basic lifestyle deprivation (related to lack of ability to afford basic needs);
2. Secondary lifestyle deprivation (related to enforced lack of durables);
3. Absence of housing facilities ;
4. Environmental problems;
5. Housing deterioration;

Besides those dimensions, in this work a dimension related to the subjective perception of the economic household situation has been taken into account as well.

Having identified the dimensions, each elementary indicator has been associated to its deprivation dimension in order to construct a synthetic index of deprivation within each dimension of deprivation.

The association is shown below:

DIMENSION	Deprivation indicator
Lack of ability to afford basic needs	inability to afford buying food (during last 12 months)
	inability to keep the home adequately warm
	inability to pay for a week long holiday
	inability to eat chicken meat or fish every second day
	inability to afford health expenses (during last 12 months)
	inability to afford education fees (during last 12 months)
	inability to afford transport fees(during last 12 months)
	inability to afford paying taxes (during last 12 months)
	inability to afford buying clothes (during last 12 months)
	inability to meet payment of scheduled mortgage/rent
	inability to meet payment of scheduled utility bills
Enforced lack of durables	inability to meet payment of scheduled hire purchase instalments
	enforced lack of a telephone
	enforced lack of a colour TV

	enforced lack of a PC
	enforced lack of a washing machine
	enforced lack of a car o van
	enforced lack of a refrigerator
	enforced lack of a satellite antenna
	enforced lack of a dishwasher
	enforced lack of a video recorder
	enforced lack of a video camera
Absence of housing facilities	absence of a bath or shower
	absence of an indoor flushing toilet
	absence of running warm water
	absence of a garden
	absence of a balcony
Environmental problems	noisy neighbours or outdoor noise
	pollution, grime
	vandalism or crime
Housing deterioration	damp walls, floors, foundation, rotten windows frames or floors
	too dark/not enough sun light
Subjective perception	SUBJECTIVE: capability to face unexpected expenses
	SUBJECTIVE: ability to make ends meet
	SUBJECTIVE: burden of housing cost
	SUBJECTIVE: burden of loans other than mortgage

In order to define the 6 indices of deprivation (5 objective and 1 subjective) a fuzzy set approach (Zadeh, 1965; Zimmermann, 1996) has been adopted which enables us to obtain a more realistic measure of the multidimensional deprivation.

A fuzzy set is defined by a membership function that assumes continued values between zero and 1: values equal to zero mean total not membership to the fuzzy set, values equal to 1 imply total membership to that fuzzy set; values between zero and 1 denote an intermediate degree of membership to the fuzzy set, which is higher the more the membership function reaches 1.

The traditional distinction between 'poor' and 'non poor' or, in a broader sense, between 'deprived' and 'not deprived' is a simplification of reality. As it has been pointed out by Cheli and Lemmi (1995), poverty is not a simple attribute that characterises individuals in terms of presence or absence, but, in a more realistic way, the hardship of an individual is a matter of degree. In other words, an individual is not simply poor/deprived or not, but he could be poorer/deprived than another, that is, he has a degree of poverty/deprivation higher than that one of another person. The dichotomy between poor and non poor (or deprived and not deprived) is not realistic. In order to take into account those principles, the poverty and the non monetary deprivation are analysed for each individual as a degree of poverty and deprivation.

A membership function to the fuzzy set of deprived is defined both for the indicator of monetary poverty and for each elementary indicator of non monetary deprivation

(objective and subjective). That membership function varies from a minimum value of zero, for the least deprived individual to a maximum of 1, for the most deprived.

The definition of the member function adopted here is different if the indicator is based on an ordinal variable or on a continued variable.

In case of an ordinal variable the specification proposed by Cheli and Lemmi (1995), based on the normalised distribution function, has been used.

Let's suppose to have an ordinal variable X with values $x_{(\min)}, \dots, x_{(k)}, \dots, x_{(\max)}$, ordered so that $x_{(\min)}$ is associated to the minimum degree of deprivation and $x_{(\max)}$ to the maximum degree.

