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Composite Index for Quality of Life in Italian Cities: An Application to URBES Indicators

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Abstract: *Il Benessere Equo e Sostenibile nelle città* (URBES) Report, drawn up by the Italian Institute of Statistics (ISTAT) offers a set of relevant indicators to assess the quality of life (QoL) in fourteen big Italian cities. These indicators belong to the twelve dimensions of well-being identified by *Benessere Equo e Sostenibile* (BES), the dashboard of indicators provided by ISTAT and the National Council of Economy and Labour (CNEL) in 2013 to evaluate the differences in well-being among the Italian regions. Our paper uses this set of data to highlight the Italian urban situation, through the construction of a composite indicator. The selected methodologies to do that are additive model, factorial analysis and Borda method. We obtain a ranking that shows what context can allow positive levels of QoL. This study drops in a critical phase: Italian territorial administration is going to be modified and "Metropolitan Cities" will be assumed an increasingly important role.

JEL Classifications: I32, C14, O15

Keywords: Quality of Life; Additive method; Borda method; Factorial analysis; Italian living conditions

1. Introduction

The increasing number of studies on the Urban Quality of Life is directly connected with the rise of the urban population in the world. Indeed, politicians and economists pay more and more attention to cities, and a large body of literature has developed, proposing alternative methods for measuring the quality of life in regions and municipal entities (see e.g. Lambiri et al. 2007).

The situation with regard to the Italian cities is at a crucial stage. Indeed a recent law (*L. 7/4/2014 n. 56*) modifies local authorities and creates new territorial entities: the "Metropolitan Cities" (Turin, Milan, Venice, Genoa, Bologna, Florence, Naples, Bari, Reggio Calabria and Rome). Therefore the bigger cities are going to play an even more central role both in institutional and in economic terms.

This article investigates the Quality of Life levels in the Metropolitan Cities, using data from the URBES Report (Istat, 2013). Then our aims are: to quantify URBES variables in order to provide an aggregate measure of urban well – being and, in the mean time, to check their suitability and consistency when this scope is pursued.

It is based on the framework of the BES Report (Cnel-Istat 2012, 2013), that appraises well-being in Italian regions by a great deal of variables, belonging to twelve different dimensions.

Using this data source we proceed to the construction of a composite indicator. Our purpose is to find which metropolitan cities achieve the better quality of life. The spatial dimension is not explicitly taken into account, given the methodology we are adopting. However, we believe that the obtained outcome is of some interest and could be confirmed by further different types of analysis that would be carried out on these topics.

In the first part of the article we briefly review the state of the art concerning the Urban Quality of Life (UQoL). In the second part we discuss the different methods to set up the indicator. Finally, the third part contains the results and the concluding remarks.

2. Urban Quality of Life

QoL is associated with the concept of social well-being, and traditionally it has been linked mainly with monetary factors such as GDP and cost of life. Then Townsend (1979) and the authors of the Scandinavian Welfare Approach (Erikson et al. 1987, Erikson 1993) singled out the multidimensionality of QoL, and after the contributions of Sen (1985, 1987, 1993, 1997), Dasgupta (2000, 2001), as well as the conclusions of the Stiglitz-Sen-Fitoussi Commission (Stiglitz et al. 2009), the multi-dimensionality of QoL is generally accepted.

Therefore there is widespread agreement (Brock 1993, Diener and Suh 1997, Dasgupta 2000, Johansson 2002, Offer 2003, Sirgy et al. 2006, Goosens et al. 2007, Grasso and Canova 2008, Bonatti 2014) that QoL can be analyzed through the economic, social, and subjective approaches and their respective families of indicators. This idea is appropriate also for the urban context: indeed urbanization encourages fast social and economic growth, but, at the same time, it causes several troubles, such as high population density, traffic, lack in housing and resources, noise, pollution, etc. (Li et al. 2009). Then it is necessary to consider a wide range of dimensions and variables to make a proper assessment of the Urban Quality of Life.

