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An Assessment of the Quality of Life in the European Union Based on the Social Indicators Approach

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Abstract This article carries out a multidimensional analysis of welfare based on the social indicators approach aimed at assessing the quality of life in the 25 member countries of the European Union. It begins with description of the social indicators approach and provides some specifications on its most controversial points. It then specifies the principles on which the social indicators were selected, describes the indicators chosen, and details the methodology employed in the empirical analysis. Its results are subsequently explained, in terms of both quality of life as measured by the general and the partial quality of life (QOL) Indexes, and their correlations with the two indicators commonly employed in the EU context for welfare analyses—GDP per capita and Unemployment Rate. The article also reports further information obtained by plotting the QOL Index against GDP per capita, the Unemployment Rate, and an indicator of subjective well-being.

Keywords European Union · Quality of life · Social indicators · Welfare

1 Introduction

There is widespread agreement among scholars (Brock 1993; Diener and Suh 1997; Johansson 2002; Sirgy et al. 2006) that the quality of life can be analysed with three methodological and theoretical approaches, economic, social, and subjective, which by and large make use in empirical applications of the respective families of (economic, social and subjective) indicators.[1]

[1] Different taxonomies of indicators exist, however. For example, Michalos (in Sirgy et al. 2006, pp. 344–345) defines as social indicators both those that we term 'social' and 'subjective'. In his

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The view that the economic approach based on the utilitarian notion of welfare can provide only a partial picture of the quality of life, and more broadly of well-being,[2] is now largely accepted by social scientists (Sen 1979, 1982, 1992; Erikson 1993; Dasgupta and Weale 1992; Dasgupta 1993, 1999, 2001). The economic conception of the quality of life relies only on the welfarist criteria of utility (in theory) and income (in application). The consequent measurements of welfare are generally derived from observation of the preferences revealed by actual choices, and interpreted in terms of the numerical representation of those choices.[3] This notion of welfare therefore reflects only the class of differences captured by the money metric, on the assumption of the economic rationality of self-interested utility maximization. Moreover, this utilitarian approach to welfare does not take account of the diversity among human beings and of the heterogeneities of contingent circumstances. Income may more exactly be regarded as a means to achieve an acceptable standard of living, rather than as an end in itself, because there are other important dimensions of welfare which it does not encompass—health, education, social bonds, longevity, employment, environmental conditions, safety, civil and political freedoms—which only an approach based on broader bases can unravel.[4] From this perspective, economic indicators cannot be considered correct proxies for the quality of life, for they arbitrarily include and exclude certain items, do not take account of distributional considerations, and originate from market valuations which are not linked to social well-being and/or life fulfilment (Land 1983, p. 3). In a theoretical perspective, therefore, income cannot grasp the quality of life of individuals and societies in their complex ramifications, even though in some specific realities it can be, on practical grounds and for coarse-grained analyses not linked with policy-making, a good proxy for the quality of life, as our ensuing empirical analysis conducted on the 25[5] member countries of the European Union demonstrates.

The social indicators approach adopted by this article is explained in depth in Sect. 3. Suffice it to say here that it encompasses by and large the dimensions of welfare neglected by economic indicators and that it aims to set out characteristics inspired by normative aims, be these grounded in moral values or policy goals, for the definition of the quality of life (Diener and Suh 1997, p. 189).

The third approach, the one based on subjective indicators, addresses the experience of individuals in terms of life satisfaction, pleasure, and achievement. To explore these dimensions, it is necessary "to directly measure the individual's cognitive and affective

Footnote 1 continued
classification the former are 'objective' indicators, and the latter are 'subjective' ones. Erikson (1993, p. 77) maintains instead that the terms 'objective' and 'subjective' are misleading, and suggests the use respectively of 'descriptive' and 'evaluative'. For a thorough review of the fundamental concepts used in social indicators research see Michalos (in Sirgy et al. 2006, pp. 344–352).

[2] Similarly to Noll (2002, p. 51), meant by 'well-being' here is the "constellation of good living conditions and positive subjective well-being".

[3] In the traditional utilitarian framework (from Bentham, to Edgeworth, Marshall, Pigou), the concept of utility is simply a matter of pleasure, happiness, or desire fulfilment. The main limitation of this view is that it sees utility in terms of a mental metric, which is highly subjective and hence may be misleading. A complete critique of the shortcomings of the utilitarian approach would, however, be beyond the scope of this article.

[4] Furthermore, even if the focus were solely on the materialistic aspects of welfare, income would only coincide with economic welfare in a situation of perfect competition, where all individuals had the same preferences (Atkinson and Bourguignon 2000).

[5] Our analysis does not include Bulgaria and Romania, who became members of the EU on 1 January 2007.

reactions to her or his whole life, as well as to specific domains of life" (Diener and Suh 1997, p. 200). If properly measured, subjective indicators yield reliable information on the quality of life (Veenhoven 1996), and are by no means less 'scientific' than economic or social ones (Noll 2004, p. 159). Nonetheless, they also have a number of weaknesses due mainly to the fact that they depend on personal and temperamental characteristics of the respondents: "[t]he problem with an approach based on people's own assessment of their degree of satisfaction is that it is partly determined by their level of aspiration, this is, by what they consider to be their rightful due" (Erikson 1993, p. 77). Moreover, the perception of subjective well-being varies greatly among countries, owing to their diverse cultural, historical and traditional backgrounds. Hence successful measures of subjective indicators of well-being should refer to communities bounded by homogeneous values. By contrast, the objectivity of social indicators makes it "technically convenient to make comparisons of social indicators across nations, regions, demographic sectors and time" (Diener and Suh 1997, p. 193).