The fuzzy set membership function could be defined by the distribution function $F(x)$ of that variable. The greater is the modality, the higher is the degree of deprivation but this latter depends also on the relative cumulate frequency of individuals with deprivation symptoms minor than that one of the considered modality. That formulation is consistent with a relative concept of deprivation as it takes into account the individual's position in the deprivation distribution. However, if the relative frequency associated to the first modality is high, the individuals with the first modality $x_{(\min)}$ have a non zero degree of deprivation, even though, according to the selected variable, they do not have deprivation symptoms. For that reason, it is better a normalised version of the fuzzy set membership function $\mu(x)$:

$$\mu(x) = \begin{cases} 0 & \text{se } x = x^{\min} \\ \mu(x^{k-1}) + \frac{F(x^k) - F(x^{k-1})}{1 - F(x^{\min})} & \text{if } x = x^k \text{ with } k > \min \end{cases} \quad (1)$$

In such a way a value of zero is associated to the minor degree of deprivation and a value of 1 is associated to the modality correspondent to the highest degree of deprivation.

An example could clarify. Table 1 shows the distribution of the variable "HS120 - ability to make ends meet" with the modalities ordered from the minor degree of deprivation to the maximum:

Table 1 – Households by ability to make ends meet

X=HS120	Frequency	Percent	F(x)	m(x)
6=very easily	230	0.95	0.0095	0
5	1474	6.09	0.0704	0.0615
4	5003	20.67	0.2771	0.2702
3	9741	40.25	0.6796	0.6765
2	4418	18.25	0.8621	0.8608
1=with great difficulty	3338	13.79	1	1

Source : IT-SILC2004

The last column shows the fuzzy set membership function as defined in (1). If an individual/household has the modality 2, he is deprived at a degree equal to 0.8608; if he has the value 5 for that variable, he is deprived at a degree of 0.0615.

In the specific case of a dichotomic indicator, the membership function assumes only its extremes values (0, 1), zero representing absence of symptom of deprivation and one representing the presence of deprivation.

In order to analyse monetary poverty, the household income per adult-equivalent has been used. The equivalence scale used is the OECD modified one. Also in this case a fuzzy-set approach has been adopted. In other words, a membership function to a fuzzy-set of monetary poor is defined in such a way that the higher is the value, the stronger is the degree of poverty. The membership function used in the case of continued variable is defined differently from that used for the ordinal variables, described above.

The monetary poverty membership function associated to each individual i is related to the person's rank and share in the equivalent income distribution. Let y be the equivalent income in the ascending income distribution, the membership function to the fuzzy set of monetary poor chosen is the following (Betti, Verma, 1998):

$$\mu_i(y) = (V_i)^\alpha = \left(\frac{\sum_{j=i+1}^n y_j}{\sum_{r=1}^n y_r} \right)^\alpha \quad \text{with } i = 1, \dots, (n-1); \quad V_n = 0$$

the parameter α is constructed in such a way that for the population, the proportion of fuzzy monetary poor, i.e. the population mean of the index, is equal to the proportion deriving from traditional European approach to the study of monetary poverty (60 percent of the median of the equivalent income). Using an iterative method, the value of α has been determined equal to 14.064 for the Italian 2004 SILC data.

The membership function is therefore represented by the share of equivalent income perceived by all the individuals less poor, corrected with the parameter α . The higher is α , the lower is the value of the membership function to the fuzzy set for the less poor.

Such a formulation implies that, even though the relative position of an individual in the income distribution does not change over time but the share of income perceived by people less poor increases, his degree of poverty (here considered as a relative concept) arises consistently.

Once calculated for each individual the degree of deprivation for each indicator, that is the value of the fuzzy set membership function for the monetary indicator (equivalent income), for the 4 subjective deprivation indicators and for the 32 non monetary objective indicators, the next step is defining the synthetic degree of deprivation within each deprivation dimension taken into account and a synthetic degree of deprivation for the subjective dimension. In order to put together different elementary indicators, their weighted sum is taken (Eurostat, 2002) for each individual i :

$$\mu_i(x_d) = \frac{\sum_{j=1}^k \mu_i(x_{jd}) w_{jd}}{\sum_{j=1}^k w_{jd}} \quad i = 1, \dots, N$$

with k being the number of indicators within each dimension d and w_{jd} the weight constructed for item j belonging to dimension d .