Thus cities have been defined as the most economically efficient spatial relationship between individuals (Royuela et al. 2010). The importance of the urban context in the economic debate has been confirmed in a report by the European Commission, which maintains that, urban areas are the foremost producers of knowledge and innovation and the hubs of a globalizing world economy, underlying the importance of cities both for material production, and also for the creation of human capital (European Commission 2007, see also Morais et al. 2013).

Thanks to these features, studying QoL in urban areas has attracted widespread research attention in recent years (see for example Johansson 2002, Das 2008, Dunning et al. 2008, Epley and Menon 2008, Rossouw and Naude 2008, Chen and Davey 2009).

In urban economics, many studies put QoL at the centre of their analysis and attempt to find ways to quantify it, while others deal with QoL indirectly and examine its role in determining urban processes such as growth, decline and competitiveness (Lambiri et al. 2007). In particular, they identify four urban QoL-related type of analysis in literature:

- ***Urban growth and urban competitiveness***. In the group of studies that approach QoL in an indirect way, we find analysis that focus on urban growth through the examination of location decisions of households and firms (Combes et al. 2012), both at an inter-city and at an intra-city level. They find out what determines the capacity of cities to attract people and economic activity (see also Rogerson 1999). Depending on the purpose of each study and if the analysis focuses on sustainable urban growth (Findlay et al. 1988, Glaeser et al. 2001) or inter-urban competition, the significance of each location-specific feature varies (Florida

2002, Moretti 2003, Shapiro 2006, Chesire and Magrini 2006, Royuela et al. 2010 among others). Also the relevance attributed to every QoL factor can change, whether the research centers on competition between cities or within cities (Chesire and Hay 1989, Glaeser 1998, Ivaldi 2006, Morais et al. 2013).

- ***Migration models, hedonic models and QoL***. In urban economic literature we find a strand of research about the role of QoL as a direct input to this decision-making process. The theoretical reasoning behind these studies is found in the revealed preferences approach that investigates the possibility to discover consumer preferences through their purchases (Douglas 1997, Wall 2001). This introduces the important link between QoL and spatial equilibrium. If households migrate to improve their QoL, then high house prices in the destination location should reflect high demand, assuming a rigid housing supply. With rational behaviour and efficient housing markets, we would expect high house prices to negatively affect immigration (Albouy 2008). For this strand of literature, the value of QoL is “capitalized” in the locally traded good (housing) and wages. Through what is called a hedonic price method the implicit prices of local attributes can be calculated and then used either separately or inside a QoL index, in order to rank cities (Rosen 1979, Roback 1982, Blomquist et al. 1988, Gyourko and Tracy 1991, Stover and Leven 1992, Giannias 1998, Berger et al. 2008).
- ***QoL indicators***. This category refers directly to indexes or indicators that measure QoL, with a multidimensional approach. D’Acci (2014) shows that Urban QoL is a hierarchical multi-attribute concept characterized by several underlying attributes: environment, parks, job availability, architecture quality, pedestrian areas, etc. They can be defined and evaluated by monetary (hedonic prices, willingness-to-pay, positional value), subjective (life satisfaction, subjective well-being, ranking/rating evaluation) and quantitative (urban attractions in the city and their distribution) criteria.
- ***City rankings***. National and international organizations periodically carry out inquiries providing QoL indicators in the urban centres (Liu 1976, Boyer and Savageu 1981). For example, in Italy, the newspapers *Sole24ore* and *Italia Oggi* classify annually the QoL in the Italian provinces.