In short, this article seeks to operationalize the concept of quality of life objectively according to a common standard based on resources and living conditions which enable individuals to pursue their life projects.[6] Our ultimate goal is in fact to give the most extensive definition possible of welfare. Such a definition should in our opinion include both input and output oriented indicators in order to capture the ability of governments of providing citizens with proper access to the resource basis, and the way in which the latter is traduced into quality of life. This perspective ultimately refers to the Scandinavian Level of Living Approach, which views welfare as "individuals' command over resources in terms of money, possessions, health, education, family, social and civil rights, etc. with which the individual can lead his life" (Johansson 2002, p. 25).

Section 2 presents the social indicators approach and provides some specifications on its most controversial points. Section 3 defines the principles applied when we selected the social indicators for our empirical analysis and describes the indicators selected. Section 4 presents the results of the empirical analysis. Finally, the main points of the article are summarized, and some reflections are conducted.

2 The Social Indicators Approach

Concern with the quality of life developed in the late sixties as a response to the no longer satisfying pursuit of material well-being and economic growth dictated by the dominant prescriptions of neoclassical economics. The approach used in this article to define and quantify the dimensions of the quality of life in the EU is, as mentioned, based on social indicators. It enables, we believe, the definition of a very broad notion of the quality of life which encompasses its various elements, highlights the multifaceted dimensions of welfare, and makes the scope of welfare analyses wider than those based on material standards alone.

Broadly speaking, social indicators are data, which can be used to analyze social systems. There are, however, various specific definitions of them,[7] all of which focus,

[6] We, nonetheless, also acknowledge that social and subjective indicators can be combined to gain a more powerful picture of the quality of life (Veenhoven 1996, Diener and Suh 1997, pp. 206–213, Noll 2004, p. 159) and that this is "nowadays the prevailing research strategy" (Noll 2002, p. 51). Indeed, in Sect. 4.4 we check the fitting of our ranking built up on social indicators with one based on subjective indicators.

[7] For a review of these definitions see for instance Michalos (in Sirgy et al.) 2006, and Noll 2004. For an exhaustive analysis of strengths and weaknesses of social indicators see Diener and Suh (1997, pp. 193–200).

explicitly or implicitly, on living conditions in critical areas of social systems. Operationally, an analysis based on social indicators has two main purposes: to monitor social change, and to measure individual and aggregate welfare (Noll 2004, p. 154). This article seeks to do the latter. It considers social indicators to be direct normative measures of the quality of life: when they move in the right direction while all other elements in the context remain steady, they indicate an improvement for all citizens.[8] Social indicators can ultimately be taken to be, as Olson (1969) suggests, "statistic(s) of direct normative interest which facilitates concise, comprehensive and balanced judgements about the condition of major aspects of a society".

Measuring individual or societal welfare requires one to have a notion of what constitutes a 'good life' or a 'good society' (Noll 2002, 2004), and of what are the most important resources and conditions for pursuit of a good life (Erikson 1993; Johansson 2002). Different views of the good life imply different notions of welfare and the quality of life. As mentioned in the Introduction, this article adopts the Scandinavian Level of Living Approach, the central element of which is the individual's command over resources and conditions "in the form of money, possession, knowledge, mental and physical energy, social relations, security and so on, *through which the individual can control and consciously direct his living conditions* [italics in the original]" (Erikson 1993, pp. 72–73). The focus of this approach is on objective elements of the quality of life, rather than on their subjective perceptions by individuals, for it tries "to assess the individual's level of living in a way which makes it as little influenced as possible by the individual's evaluation of his own situation" (Erikson 1993, p. 77). On this view, therefore, the notion of welfare broadens to include "health, education, work, family, social and civil rights, etc., ...resources with the help of which the individual can control and consciously direct his or her life" (Johansson 2002, p. 25). In other words, the focus on resources and conditions avoids the sole concern on the degree of individual's needs satisfaction, emphasizing instead her/his capacity to fulfil those needs, and ultimately to make her/his life a good one. Consequently, we have chosen to focus solely on social indicators because of our conviction that the notion of quality of life itself requires that individuals be able to choose the life that best suits them (a goal ultimately pursued through the 'commanded' resources and conditions) more than because of the intrinsic limitations of subjective indicators or because of the incompleteness of the picture yielded by the economic approach.

It should also be stressed that when resources and conditions are examined, the use of objective (or descriptive, as Erikson prefers) indicators seems unavoidable,[9] because they are deliberately designed to describe the resources and conditions that individuals can exploit to improve their lives and to pursue their life projects. It is very interesting to note that, as Erikson himself (1993, p. 73) acknowledges, the social indicators approach and Amartya Sen's capability approach are very similar: "[r]esources, as understood here, seem to be very close to Sen's concept of capabilities". Sen's capability approach in fact requires "a broader informational base, focusing particularly on people's possibility to choose the life they have reason to value" (Sen 1999, p. 63). Thus the capability approach,

[8] This notion is coherent with the needs of policy-making, for it considers the purpose of public policies (programmes, projects) to be the improvement of indicators. This implies that (a) the society agrees that improvement is necessary; (b) it is possible unambiguously to define improvement; (c) it makes sense to aggregate indicators at the level where the public intervention is defined.