The weight for each item is determined taking into account two factors:

1. the item's power to discriminate among individuals in the population, that is, its dispersion, measured by the coefficient of variation. This means that the weights are inversely proportional to the square root of the proportion of deprived in the population; therefore items whose deprivation affects only small share of population – and can be considered more significant – weight more.
2. the correlation with the other items of the same dimension. It is necessary to reduce the effects of items correlated with others of the same dimensions. For this reason the second component w'_{jd} of the weight for item j is obtained in the following way (Betti, Verma, 1998, p. 10):

$$w'_{jd} = \left(\frac{1}{1 + \sum_{j'=1}^k \rho_{j,j'} \mid \rho_{j,j'} < \rho_h} \right) \times \left(\frac{1}{\sum_{j'=1}^k \rho_{j,j'} \mid \rho_{j,j'} \geq \rho_h} \right)$$

where $\rho_{j,j'}$ is the correlation between the fuzzy membership function values for item j and j' . ρ_h is determined by separating the ordered set of correlation values at the point of the largest gap. Such a construction of this component of weights means that items having small correlation with item j slightly influence the weight w'_{jd} , while items highly correlated reduce it more intensively.

The final weight w_{jd} is obtained as a product of the two components described above. Moreover the weights have been re-scaled in such a way that their sum within the dimension d equals one. That implies the fuzzy membership function on dimension d varies between 0 (when there is no deprivation for all the items in the dimension) and 1 (when there is deprivation for all the items in the dimension).

In order to synthesize the non monetary deprivation as a whole and to compare it with the degree of monetary poverty, a global non-monetary indicator has been constructed, combining the 6 non-monetary indicators deprivation.

The global non-monetary indicator has been calculated as a weighted average of the deprivation indicators for the 6 dimensions, where the weights are proportional to a weighted average of coefficients of variation of items in the dimension. Also in this case, the weights are re-scaled in such a way that their sum for all dimensions equals one.

Within each dimension, the fuzzy proportion of deprived is determined as the average across all the individuals of the values they assume for each synthetic indicator of deprivation. Comparing the fuzzy proportion of deprived for specific subgroups of the

population (for instance children) with that affecting the population as whole, it is possible to enlighten the groups at higher risk of deprivation for one or more dimensions.

4. Results

Table 2 shows the fuzzy proportion, calculated as average across all individuals of the category of the values of the fuzzy indices, for all the 6 deprivation dimensions and for the monetary poverty; moreover the poverty rate determined according the official European methodology (poverty threshold as 60% of the equivalent income median) is shown as well. The values are expressed as ratio of the population mean, in order to enlighten the groups more at risk of deprivation for each dimension.

Considering the differences among the age classes, the data show that children and young people are at higher risk both of deprivation and poverty. The global non monetary deprivation index is 5% greater than the mean value for children up to 4 years, 7% greater for children between 5 and 15 years old and 10% greater for people between 16 and 24 years old. Also if the monetary poverty is considered, people up to 24 years are at higher risk of poverty: in particular, children aged 5-15 have a risk of being poor 37% higher than the mean value with the fuzzy approach. Also the poverty traditional approach confirmed that trend across age.

Table 2 - Mean fuzzy proportion of deprived by deprivation dimension, mean fuzzy proportion of poor and poverty rate by age (values as ratio of total population mean)

AGE	indD1 Lack of ability to afford basic needs	indD2 Enforced lack of durables	indD3 Absence of housing facilities	indD4 Environmental problems	indD5 Housing deterioration	indD6 Subjective perception	global index non monetary deprivation	poverty index (fuzzy-set approach)	poverty rate (traditional approach)
0-4	110.4	115.3	100.0	102.4	96.1	112.1	104.9	121.1	119.8
5-15	128.1	108.8	96.7	101.4	101.2	116.3	107.3	137.5	140.3
16-24	129.4	124.1	100.7	100.8	101.9	115.0	109.7	128.8	133.6
25-44	99.9	102.9	100.0	98.2	97.8	106.0	100.6	97.4	97.5
45-64	89.7	89.8	96.1	91.6	103.2	93.0	94.6	82.8	81.6
65+	80.1	89.8	106.9	112.3	98.7	79.6	95.9	86.0	83.3
total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source : IT-SILC2004

However if the non monetary deprivation is analysed across its components, children and young people are deprived for the lack of ability to afford basic needs (+10% for children up to 4 years and more than +28% for aged 5-24 years) and for the enforced lack of durables (+15% for aged 0-4 , +9% for aged 5-15 and +24% for aged 16-24), as well for the subjective dimension, while they do not have a higher risk of deprivation or have a slight higher risk for aspects related to absence of housing facilities, environmental problems and housing deterioration. It could be observed that it is more likely that older children have siblings and therefore have a larger household size: that could be related to higher risk of deprivation.