3. Material and Methods

The first step is the selection of the dimensions and variables. As specified above, we consider the *URBES* Report available data (Istat, (2013)), which refers to particular indicators belonging to dimensions identified by *BES* (Cnel-Istat 2012, 2013). This group of dimensions is listened below:

3.1 Dimensions and Variables

In contrast to the BES report (Table 1), the URBES report does not take into account two dimensions: Social Relations and Subjective Well-being. This difference is mainly due to the lack of data at metropolitan level. For this reason, since the index, which it is proposed to build, refers directly to URBES data, we will not consider variables describing the two dimensions mentioned above. These 10 dimensions and corresponding specific explanations are shown in Table 2.

Table 1. BES dimensions

1. Health
2. Education and training
3. Work and life balance
4. Economic well-being
5. Social relations
6. Policy and institutions
7. Security
8. Subjective well-being
9. Landscape and cultural heritage
10.Environment
11.Research and innovation
12.Quality of services

Table 1 reports dimensions and variables considered by URBES framework. The data available in the URBES report, released by ISTAT and published in 2013, have been collected in 2011 – 2012[1], each variable in the same year for all cities. We assume that this slight difference doesn't weaken our results significantly[2].

In absence of dominance of one dimension over all others, some combination or aggregation is necessary in order to make QoL inter-individually comparable. The weighting of the relevant life domains is deemed a crucial, but very difficult issue by many authors. Therefore we have opted for equal weighting, both for dimensions and variables. Indeed, even though it would be desirable to assign different weights to the various factors considered, there is no reliable basis for doing this (Mayer and Jencks 1989). However, this does not mean no weighting, because equal weighting does imply an implicit judgment on the weights being equal (Nardo et al. 2005).

The second step is the aggregation of the variables, in order to describe the QoL in each city by a single index. We have used the following methods: factorial, additive and Borda. The use of three different methods aims at assessing the goodness of considered data, it is not intended to evaluate a comparison between methodologies. The task of this study is to evaluate well-being in Italian cities, not to compare results of particular methods; so what matters is to verify that the three procedures give very similar results, in order to affirm that the variables suggested by the report have descriptive significance. An high correlation among the indexes it could be considered a test for validation and robustness.

[1] Voter turnout is 2009, being referred to the election for the European Parliament.

[2] The choice of a few variables could appear disputable, thus some justification is needed. It must be remarked that we use the employment rate in the age range 20-64, instead of the usual 16-64, because this is the datum provided by BES. However, in order to capture "Work and life balance", the group 20-64 fits better. Indeed, it excludes young attending high school, who do not belong to people really disposed to work, since their "balance" bends rather towards a different choice. On the other hand, when they work, they often do jobs with reduced working hours, just in order to get money for their leisure time. Therefore, from the point of view of "Work and life balance", their contribution to the employment rate can be overlooked. The variable "Homicide rate" has been chosen by BES - Istat as an indicator of "security". Even though the crime rate might be deemed more appropriate, it would be greatly influenced by the different attitude towards legality, then the different number of charges filed in the various Italian regions, rather than the actual "security". On the contrary, the homicide rate mirrors facts that can hardly be concealed or not reported. A recent analysis of the European well-being, based on nine variables concerning security (ONU and Eurostat data) shows quite paradoxical results (e. g.: Sweden and Denmark in the bottom class; Romania and Bulgaria in the top classes) just for this reason (Bonatti 2014).

Table 2. Dimensions and variables[3]