[9] Conversely, when welfare is understood as needs satisfaction, it is natural to ask people whether they are satisfied or not, and thus to use subjective ('evaluative', in Erikson's vocabulary) indicators.

too, highlights the social and economic factors which give people the opportunity to do and to be what they consider valuable.[10] On theoretical grounds, the main differences between the social indicators approach and the capability one is that the former basically provides a 'snapshot' of the quality of life, and therefore implies a static notion of welfare grounded in reality as it is perceived. Hence, where Sen's approach conveys a dynamic notion of welfare as the freedom to achieve one's own most valued life project, the social indicators approach assumes a static perspective which conceives welfare as a situation that produces a given quality of life for individuals at a certain point in time. On practical grounds, however, we assume that the strength of the social indicators approach is that it is more directly useful for public decision-making, as Dasgupta points out (1999, p. 8): "the...reason we seek a quality-of-life index is that we need ways to evaluate alternative economic policies". In fact, although this article does not explore the causality relationships with policy-making, the information obtained from social indicators may form the basis for more informed public decision-making. Put slightly differently: social indicators are necessary for policy-making because they are based on factual elements, and the goals of policy-making should be expressed in terms of such elements, not in terms of people's capability to achieve their life projects.

An objection might be raised at this point. The satisfaction of needs, and eventually happiness, are indeed crucial components of welfare. Why neglect them, therefore, since they could be rather easily captured by subjective indicators? The answer to this question resides in the overall goals of the analysis, as well as in its philosophical underpinnings, and can also be seen as one more reason for our choice of social indicators. As far as the first point is concerned, social indicators are used to support (and evaluate) public decision-making, and they inform and orient public actions. In regard to moral bases, the liberal theories of the state, which the social indicators approach implicitly endorses do not argue that the government should enter the sphere of happiness. Rather its role is to make basic liberties, rights, goods and services available to citizens, establishing a framework of rules that, through commanded resources and other contingent conditions, allow individuals to pursue their own ends. On this view individuals are not simply recipients of utility and satisfaction; rather, they have the potential to do things, to decide their projects, and to achieve their goals. The language is therefore that of rights and freedoms, not that of happiness, where individuals are represented only by the extent to which their preferences and desires are satisfied. The social contract thus cannot and should not concern itself with the satisfaction or the happiness of individuals. Even if happiness in itself is a good thing, it does not lie within the government's purview, for it does not have the information that individuals instead possess about their possibilities of living a happy life. The government must provide citizens with proper access to the conditions, goods and services necessary to enjoy the freedom to pursue their interests. Consequently, the government must not consider the use that citizens make of freedom, rights, goods and services to achieve their happiness. When evaluating the behaviour of the government, therefore, attention should focus on the availability of the resources and conditions that allow pursuit of the good life, a circumstance that ultimately calls for the use of social indicators.

[10] More specifically, Sen suggests that welfare (he defines it 'well-being') should be considered in terms of functionings and capabilities. Functionings relate to what a person may value doing or being: they are the living conditions achieved by an individual and represent a set of interrelated activities and states ('doings' and 'beings') forming her/his life. Capabilities concern the ability of an individual to achieve different combinations of functionings and define the freedom to choose the life that s/he prefers.

A final *caveat*: the social indicators approach concentrates on evaluation of individual welfare in terms of the quality of life as measured by socio-economic indicators. Consequently, the aggregate welfare of a given group of individuals, in our empirical analysis a EU country, corresponds to the average welfare of the group.[11] This is also the level at which the usual economic and socio-economic measurements are applied (for example, per capita national income, or the Human Development Index of the United Nations Development Programme).

3 The Quality of Life According to the Social Indicators Approach

3.1 The Selection of Social Indicators

For the purposes of the empirical analysis, the selection of social indicators had to take account not only of the aims of social development encompassed by the chosen notion of welfare as command over resources, but also of the objectives and goals of welfare and social development proper to the area of analysis, in our case the European Union.

As far as the first point is concerned, the list of components of welfare which informed the selection of social indicators for our empirical analysis was the one emerging from the Swedish Level of Living Survey, as synthesized by Erikson (1993) and Johansson (2002). It includes:

1. Economic resources and consumers' conditions,
2. Employment and working conditions,
3. Education and access to schooling,
4. Health and access to medical care,
5. Family and social relations,
6. Housing and amenities,
7. Culture and recreation,
8. Security for life and property,
9. Political resources and participation.

According to Johansson (2002), this list of components is very similar to lists from other countries, despite their differences of political, social and cultural conditions. This circumstance suggests that there is "a high degree of universalism in what is considered as social concerns in all countries" (Johansson 2002, p. 26), due to the fact that "the human condition is basically the same everywhere. Some of the problems and challenges facing people over the life cycle in every society must be solved collectively." (Johansson 2002, p. 26).

Significantly, the Swedish Level of Living list of indicators is also similar to the prescriptions that have emerged in the recent European debate on the social indicators of national performance as synthesized by the so-called Atkinson's report,[12] which represents an authoritative view currently influencing EU policy-making. This report highlights the

[11] The reason for this is provided by Harsanyi (1988), who points out that the standard of living of a society is given by the expected standard of living of the individual that has equi-probability of finding her/himself in the place of each member of the society.