Once observed that children and young people are generally more deprived and poor than the other groups, it is useful to deepen the analysis with the aim to understand which are the children at higher risk of deprivation and poverty. From now on, the concept of dependent child is introduced. Dependent child is each individual below 16 years old and each individual aged 16-24 that lives with at least one parent and is economically inactive.

Table 3 - Dependent children: mean fuzzy proportion of deprived by deprivation dimension, mean fuzzy proportion of poor and poverty rate by household type (values as ratio of total population mean)

HOUSEHOLD TYPE	indD1 Lack of ability to afford basic needs	indD2 Enforced lack of durables	indD3 Absence of housing facilities	indD4 Environmental problems	indD5 Housing deterioration	indD6 Subjective perception	global index non monetary deprivation	poverty index (fuzzy-set approach)	poverty rate (traditional approach)
Single parent, at least 1 dependent child	170.9	188.3	109.3	110.8	101.6	125.2	127.0	187.4	194.7
2 adults, 1 dependent child	83.1	70.8	95.9	82.1	98.8	97.4	90.5	85.4	79.0
2 adults, 2 dependent children	100.1	102.2	94.8	91.1	95.1	107.3	98.1	124.3	127.4
2 adults, 3+ dependent children	168.0	121.2	103.7	118.6	99.8	127.1	120.2	180.3	190.7
Other households with dependent children	144.2	104.4	93.7	107.5	113.9	126.0	113.4	133.0	134.1
Total dependent children	119.9	105.8	97.4	97.8	100.2	112.9	104.6	131.3	133.6

Source : IT-SILC2004

As shown in Table 3, the household context is important with reference to the level of deprivation and poverty. Even though children have a higher deprivation risk, dependent children without siblings living in households with 2 adults have a minor risk than the total population for both the non monetary deprivation (-9%) and poverty (-15% with the fuzzy approach and -21% with the dichotomic approach). They are less deprived above all for enforced lack of durables and environmental problems.

The situation is different for children in households with 2 adults and 2 dependent children: from the monetary point of view, those children are poorer (+24% considering the fuzzy set indicator), while they are as deprived as the mean population regarding affording basic needs and for durables, while for the other material dimensions are less deprived. However the subjective judgement about the economic situation of their households is worse than the population mean (+7%).

Higher degree of both deprivation and poverty are observed for children living in household with 2 adults and 3 or more dependent children. The global non monetary deprivation index is 20% higher than the mean, the incapability to afford basic needs being the dimension for which they are most deprived (+68%), followed by the subjective one (+27%). They are also deprived for the lack of durables and for environmental problems, even though dependent children in general do not show a high degree on that dimension, as seen before. Considering the monetary aspects children of household with at least 3 dependent children are 80% poorer than the mean value.

If dependent children live only with one parent, their condition is even worse. They are 27% more deprived and 87% poorer than the mean. They are most deprived for all the