Health	*Life expectancy at birth*. Life expectancy expresses the average number of years that a child born in a given calendar year can expect to live if exposed during his whole life to the risks of death observed in the same year at different ages.
	Infant mortality rate. Deaths during the first year of life per 10,000 born alive.
	Traffic accidents (15-34 years old): Mortality rate for traffic accidents (initial cause) by five year age groups for people aged 15-34 years
	Age-standardised cancer mortality rate (19-64 years old): Mortality rate for cancer (initial cause) by five year age groups for people aged 19-64 years
	Age-standardised mortality rate for dementia and related illnesses (people aged 65 and over): Mortality rate for nervous system diseases and psychical and behavioural disorders (initial cause) by five year age groups for people aged 65 years and over
Education and training	*Level of literacy*: Scores obtained in the tests of functional literacy skills of students in the II classes of upper secondary education
	Level of numeracy: Scores obtained in the tests of numeracy skills of students in the II classes of upper secondary education
Work and life balance	*Employment rate of people 20-64 years old*: (Employed persons aged 20-64 / persons aged 20-64) *100
	Non-participation rate: Unemployed persons aged 15-74 + part of the potential labour force aged 15-74 (persons who are inactive not having looked for a job in the past 4 weeks but willing to work) / Labour force aged 15-74 + part of the potential labour force aged 15-74 (persons who are inactive not having looked for a job in the past 4 weeks but willing to work)
	Incidence rate of fatal occupational injuries or injuries leading to permanent disability: Number of fatal occupational injuries or injuries leading to permanent disability/ Total employed population (excluding the armed forces)*1,000
Economic well-being	*Per capita adjusted disposable income*: Ratio of adjusted household disposable income (inclusive of the value of in-kind services provided by public and non-profit institutions) to the total number of residents.
Policy and institutions	*Voter turnout*: Percentage of eligible voter who cast a ballot in the last election for the European Parliament
	Women and political representation at municipal level: Share of women elected in municipal councils.
Security	*Homicide rate*: Number of homicide / population * 100,000
Landscape and cultural heritage	*Presence of historic rural landscapes*: Percentage ratio of areas classified as such by the National Inventory of Historic Rural Landscapes to the total area of the Region;

[3] For detailed references, see CNEL-ISTAT (2013) and ISTAT (2013).

	Conservation of historic urban fabric: Share of inhabited buildings realised before 1919 and in excellent or good state on the total number of building realised before 1919
Environment	*Drinkable water*: Volume of drinkable 1 water supplied every day per capita
	Quality of urban air: Number of exceeding the daily limit of PM10
	Urban parks and gardens: Square meters of urban parks and gardens per thousand inhabitants
Research and innovation	*Patent propensity*: Patent applications to the EPO per million of inhabitants
Quality of services	*Citizens who benefit from infancy services*: Percentage of children aged 0-2 who benefited from infancy services (crèches, micro-crèches or supplementary and innovative services).
	Separate collection of municipal waste: Percentage of municipal waste object of separate collection on total municipal waste.
	Density of urban public transport networks: Km of urban public transport networks per 100 Km^2 of municipal surface

3.2 Additive Index

The additive index consists in summing the partial indicators, usually not weighted. The partial indicators are often quantified in different units of measure. This requires their standardization, to avoid that some of them have more relevance with respect to the others (Jarman 1983, Jarman 1984, Townsend 1987, Townsend et al. 1988, Carstairs and Morris 1991, Forrest and Gordon 1993, Bartley and Blane 1994, DETR 2000, Testi and Ivaldi 2009, Ivaldi and Testi 2010, Ivaldi and Testi 2011). Indeed standardization converts all indicators to a common scale. The scaling factor is the standard deviation of the indicator across the countries. Thus, an indicator with extreme values will have intrinsically a greater effect on the composite indicator. This might be desirable if the intention is to reward exceptional behaviour, that is, if an extremely good result on few indicators is thought to be better than a lot of average scores. The result of the standardization process, the *z-score* of a variable, represents the number of standard deviations from its mean. (Salzman 2003, Nardo et al. 2005).

The general formula of the index for each *i-th* city is therefore:

$$ADDITIVE_i = \sum_j z_{i,j}$$

where $z_{i,j}$ is the *z-score* of each *i-th* (i=1,...,n) city for each *j-th* (j=1,...,m) partial indicator considered specified by the following equations:

$$z_{i,j} = \frac{(X_{i,j} - \mu_j)}{\sigma_j}$$

Where:

- $X_{i,j}$ is the observation of each *i-th* (i=1,..., n) city for each *j-th* (j=1,..., m) partial indicator.
- μ_j is the mean of each *j-th* variables.
- σ_j , is the variance of each *j-th* variables.