[12] We refer to the report prepared in 2001 for the Belgian Government EU presidency (Atkinson et al. 2002), which develops a platform of social indicators with which to examine and evaluate the situations of member countries and their responses to EU social policies.

areas on which social indicators should focus, clarifies the principles that should determine their selection, and suggests a list of indicators. It maintains that the main fields covered by indicators should be the following: the economic dimension (income, its distribution, and poverty), (un)employment, regional disparities, education, housing, health and social participation.[13]

Turning to the second aspect, crucial for fruitful application of the approach proposed is proper identification of indicators covering the relevant dimensions of current economic and social welfare and coherent with the social, political and economic context under scrutiny: that is, the 25 member countries of the EU. In fact: "value and goals of societal development are not only dealt with on a conceptual level within the social sciences, but they are also part of political programmes and measures." (Noll 2002, p. 63). In other words, when indicators are being selected, attention should also be paid to the circumstance that the more that objectives and goals are shared within a community, the greater are their acceptability and likelihood. Hence, from a policy-oriented perspective, it is essential that goals be acknowledged at institutional level. For this reason, we maintain that the political and conceptual referents for the choice of indicators should be the objectives and goals of the EU as set out by the Treaty of Rome establishing the European Community (1957), the Treaty on the European Union (Maastricht 1992), and the amendments to the Treaty of Amsterdam (1997).[14] Broadly speaking, the first objective is economic and social progress, the second is the strengthening of economic and social cohesion, and the third is the sustainability of development. As said, the indicators selected measure only the current magnitude of welfare, not its sustainability. In fact, by sustainability we mean the capacity to provide a level of welfare, which does not diminish over time. Accordingly, an indicator of current welfare includes elements, which cannot grasp the diachronic core of sustainability. Therefore, when defining our set of social indicators, we did not consider the third objective—sustainability—of EU policies.

Furthermore, if social indicators are coherently selected according to the political and social contexts of analysis, they provide policy-makers with valuable information for dealing with societal dynamics properly. In Noll's words: "This requirement can be fulfilled by considering the goals and objectives tackled by current policies of the European Union. These goals and objectives are agreed upon the different Member States and—since they are ultimately the results of a democratic decision-processes—they may also be considered as common concerns of the majority of European citizens... This indicator system... will serve the function to measure progress towards political goals and specific target." (Noll 2002, p. 63).

In brief, the political objectives and the consequent goals of the EU policies, which determined—jointly with the indications of the Swedish Level of Living Approach with

[13] The report also lays down six principles that should inform the selection of indicators (ability to capture the essence of the problem and to receive an agreed normative interpretation, statistical validity and robustness, responsiveness to policy interventions, comparability across member countries and with international standards, appropriateness and possibility of revision, undemanding measurement processes) and three principles that apply to the set selected (it should be balanced across different dimensions; its elements—the indicators—should be mutually consistent and have proportionate weights; it should be transparent and accessible).

[14] There are, obviously, many other official documents of the European Commission—White Papers, Communications, Action Programmes—that outline the specific and general objectives of European policies. A similar framework, based on the provisions of the three main documents pointed out has been used to rank well-being in the Italian regions (Grasso 2002).

Table 1 Objectives and goals of EU's policies

Objective I—Economic and social progress, improvement of the quality of life
Goal 1—Improvement of economic conditions
Goal 2—Employment creation and struggle against unemployment
Goal 3—Improvement of education
Goal 4—Improvement of health and security
Goal 5—Reduction of pollution and improvement of environmental protection
Objective II—Strengthening of economic and social cohesion
Goal 6—Reduction of regional disparities
Goal 7—Strengthening of social bonds

which they by and large overlap—our choice of social indicators are summarized in Table 1.

3.2 Objectives, Goals and Indicators

We now briefly describe the indicators selected in accordance with the above specifications.

The indicators used in our empirical analysis were in some cases closely correlated. But this is not necessarily a weakness of the study, because factor analysis, the technique employed to aggregate the data (described in the Appendix), is a multivariate statistical tool supposed to help in disaggregating a set of data correlated by definition: the first common factor is in fact the proportion of common variability that the entire set of data contributes to explain. Rather, we maintain that the use of kindred indicators strengthens the analysis, for it makes possible to capture the complex facets of the quality of life, which in developed countries can be a matter of nuances.

The set of indicators[15] is now presented following the classification of Table 1. At the end of Sect. 3.2 a synoptic table (Table 2) will summarize the sources from which the indicators were taken.

3.2.1 Objective 1—Economic and Social Progress, Improvement of the Quality of Life

The first objective of the EU's policies includes five goals: improved economic conditions, higher employment and lower unemployment, greater educational provision, improved health and security, and environmental quality.

Goal 1—Improvement of Economic Condition: The economic condition is usually approximated by disposable personal income, which represents the degree of command exerted by an individual over the market goods and services that determine her/his material standard of living. We chose income instead of personal expenditures, because income is a true means to command resources as required by our notion of welfare (Erikson 1993; Johansson 2002). The proper indicator in this context is 'Gross Domestic Product—GDP' (GDP—constant 2000 US$).

[15] All indicators used in this article refer to year 2000.