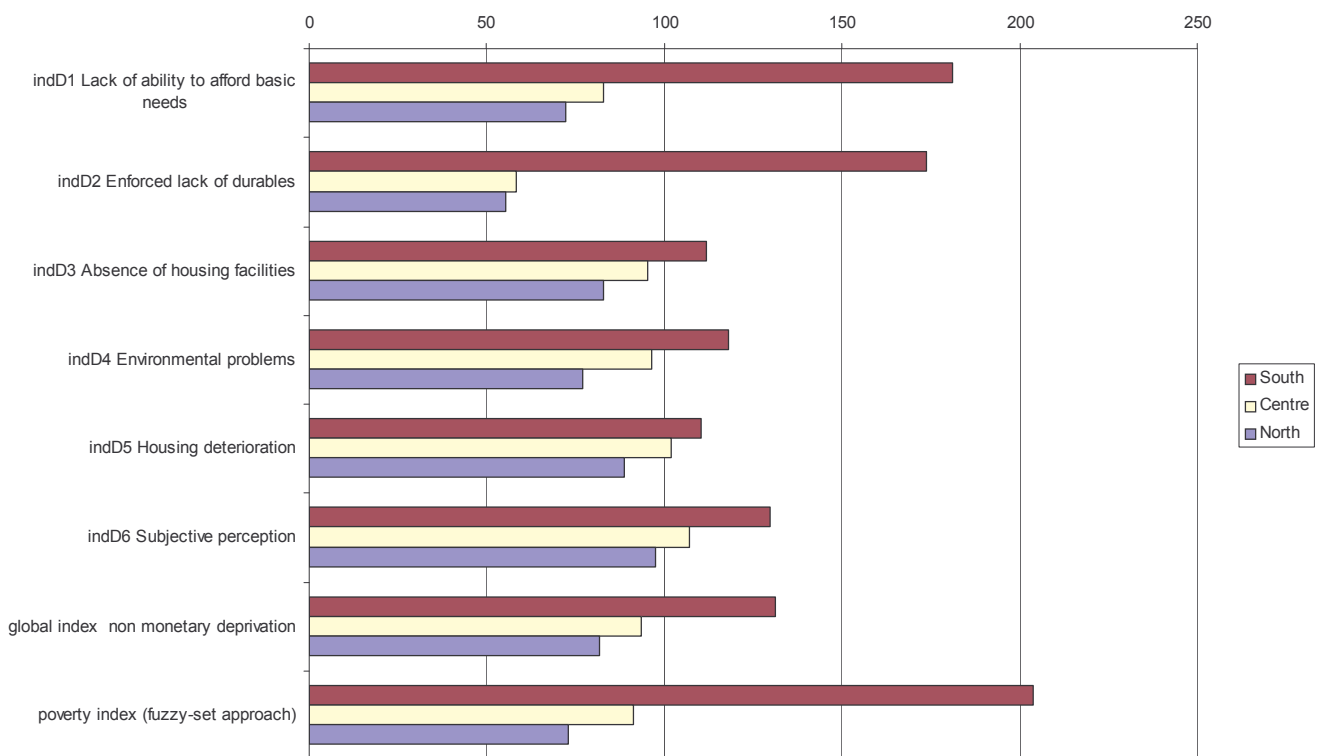
material deprivation dimensions, in particular for the lack of durables (+88%) and for the incapability to afford basic needs (+71%).

Traditionally in Italy poverty is more spread in the southern areas of the country (Istat, 2004). The analysis with the fuzzy approach used in this paper does confirm the higher risk of poverty in the South compared to the Centre and the North of Italy. Besides, also the deprivation risk is greater in the southern areas, even though the differences among the areas are slightly reduced if compared with those arising from the monetary analysis. The cause of that could be found in the different purchasing power for the same amount of income across the different regions, which is not easily measurable and therefore it is not taken into account in the monetary indicators. In that way the monetary indicators emphasize the gap among the areas more than the non monetary indicators do.

It should also be taken into account that the items based on subjective information can be influenced by the socio-economic context. Where the rate of poverty is greater, it is more likely that one's own perception of bad economic household conditions is attenuated compared to the same situation existing where poverty is less widespread. For that reason, the deprivation indicators could emphasize minor gaps across the different areas. The impact of the general conditions of the groups in which one lives in contact with, should be taken into account also when the other results of this analysis will be presented.

As we focus on the child deprivation, Figure 1 shows the mean fuzzy proportion of deprived dependent children (as ratio of the total population) for the usual dimensions and across the three main geographical areas of Italy.

Figure 1 – Dependent children: mean fuzzy proportion of deprived by deprivation dimension and mean fuzzy proportion of poor by area (values as ratio of total population mean)



Source : IT-SILC2004

Dependent children living in the South have twice the risk of being poor, while they have 1,3 times the risk of being deprived. In any case for some dimensions of material deprivation such as the incapability to afford some basic needs and the lack of durables the degree of deprivation is considerably high (respectively +81% and +74% compared to the mean).