Note that if the frequencies of the partial indicators are not normally distributed, it is necessary to apply a variable transformation before standardization, to reduce the asymmetry of the distribution (Bland and Altman 1996, Osborne 2002). To find the appropriate transformation the Box Cox method (Box and Cox 1982) has been used.

This method turns to a family of transformations given by

$$x(\delta) = \frac{(x^{\delta}-1)}{\delta} \quad \text{with} \quad \delta \neq 0$$

$$x(\delta) = \ln(x) \quad \text{with} \quad \delta = 0$$

And one must use the values which, given an observations vector x = x_1, x_2, x_3,..., $x_{n,}$ maximizes the logarithm of the likelihood function in order to select the value of the parameter δ.

$$f(x,\delta) = -\frac{n}{2}\ln\left(\sigma^2_{X(\delta)}\right) + (\delta-1)\sum_{i=1}^{n}\ln\,(x_i)$$

After this transformation, z-scores were calculated for each observation, obtained by subtracting the means of the distribution from the observed, transformed value and dividing the result by the standard deviation of the distribution (Osborne 2002). Therefore, the index results from the sum of the z-scores. The advantage of an additive form is its simplicity.

Lastly, the index distribution was obtained, where values may be either negative or positive, going from the most affluent city (larger positive values) to the most deprived one (larger negative values).

3.3 Factorial Index

Factor analysis aims to summarizing the information contained in a matrix of correlation or variance/covariance, trying to statistically identify the latent and not directly observable dimensions (Stevens 1986). Therefore, by providing a principle of identification of these common factors, factor analysis describes in simple form the complex network of interpolations existing within the set of associated variables. This description allows to define, within the correlation matrix, a limited number of components independent of each other and identified with the factors: they explain the maximum possible variance of the variables contained in the original matrix of information (Dillon and Goldstein 1984).

Given an $n \times p$ matrix containing p variables on n units, it is necessary to verify the extent to which each variable is a repetition of the description given by the remaining p-1 and, therefore, if it is possible the same descriptive efficacy with fewer of these non-observed variables called factors. In the present application, in order to determine the latent dimension of the factors, the method of extraction of the principal components has been used. This method replaces the original variables with a fewer number of variables obtained as a linear transformation of the original ones, thus reducing the number of variables needed. This means that we must search for a series of transformation matrix, called principal components, that explain as much of the variance of the original variables as possible and that are orthogonal. To simplify the description of the phenomenon, the application of the method is as more useful as lower the number of components is, thus the process stops as soon as the part of the variance of the p variables extracted from the first q components is sufficiently large. So the analysis of the principal components generates a shift of the reference system at the centre of gravity: in fact, the only change is the viewpoint of the study.

Since the variables can be saturated in almost the same way by different factors, the problem of the rotation of the factors does exist (Krzanowski and Marriott 1994). The plurality of techniques for the rotation of factors causes indeterminacy in the factor solution, because one cannot decide which rotation is the best, not only when choosing between orthogonal rotation and oblique rotation, but even within the two types of rotation. This implies that contradictory sets of factor scores are equally plausible and the choice of a solution rather than another appears to be arbitrary (indeed all solutions explain the same variance (Guilford and Hoepfner 1971, Morrison 1976). However, in the analysis conducted to gain information about the latent structure of the observed data, the very existence of many mutually consistent interpretations can be considered a position of privilege and not a disadvantage (Johnson and Wichern 2002).

As for the present case, subsequent tests with different algorithms for extraction and rotation have showed a real stability of the extracted factors. We have applied the rotation Quartimax with Kaiser normalisation, which maximizes the variance of the saturation per line, concentrating as much variance as possible for each variable on a single factor (Carroll 1953, Jackson 2005). This rotation provides better results than the Varimax (Kaiser 1958) when the simplification of the first extracted factor is concerned, because it minimizes the number of the extracted factors and reduces the presence of the variance among factors obtaining the minimum number of factors for which the single variable gets significant weights[4].