Table 2 Selected indicators (Year 2000): definitions and sources

Acronym	Definition	Source
GDP	Gross Domestic Product per-capita (constant 2000 US$)	World Bank—World Development Indicators
RRPG	Relative at Risk of Poverty Gap	Eurostat
TER	Total Employment Rate	Eurostat
TU	Total Unemployment	World Bank—World Development Indicators
SE	School Expectancy	Eurostat
TPSE	Total Public Spending on Education (% of GDP)	World Bank—World Development Indicators
PTR	Pupils-Teacher Ratio	World Bank—World Development Indicators
LEB	Life Expectancy at Birth (years)	World Bank—World Development Indicators
IM	Infant Mortality (per 1,000 life births)	Eurostat
IT	Incidence of Tuberculosis (per 100,000 persons)	Eurostat
HEPC	Health Expenditure Per Capita (current US$)	World Bank—World Development Indicators
THE	Total Health Expenditures (% of GDP)	World Bank—World Development Indicators
TMTR	Total Major Thefts Recorded (rate per 100,000 persons)	United Nations Surveys of Crime Trends and Operations of Criminal Justice Systems
TRR	Total Rapes Recorded (rate per 100,000 persons)	United Nations Surveys of Crime Trends and Operations of Criminal Justice Systems
PKRA	People Killed in Road Accidents (per 100,000 persons)	Eurostat
CC	Control of Corruption	Governance Matters V: Governance Indicators for 1996–2005
TRET	Total Revenues from Environmental Taxes (€ ml.)	OECD Database on instruments used for environmental policy and natural resources management
RE	% of Renewable Electricity on gross electricity consumption	OECD Database on instruments used for environmental policy and natural resources management
NEL	Number of Environmental Laws	OECD Database on instruments used for environmental policy and natural resources management
R&D	Research and Development expenditure (% of GDP)	World Bank—World Development Indicators
GE	Government Effectiveness	World Bank—Governance Matters V: Governance Indicators for 1996–2005 (Kaufmann et al., 2006)
RQ	Regulatory Quality	World Bank—Governance Matters V: Governance Indicators for 1996–2005 (Kaufmann et al., 2006)
ROL	Rule Of Law	World Bank—Governance Matters V: Governance Indicators for 1996–2005 (Kaufmann et al., 2006)
R&C	Recreation and Culture expenditure (% of total household consumption)	Eurostat
TESP	Total Expenditure on Social Protection (% of GDP)	Eurostat
ERF	Employment Rate of Females	Eurostat
V&A	Voice and Accountability	World Bank—Governance Matters V: Governance Indicators for 1996–2005 (Kaufmann et al., 2006)

In order to specify economic conditions more precisely, an indicator of inequality was included in our set to capture distributional aspects which consideration of mean income alone cannot depict. We selected for this purpose the indicator 'Relative at-risk-of-poverty gap' (RRPG).[16]

Goal 2–Employment Creation and the Struggle against Unemployment: The second goal is a priority of EU economic policies,[17] and it is also central to the Swedish Level of Living Survey. Its achievement is measured by the employment rate among individuals aged 15–64, which at the EU level is the key variable in analysis of labour-market dynamics. The relevant indicator is 'Total Employment Rate'[18] (TER). Another significant indicator is 'Total Unemployment' (TU), calculated as a percentage of total labour force.

These indicators are, in principle, closely correlated with income, in that they reduce the possibility of individuals to access monetary resources. However, we include TU because, besides reducing disposable income, it affects welfare in other ways. Sen (1997) for instance lists the following non-income impacts: loss of freedom, social exclusion and familial instability, loss of skills and cognitive abilities, psychological harm, reduction of motivation and of civil and political participation. Similarly, Blanchard (1990, 2004) focuses his attention on the determinants of long-term unemployment, especially with regard to the European context and the phenomenon of hysteresis, highlighting the dimension of pain embodied by this condition: "[w]orkers, on the other hand, focus on the pain of unemployment, and argue that such pain should be taken into account by firms when they consider closing a plant, or laying off a worker" (Blanchard 2004).[19]

From this broader perspective there emerges the relevance of the non-income repercussions of labour dynamics. It therefore seemed appropriate to include both TER and TU among the indicators of economic and social welfare.

Goal 3—Improvement of Education: Education is essential to increase occupation and advance the overall competitiveness of the EU, as well as to augment people's self-esteem and their sense of command over their life circumstances. Educational level is a decisive element, to put it *à la* Sen, in a person's capability to realize the life project that she/he intends to pursue. The indicators selected to capture this dimension were composite in nature. We relied on 'School Expectancy'[20] (SE). Another indicator selected

[16] RRPG is calculated as the difference between the median equivalised total net income of persons below the at-risk-of-poverty threshold, expressed as a percentage of the at-risk-of-poverty threshold. The cut-off point is fixed at 60% of median equivalised income. In line with decisions of the European Council, the risk-of-poverty rate is measured specifically for each country, rather than on the basis of a common threshold for all countries.

[17] This is pointed out in every European Treaty and in the White Papers "Growth, Competitiveness, Employment: The Challenges and Ways Forward into the 21st Century" and "European Social Policy—A Way Forward for the Union".

[18] This indicator is calculated by dividing the number of persons aged 15–64 employed by the total population of the same age group, and is based on the EU Labour Force Survey.

[19] Internet: http://www.project-syndicate.org/commentary/blanchard10 (retrieved December 29, 2006).

[20] 'School Expectancy' corresponds to the expected years of education over a lifetime, and was calculated by adding the single-year enrolment rates for all ages. The following example illustrates the meaning of SE: SE for the age of 10 would be one year if all 10-year-old students (in the year of data collection) were enrolled. If only 50% of 10-year-old were enrolled, SE for the age of 10 would be half a year. Estimates are based on headcount data.

was 'Total Public Spending on Education' (TPSE, percentage of GDP). This represents the particular weight given by a government to education in terms of dedicated public spending.

The last indicator that we chose was 'Pupil-Teacher Ratio in primary school' (PTR). This measure is traditionally used to quantify the level of human resources input in terms of number of teachers in relation to the size of the pupil population.[21] It should normally be used as a yardstick against established national norms on the number of pupils per teacher for each level or type of education.

Goal 4—Improvement of Health and Security: Goal 4 includes both health and security[22] as priorities for social progress on the EU's political agenda, as explicitly stated by all its programmatic documents.