Table 4 - Dependent children: mean fuzzy proportion of deprived by deprivation dimension, mean fuzzy proportion of poor and poverty rate by highest level of education and number of dependent children in the household (values as ratio of total population mean)

Highest level of education in the household	Number of dependent children	indD1 Lack of ability to afford basic needs	indD2 Enforced lack of durables	indD3 Absence of housing facilities	indD4 Environmental problems	indD5 Housing deterioration	indD6 Subjective perception	global index non monetary deprivation	poverty index (fuzzy-set approach)	poverty rate (traditional approach)
low education	1	166.3	165.0	105.8	136.6	96.4	129.5	127.3	170.2	172.7
	2	194.9	221.9	109.3	136.8	101.5	142.2	140.7	216.0	233.2
	3+dependent children	320.1	270.8	122.1	151.4	97.8	159.1	170.3	289.8	318.7
	Total	212.4	215.3	111.0	139.8	99.2	142.0	142.9	217.8	233.1
medium education	1	83.8	65.0	92.4	77.8	100.7	101.4	89.5	89.3	82.7
	2	90.3	80.3	90.9	74.7	97.8	108.3	91.7	115.8	113.5
	3+dependent children	124.5	78.1	95.2	106.7	97.3	127.1	105.7	177.5	184.7
	Total	94.0	75.2	92.0	81.3	98.7	109.2	93.5	117.6	115.5
high education	1	60.8	37.2	91.8	64.2	113.3	85.1	80.6	48.1	42.7
	2	55.7	42.3	90.0	78.5	96.7	86.5	79.5	62.5	58.5
	3+dependent children	88.3	35.8	95.0	117.0	106.7	93.1	93.6	75.3	73.0
	Total	63.2	39.4	91.4	80.4	104.1	87.2	82.4	59.8	55.6
Total dependent children		119.9	105.8	97.4	97.8	100.2	112.9	104.6	131.3	133.6

Source : IT-SILC2004

One of the factors that influences the degree of poverty is the level of education. The higher is the latter, the greater are the opportunities to get better jobs, therefore higher income and hence a reduced risk of being poor. In order to sharpen the link between that factor and the child poverty, the highest level of education in the household is assumed as an indicator of the degree of education of the household members. As expected, the lower is the level of education, the greater is the risk of child poverty and deprivation (table 4). The fuzzy proportion of children in poverty is more than twice (2.2) the mean population if the household education is low, and it is a little more than a half (0.6) if the household education is high.

The differences are less stressed if the global non monetary deprivation indicator is considered (from 1.4 times for low educated household members to 0.8 times the mean for high educated household members). In any case, children living in households with a low education level suffer from high degree both of deprivation and poverty. More in details the dimensions of maximum deprivation are the lack of durables (+115%) and the inability to afford basic needs (+112%). Moreover, for that category of children also the level of environmental deprivation is considerably high (+40%). If the number of dependent children in the household increases, the level of deprivation and poverty rises consistently. For children in low educated households the global non monetary deprivation index as ratio of the mean population varies from 127 for one dependent child to 170 for 3 dependent children or more. Those differences are more stressed for the inability to afford basic needs and the lack of durables.

At this stage, it would be useful to enlighten the relationship between child poverty and the household work attainment. A measure of this last aspect could be the work intensity of the household, computed as ratio between the number of worked months by the number of 'workable' months by all persons of working age in the household.

As the household working intensity increases (table 5), the degree of poverty and deprivation decrease consistently, with stronger differences if the monetary indicator is considered. Children living in households with a working intensity equal to zero, that is with no members occupied for the whole year, are 68% more deprived than the mean value, therefore more than twice the degree of deprivation of children living in households with the maximum working intensity. They suffer primarily from lack of durables (+229%), incapability to afford basic needs (+163%). This bad condition, however, does not affect a considerable part of children (839.000 out of 12.220.000 dependent children in Italy)

Table 5 - Dependent children: mean fuzzy proportion of deprived by deprivation dimension, mean fuzzy proportion of poor and poverty rate by work household intensity (*values as ratio of total population mean*)

	indD1 Lack of ability to afford basic needs	indD2 Enforced lack of durables	indD3 Absence of housing facilities	indD4 Environmental problems	indD5 Housing deterioration	indD6 Subjective perception	global index non monetary deprivation	poverty index (fuzzy-set approach)	poverty rate (traditional approach)
Work household intensity									
Household with dependent children W=0	262.6	329.2	119.5	135.0	134.7	141.0	167.7	348.8	365.9
Household with dependent children 0<W<0.5	237.4	217.5	105.9	143.3	106.2	145.2	147.5	261.3	294.8
Household with dependent children 0.5<W<1	124.0	102.2	98.5	103.6	101.1	117.6	107.2	145.0	145.8
Household with dependent children W=1	60.7	42.3	89.8	72.9	91.5	94.4	79.8	44.0	37.7
Total dependent children	119.9	105.8	97.4	97.8	100.2	112.9	104.6	131.3	133.6

Source : IT-SILC2004

If in the household some members work for a part of the year or some of the people of working age do not work and the total months worked are below 0.5 the number of months workable, the global non monetary deprivation indicator is 147. To be pointed out the degree of subjective deprivation for children living in those households is slightly greater than the value registered for the case of household working intensity equal to zero. Around 5.570.000 dependent children live in those households.