The factorial index for each *i-th* urban reality consists in the factor score resulting from the factorial analysis on the partial indicators.

$$FACTORIAL_i = c_{i1}x_1 + c_{i2}x_2 + \ldots + c_{im}x_m$$

Where:

- $c_{i,j}$ are factor coefficients of each *i-th* (i=1,...,n) city for each *j-th* (j=1,...,m) partial indicator
- x_j (j=1,...,m) are the original variables

This value quantifies the position of each city in the component space, thus summarizing the information of all partial indicators (Michelozzi et al. 1999, Hogan and Tchernis 2004). Also in this case the index can assume both positive and negative values.

This method is considered acceptable when it explains variance at least 70% of each dimension. In this way, the variables making up the indicator represent a statistically significant portion of each of the dimensions taken into account, and therefore of the overall phenomenon. Indeed, scores which the construction of the factorial index is based on, is determined in accordance with the covariance between the variables: this implies that it can create distortions due to the presence of spurious correlations, or correlations with value fairly high, but without an effective and real relationships between variables. That's why it is needed a significant level of explained variance so that this effect can be considered less considerable.

3.4 Borda Index

The Borda method was born as the simplest weighted votation to allow the measurement of the individual preferences on different alternatives (Philip and Straffin 1980). This rule occupies a special place among all the positional scoring rules since it is less susceptible than all other rules to many unsettling possibilities and anomalies (Brams and Fishburn 2002, Nurmi 2002, Saari 1995, Saari 2001).

More recently (Grasso 2002, Grasso and Pareglio 2007, Ivaldi and Testi 2011) it has been

[4] For a thorough comparison between different types of rotations, see Abdi 2003. See also: Neuhaus and Wrigley 1954, Kaiser 1958, Dien et al. 2005).

utilized as an ordinal aggregation methodology to avoid subjectivity in giving cardinal measures to weigh single indicators. It is useful when partial indicators have different units of measure. The Borda method in presence of *n* alternatives to classify gives score *n* to the first position in the ranking for each alternative, then *n-1* to the second position and so on until the *n-th* position that is scored. The final index of each *i-th* city is simply the sum of the scores obtained for each *j-th* considered variable:

$$BORDA_i = \sum_j B_{i,j}$$

The final ranking of the cities is the same as the natural ranking of their scores. This rule allows to achieve a sort of alternative that can be interpreted as a social welfare function, because the criteria can be interpreted as votes that explicitly take into account the relative intensity of preference to the various alternatives being studied (Goodman et al. 1952).

Borda method offers the following advantages (Lansdowne and Woodward 1996): it reduces the need for subjective assessments, that are generally needed to construct utility functions in multiple attribute utility theory and to make pair wise comparisons in the analytic hierarchy process; it does not require the criteria to satisfy independence conditions; finally it needs only enough precision in data to determine a rank order for each criterion. In contrast, cardinal methods require additional precision to determine the degree of preference of one alternative over another.

Since this method basically consists in summing up ranks, it fails to grasp the wideness of the gaps between the statistical units. In addition to this, another problem is about the extreme values of the distribution: assigning scores in relation with ordinarity can lead to distortions of reality due to the possible presence of outliers far away from the other values, with their the effect on the index that can be underestimated.

4. Results

In this section, through the set of indicators defined above, we will assess and compare the results, focusing on the Additive because since it does not suffer the problems of the other methods mentioned above, it provides a better accuracy of interpretation. However, after calculating Spearman rank correlation coefficient on the three methods' results (see Appendix 1), a high similarity between the three rankings obtained has emerged (0.94)[5]. All results were calculated using Excel (Additive; Borda) and SPSS vers. 20 (Factorial analysis; Spearman) software.