With regard to health, Dasgupta (1993) suggests that the most important indicator is 'Life Expectancy at Birth'[23] (LEB, measured in years), even if this indicator has more limited variability in the EU than in other less developed regions.

We also selected, as close in its scope to LEB, 'Infant Mortality'[24] (IM). We then included the 'Incidence of Tuberculosis' (IT) indicator.[25]

Another set of indicators crucial for public health and its improvement is based on the use of health expenditure data. The measures selected were the following: 'Health Expenditure Per Capita' (HEPC, current US $) and 'Total Health Expenditure' (HET, percentage of GDP). The former comprises information about the mean level of individuals' command over health resources, while the latter captures a government's specific concern to regulate health issues, and thus has a more policy-oriented nature.

Turning to public security, of particular significance is the pervasiveness of crime as a factor closely influencing the quality of life. Specifically, we chose two indicators. The first was 'Total Major Thefts Recorded' (TMTR, as a rate per 100,000 persons). The second was 'Total Rapes Recorded' (TRR, also as a rate per 100,000 people).[26]

It is important to point out that we used data about the reporting of crimes, not their prosecutions, because this circumstance is decisive as regards interpretation of results: people are more likely to report crimes in contexts where civicness is developed. For instance, the rate of reported thefts in Finland may be higher than in, say, Italy, not because thefts are more frequent, but because Finns are more likely to report crimes than Italians

[21] The advantage of its utilization rather than 'Class Size' is the great availability of data. Hanushek (1998, p. 12) claims that "many people correctly note that typical class sizes observed in schools tend to be larger than the measured pupil-teacher ratio. The only data that are available over time reflect pupil-teacher ratios. This situation is quite natural, because reporting on actual class sizes requires surveying individual districts about their assignment practices."

[22] Johansson (2002), while including too these dimensions in his list, distinguishes them into independent categories.

[23] "It [Life expectancy at birth] is a major constituent of utility. Indeed, it is difficult to think of a more important one, given that the desire for survival itself has had survival value over the long haul of time" (Dasgupta 1993, p. 87).

[24] This indicator is measured as the ratio of the number of deaths of children under one year of age during the year to the number of live births in that year. The value is expressed per 1,000 live births.

[25] This is a measure of the number of new cases arising in a population in a given period and is expressed as the number of new cases of the disease per 100,000 persons in a year.

[26] These two indicators are coherent with Johansson's (2002) classification, in which security is expressed as 'security for life' and 'security for property'.

are. Other indicators completing the picture on security issues are: 'People Killed in Road Accidents'[27] (PKRA), and 'Control of Corruption'[28] (CC).

Goal 5—Reduction of Pollution and Improvement of Environmental Protection: Improving the quality of the environment is one of the main challenges faced by the EU, as the inclusion of Goal 5 confirms. The EU has acknowledged that development should not be centred on the depletion of natural resources and deterioration of the environment. Rather, it must enhance the quality of life by protecting natural resources, promoting efficiency in their use, and introducing measures to address global challenges such as climate change and biodiversity reduction. The increasing importance of the environment within European policies is confirmed by the Framework Programmes, which are increasingly focused on issues regarding protection of the environment and nature. Accordingly, the inclusion of environmental indicators was coherent with Noll's (2002) thesis of a correspondence between the social indicators system and political goals.

However, the choice of proper indicators in this field is a subtle undertaking in that some of those most commonly employed, for instance the ones related to carbon emissions or waste generation, are very closely correlated with GDP: an increase in their level may be found, contrary to our expectations, to contribute positively to welfare. In order to capture, instead, the specific role of environmental resources as a basis of the quality of life, we selected three indicators. The first was 'Total Revenues from Environmental Taxes' (TRET), expressed in € millions for year 2000. The second was 'percentage of Renewable Electricity on gross electricity consumption' (RE), which also includes information about housing and sheds light on efficient uses of energy. The third one was the 'Number of Environmental Laws' (NEL) which a European country applies and which captures the particular concern of a government with environmental issues. In regard to this last indicator, we took up the suggestion of Diener and Suh (1997), whose Advanced Quality of Life Index comprises a variable related to the number of environmental treaties signed. The importance of laws regulating the environment can in fact manifest the attitude of governments towards the dimensions of welfare deriving from environmental protection.

3.2.2 Objective 2—Strengthening of Economic and Social Cohesion

This objective encompasses two goals: the reduction of regional disparities and the strengthening of social bonds.

Goal 6—Reduction of Regional Disparities: Testifying to the importance of this issue in promoting welfare is the fact that it is the goal itself of the EU Structural Funds: namely, reduction of the distances among different areas of the EU member countries. The most direct indicator would be income inequality, which we included in Goal 1—Improvement of economic conditions, owing to its more limited and static scope. In fact, from a broader and dynamic perspective, we preferred to use 'Research and Development expenditure' (R&D, percentage of GDP), because this is the essential condition for growth and progress. It determines, in fact, almost any process of economic and social development and it is essential if regional disparities are to be reduced.

[27] Fatalities caused by road accidents include drivers and passengers of motorised vehicles and pedal cycles as well as pedestrians, killed within 30 days from the day of the accident per 100,000 inhabitants, thereby encompassing the dimension of 'security for life' (for Member States not using this definition, corrective factors were applied).

[28] To measure corruption we picked an indicator (CC) measuring the perception of corruption, conventionally defined as the exercise of public power for private gain (assuming values from −2.5 to +2.5, from minimum to maximum corruption).