Considering the principal household income source³ (table 6), it should be emphasised that dependent children living in households where self-employment is the main source of income are less deprived than the total population, even though they have a higher risk of poverty. The explanation of that could be found in the under-reporting of income by the self-employed that could justify a worse position of their household in relation to the others if income is considered, while their situation is not so bad if other material non monetary indicators are taken into account. Confirmation of that relationship between the

³ The main household income source is the one from whom the highest share of income is derived

monetary and the non monetary indicator could be observed also for the population as a whole, but it is stronger for those households with children.

Children living in households with wages and salaries as main income source run a slightly higher risk of being deprived (+5%) and poor (+10) than the population mean, but with respect to the global situation of dependent children they are as deprived as the rest of children and less poor of them (+31%). Where the main source of household income is made up by social transfers the risk of being poor and deprived is considerably high, mainly for the first two deprivation dimensions. This condition, however, regards only 924.000 out of 12.220.000 dependent children in Italy. In general the presence of transfers among the source of income is connected to higher risk of deprivation and poverty.

Table 6 - Dependent children: mean fuzzy proportion of deprived by deprivation dimension, mean fuzzy proportion of poor and poverty rate by main household income source, by number of income recipients, by income shared received by females, by presence of income transfers (values as ratio of total population mean)

	indD1 Lack of ability to afford basic needs	indD2 Enforced lack of durables	indD3 Absence of housing facilities	indD4 Environmental problems	indD5 Housing deterioration	indD6 Subjective perception	global index non monetary deprivation	poverty index (fuzzy-set approach)	poverty rate (traditional approach)
MAIN HOUSEHOLD INCOME SOURCE									
wages and salaries	114.2	97.8	99.1	99.4	102.0	118.3	105.2	109.7	107.2
self-employment	93.8	69.3	88.8	83.9	88.4	93.8	87.8	134.2	146.1
social transfers (including pensions)	201.5	192.7	104.6	116.1	117.8	122.8	133.5	217.1	225.0
others	237.9	373.0	105.6	117.7	105.1	130.6	155.2	371.4	390.8
N OF INCOME RECIPIENTS									
1	208.7	225.5	113.9	133.5	120.2	137.7	145.9	246.2	267.5
2	88.6	62.8	93.5	85.4	91.8	104.3	90.5	97.9	95.5
3+	95.8	73.7	86.2	86.7	98.6	107.8	92.7	77.4	70.8
INCOME SHARE RECEIVED BY FEMALES									
zero	184.3	175.2	110.8	118.0	109.3	130.7	131.5	229.0	245.2
up to 25%	96.6	73.0	90.9	101.8	90.8	106.2	94.6	104.1	98.9
25%-49%	72.0	47.4	85.9	73.1	97.1	95.9	82.2	47.5	40.3
50%-99%	85.9	75.2	94.6	89.6	93.7	108.7	93.3	84.6	83.7
100%	174.4	194.9	107.4	116.1	114.0	130.6	131.6	224.2	232.3
PRESENCE OF INCOME TRANSFERS (SOCIAL AND PRIVATE)									
No	85.1	75.2	92.8	78.7	100.0	94.6	89.5	127.4	133.8
Yes	137.9	121.9	99.6	107.6	100.3	122.3	112.6	133.3	133.5
Total dependent children	119.9	105.8	97.4	97.8	100.2	112.9	104.6	131.3	133.6

Source : IT-SILC2004

If the number of income recipients is at least 2, children suffer relatively less from deprivation and poverty. Confirmation of the importance of other sources of income different from the one of the household head, is given also by the share of total household income received by females. When it is zero, that is when it is likely to have one recipient household, the risk of being deprived and poor rises. That risk is minimum when the share of total household income earned by females is between 25% and 49%, that is women contribute to the total household income, but they are not the main recipient. On the other hand, when women contribute to the 100% of the total household income and therefore are the sole recipient, the risk of being deprived and poor rises for the children of those households. Most of these households are headed by a single female parent (over 72% of dependent children live in a single female parent households out of those with a sole female recipient).