We have reckoned the scores and set up the rankings, and in the three columns appear the number of classes, nations and scores. The index ranges from -18.29 to 14.51 (Tale 3). These scores have just a comparative meaning and express the distances between the cities, related to the phenomenon under scrutiny (urban Quality of Life). The score 0 indicates the average value. The literature suggests to divide the indicator's distribution on the basis of its parameters, or of deciles of population, to establish the classes (Carstairs and Morris 1991). In our case, the first method seemed more appropriate, since it allows to maintain the discriminatory features of the distribution (Carstairs 2000). Values $\pm(2/3)\sigma$ has been used as a cut-off of classes, together with 0, the mean value of the additive scores' distribution (Table 2.).

[5] More specifically, considering the Borda index, the same classes have been found; the differences with respect to the additive method are represented by changes of position within classes (Milan swaps position with Florence, Genoa is fourth in the rankings, Turin fifth, Venice sixth; in the last class Naples and Reggio di Calabria change position). The results of the factorial method set Milan at the second place; Venice, Florence and Turin being third, fourth and fifth respectively.

It is worthwhile to stress that the Index is only an ordinal measurement and the scores do not have any intrinsic economic interpretation. Similar considerations could be made for factorial and Borda methods.

The first group, which includes only Bologna, heads the ranking. The second group is made up of Florence and Milan. In the third group we find Turin, Venice and Genoa. The last three groups, set in the Central – Southern Italy, include Rome, Bari, Reggio Calabria and Naples.

Table 3. Index scores

Class	City	Score
1	Bologna	14.51
2	Florence	8.37
	Milan	7.44
3	Turin	5.14
	Venice	4.93
	Genoa	4.82
4	Rome	-1.47
5	Bari	-9.77
6	Reggio Calabria	-15.68
	Naples	-18.29

5. Discussion and Conclusion

The Index aims to creating a hierarchical order in relation to the Quality of Life of the Italian "Metropolitan Cities". It is a device to improve the decision – making process and optimize the allocation of territorial resources.

The results highlights the differences in QoL levels between the Southern Italian cities and the ones of Centre-North. Indeed in the first and second class are Bologna (with a very high score), Florence and Milan (whose scores are near, but quite far from Bologna), that is three cities in the Centre - North. They get the highest values in almost all variables considered, especially with regard to "Landscape and cultural heritage", "Quality of Services" and "Education and Training" and also the top levels of "Per capita adjusted disposable income".

In the third class appear the remaining three big cities of the north: Turin, Venice and Genoa. The gap between South and North is emphasized: in fact, no city in Northern Italy gets negative scores (i.e. below the average). Two of them (Turin and Genoa) are more populated than Bologna and Florence. There we have articulated stratification and considerable complexity of the social structure, large migration phenomena, constant and widespread urbanization process and hard consequences of industrialization, both in its last phase of sustained development - environmental depletion and massive exploitation of resources - and in the current slowdown - disadvantaged areas, deprivation and crime. This situation leads to a lacking distribution of QoL on all levels, due to the great deal of needs to meet, which get it difficult the choice of investment and the allocation of resources.

Slightly below the average is Rome, where the complex social structure appears overall in the large suburbs.

Finally, the last two classes include, with very low scores, the realities representative of Southern Italy: Bari, Reggio Calabria and Naples. They have recorded the lowest values with regard to almost all the variables taken into account by the URBES report.

Appendix 1. Results of Factorial index and Borda index

Factorial index	
Bologna	1.50
Milan	0.67
Venice	0.61
Florence	0.56
Turin	0.50
Genoa	0.12
Rome	-0.25
Bari	-0.57
Reggio di Calabria	-1.46
Naples	-1.68

Borda index	
Bologna	144
Milan	136
Florence	133
Genoa	120
Turin	119
Venice	115
Rome	87
Bari	74
Naples	60
Reggio di Calabria	49

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