We then selected two indicators of governance, on the grounds that it can ultimately fosters the means to reduce social and economic heterogeneity and regional disparities. The first one was 'Government Effectiveness' (GE), which captures a government's ability to produce and implement good policies and deliver public goods (assuming values from −2.5 to +2.5). The second was 'Regulatory Quality' (RQ), a measure of the incidence of market-unfriendly policies such as price control or inadequate bank supervision, as well as perceptions of the burdens imposed by excessive regulation in areas such as foreign trade and business development (this indicator too assumes values from −2.5 to +2.5).

Goal 7—Strengthening of Social Bonds: This goal includes two dimensions: civil and political participation. Civil participation was approximated by the 'Rule Of Law' (ROL), this being a composite indicator that measures the success of a society in developing an appropriate environment for the economic and social interactions that eventually strengthen interpersonal bonds (with a value ranging from −2.5 to + 2.5). Another indicator of civil participation is 'Recreation and Culture expenditure' (R&C at current price, percentage of total household consumption expenditure). Furthermore, it seemed convenient to include a further two indicators in the realm of civil participation. The first was 'Total Expenditure on Social Protection' (TESP, as percentage of GDP).[29] The second was 'Employment Rate Females'[30] (ERF). We included information about female employment because we considered gender issues to be a decisive concern of policies intended to strengthen social bonds: gender parity is a central element of European governments' agendas and ultimately a key constituent of the quality of life.

Political participation was measured by the indicator 'Voice and Accountability' (V&A), which quantifies the extent to which the citizens of a country participate in the selection of its government, and assumes values ranging from −2.5 to +2.5.

4 Results

The interpretation of the results was organized along different dimensions. First, we presented the evidence emerging from the approach used for aggregating indicators (factor analysis).[31] Then we explained the empirical evidence in terms of both quality of life as measured by the general Quality Of Life (QOL) Index and the seven indexes of 'partial' quality of life related to the goals of the EU policies set out in Sect. 3.2. Third, we checked the robustness of our analysis by investigating the correlations between all the QOL Indexes and the two indicators traditionally most used, and relevant in terms of EU policy objectives: GDP per capita and Total Unemployment rate (TU). Finally, we derived some further information by plotting the QOL index against GDP, TU and an indicator of subjective well-being.

[29] This includes: social benefits, which consist of transfers, in cash or in kind, to households and individuals to relieve them of the burden of a defined set of risks or needs; administration costs, which represent the costs charged to the scheme for its management and administration; other expenditure, which consists of miscellaneous expenditure by social protection schemes).

[30] The indicator is calculated by dividing the number of employed women aged 15–64 by the total female population in the same age group. It is based on the EU Labour Force Survey, which covers the entire population living in private households and excludes those in collective households such as boarding houses, halls of residence and hospitals. Employed population consists of those persons who during the reference week did any work for pay or profit for at least one hour, or were not working but had jobs from which they were temporarily absent.

[31] For a methodological description of this technique see the Appendix.

Table 3 Factor analysis: factor loadings

Variable	Factor loadings
GDP	0.83
RRPG	−0.64
TER	0.77
TU	−0.66
SE	0.55
TPSE	0.40
PTR	−0.12
LEB	0.72
IM	−0.76
IT	−0.62
HEPC	0.90
THE	0.45
TMTR	0.66
TRR	0.70
PKRA	−0.64
CC	0.93
TRET	0.38
RE	0.23
NEL	0.60
R&D	0.88
GE	0.88
RQ	0.71
ROL	0.94
R&C	0.74
TESP	0.75
ERF	0.56
V&A	0.82

4.1 Evidence From Factor Analysis

Table 3 presents the factor loadings of factor analysis, which indicate whether the single variables selected contribute as expected to the common factor 'quality of life', as eventually measured by a Quality Of Life (QOL) Index:

Inspection of the values confirms the reliability of our choice: loadings of the single variables have the expected positive sign when they are supposed to contribute positively to the quality of life and have, instead, negative sign when they are expected to negatively affect it. As mentioned, the two indicators used to capture the dimension of security produce positive factor loadings because we assume that data on the reporting of thefts and rapes represent the civicness of a society better than the mere incidence of these crimes upon security itself. That is to say, a theft is more likely to be recorded in Scandinavian countries than in Eastern or Southern Europe ones owing to the existence of a well-developed cultural background, and this is exactly the meaning of the signs of factor loadings.

Table 4 QOL and GDP rankings for EU countries

Position	QOL ranking	QOL value	GDP ranking	GDP value (US $)
1	Sweden	1.745507	Luxembourg	44756.77
2	Denmark	1.515176	Denmark	29630.32
3	Finland	1.331122	Sweden	27011.80
4	Netherlands	1.166141	Ireland	24848.36
5	United Kingdom	1.145244	United Kingdom	24445.45
6	Germany	0.9680289	Austria	23765.65
7	Austria	0.910462	Netherlands	23282.77
8	Belgium	0.6041799	Finland	23183.51
9	France	0.5363774	Germany	22750.01
10	Luxembourg	0.5264845	Belgium	22268.39
11	Ireland	0.124807	France	22216.57
12	Spain	−0.067337	Italy	18629.98
13	Portugal	−0.1557233	Spain	13870.68
14	Italy	−0.2222351	Cyprus	12083.44
15	Slovenia	−0.3000551	Portugal	10405.31
16	Czech Republic	−0.4748594	Greece	10267.94
17	Malta	−0.5044666	Malta	9760.79
18	Cyprus	−0.5447101	Slovenia	9586.29
19	Greece	−0.8103318	Czech Republic	5422.55
20	Hungary	−0.859964	Hungary	4656.88
21	Estonia	−1.016199	Poland	4309.37
22	Poland	−1.067066	Estonia	3986.89
23	Lithuania	−1.385676	Slovak Republic	3750.29
24	Slovak Republic	−1.406663	Latvia	3,259.78
25	Latvia	−1.758242	Lithuania	3,247.21

4.2 Quality of Life in the EU

To measure the quality of life, the indicators selected were weighted in order to build a single index, the QOL Index, which was ordered from the lowest value of quality of life to the highest. It was thus possible to carry out a first comparison between the ranking of the 25 EU countries based on the derived QOL Index and the one based on absolute values of the GDP. Table 4 shows the comparison.