5. Some final remarks

Children are a weak subgroup of population as they are not able to influence their own economic condition. But the future progress of a society is affected by their success in later life that is strictly tied to the opportunities they have in the household they live in. For these reasons, from a political point of view, it is important to prevent and to reduce bad economic situations that could affect households with children.

In this paper the level of child poverty has been analysed with respect to the Italian context. As the multidimensional nature of poverty is widely recognised, the approach used takes into account not only the more traditional poverty indicator based on income, but a set of deprivation indicators that should give a better picture of the phenomenon.

Five main material deprivation dimensions and a subjective one are considered in order to synthesize 36 elementary deprivation indicators constructed on the base of 2004 Italian SILC data 2004. A fuzzy-sets approach is used to assess the degree of deprivation of each individual for all the elementary indicators and an aggregation of the membership fuzzy sets functions is performed to obtain the synthetic degree of deprivation for the main dimensions identified.

The comparison of the mean degree of deprivation across different subgroups of population, has allowed us to highlight that children are more at risk of deprivation and poverty than the rest of the population. If the different dimensions are analysed, children suffer more from the incapability of their household to afford basic needs and from the lack of durables. Also from the subjective indicator, it seems that children live in households with worse perception of their economic situation. By focusing only on children and distinguishing them into groups according to their household characteristics, we have emphasized that the education household attainment affects both the level of poverty and of deprivation: children living in low educated households have 3.6 times the risk of being poor than a high educated household and 1.7 times the risk of being deprived. Moreover the presence of other dependent children in the household increases the deprivation and risk of poverty. The risk is particularly high when the work household intensity is less than 0.5 and when there is only one income recipient in the household. It has been shown the importance of complementary source of income other than that one of the household head. In fact the risk of being deprived and poor rises when the share of total household income received by females is zero or, on the opposite, when the women are the sole recipient, being those households headed most frequently by single female parent.

In this work deprivation and poverty have been analysed as separate indicators across different subgroups of population. Generally, the evidences from the two indicators are consistent, except for children living in households with self-employment as main income source.

Further analyses could be performed measuring how much poverty and deprivation affect simultaneously the same individuals, which identify a condition of accumulation of

disadvantages, more intense and difficult of situation where only some hardships are present.

Moreover the availability of the second wave of data could allow enlarging the fuzzy-sets approach to child deprivation and poverty through a longitudinal development of the analysis.

At the same time the fuzzy-sets approach applied here could be extended for a cross European countries comparison of child poverty and deprivation in order to enlighten if some factors could affect child poverty differently.

References

- Betti G, Verma V.K., 1998, *Measuring the degree of poverty in a dynamic and comparative context: a multi-dimensional approach using fuzzy set theory*, Università di Siena, Dipartimento di Metodi Quantitativi, Working Paper n. 22.
- Cheli B., Lemmi A., 1995, *A Totally Fuzzy and Relative Approach to the Multidimensional Analysis of Poverty*, *Economic Notes*, vol. 24, n. 1, pp. 115-134.
- Duncan G.J., Yeung W-J, Brooks-Gunn J., Smith J., 1998, *How Much Does Childhood Poverty Affect the Life Chances of Children?*, *American Sociological Review*, vol. 63, n. 3, pp. 406-423
- European Commission, 2003, *DRAFT JOINT INCLUSION REPORT, Statistical Annex*, Luxembourg.
- Eurostat, 2002, *European social statistics, Income, poverty and social exclusion:2nd report*, Luxembourg, Office for Official Publications of the European Communities.
- Istat, 2004, *La situazione finanziaria delle famiglie e degli individui in Italia e in Europa - Anni 1994-2000, Panel Europeo sulle famiglie (ECHP) 1994-2000*, Informazioni N.6/2004.
- Sen A., 2000, *Lo Sviluppo è libertà*, Mondadori, Milano.
- Zadeh L.A., 1965, *Fuzzy sets*, *Inform.Control*, n. 8, pp. 338-353.
- Zimmermann H. J., 1996, *Fuzzy Set Theory and its Applications*, Kluwer Academic Press, Dordrecht.