To be noted is the remarkable similarity between the QOL and GDP rankings, which means that income is in general a good proxy for the quality of life in the EU. Nonetheless, some interesting remarks are in order. Firstly, it should be pointed out that, in terms of the rankings of Table 4, there are two sharply differentiated blocks in the EU: on the one hand the 15 countries that formed the EU before the 1 May 2004 enlargement (O15); on the other, the 10 new members (N10). The O15 countries in general occupy the top 15 QOL and GDP positions, whereas the N10 ones are at the bottom of both rankings. Moreover, the N10 group shows a marked consistency of rankings in terms of QOL and GDP, while there are some striking inconsistencies among the O15 countries: namely Luxembourg (first in term of GDP and only tenth in QOL) and Ireland (eleventh in QOL and fourth in GDP).

Furthermore, it seems possible to identify two patterns for the O15: Nordic and Mediterranean. The former is displayed by Sweden, Denmark and Finland and is characterized by a certain dominance of QOL over GDP, highlighting a higher quality of life with proportionally lower incomes. The Mediterranean pattern (especially in regard to Italy and Greece), where the QOL figures are lower than the GDP ones, instead emphasizes some sort of inability by these countries to turn income into quality of life.

This analysis—aside from confirming the divide between the old EU countries and the newcomers—does not allow definitive conclusions to be drawn on the economic and social circumstances that have shaped the current situation,[32] but it prompts a number of important considerations nevertheless. Southern European countries (the Mediterranean group) seem still to be suffering the consequences of a model of development that, although able to generate and promote economic growth, has neglected or even imposed heavy tolls on the other dimensions of the quality of life. The Nordic countries, by contrast, have followed development paths, which have yielded higher levels of quality of life, as the term is defined here. The continental countries of the O15 (plus the UK) have maintained their long-standing traditions of ensuring acceptable levels of quality of life for their citizens. Finally, the backwardness of the latest EU entrants is confirmed in terms of both quality of life and income.

The new Europe is highly heterogeneous as regards both quality of life and income. Our findings also confirm the impression that enlargement has generated an inevitable increase in internal diversity, at least in terms of the juxtaposition of two specific blocks, old EU countries and the newcomers. Hence, economic growth alone is probably not enough in the long run to give to the EU a unitary identity, and consequently cohesion policies should be addressed to a broader spectrum of social and political issues.

The methodology used to build the QOL Index could be replicated to construct seven different indexes, one for each goal of the EU policies of Sect. 3.2: improvement of economic conditions, employment creation and struggle against unemployment, improvement of education, improvement of health and security, reduction of pollution and improvement of environmental production, reduction of regional disparities, strengthening of social bonds. Each of these indexes contained the indicators representative of the specific goal. Therefore, we could rank the EU countries on each of the seven goals and check for the consistency of the rankings thus obtained with those based on the QOL Index and on GDP.

Table 5 presents the results of this comparison. The reported values are the relative positions of the country considered in each rank.

In general, the seven 'partial' QOL Indexes confirm the internal juxtaposition between old EU members and newcomers. More specifically, the rankings of Objective II, strengthening of economic and social cohesion (Regional disparities QOL and Social bonds QOL), substantiate the excellence of Nordic countries, which is very likely due to their inclusive systems of welfare, whereas the Mediterranean countries' social cohesion rankings are far below the general QOL and GDP rankings, probably because of their long-standing internal diversity.

Turning to the broader Objective I, economic and social progress and improvement of the quality of life, comment is required on the specific goal rankings. The Economic QOL is generally consistent with the GDP's one: the main differences concerning the relatively lower positions of Ireland and the UK in the Economic QOL Index. A possible explanation

[32] This would require the indicators to be linked with the economic and social policies that have produced the situation. This, however, is beyond the scope of this article.

Table 5 QOLs rankings

Countries	QOL	GDP	Economic QOL[a]	Employment QOL	Education QOL	Health & Security QOL	Environment QOL	Reg. disparities QOL	Social bonds QOL
Austria	7	6	3	5	11	10	2	9	6
Belgium	8	10	7	14	3	6	16	12	8
Cyprus	18	14	13	9	23	18	22	16	18
Czech Republic	16	19	14	13	25	17	18	20	14
Denmark	2	2	2	1	1	5	4	7	2
Estonia	21	22	22	18	7	23	23	13	23
Finland	3	8	5	11	4	8	6	1	3
France	9	11	8	15	18	3	8	11	9
Germany	6	9	9	10	15	2	20	6	7
Greece	19	16	23	19	21	15	17	19	21
Hungary	20	20	24	16	9	21	13	15	19
Ireland	11	4	10	8	24	14	24	8	12
Italy	14	12	17	20	10	9	9	18	20
Latvia	25	24	20	21	17	25	3	24	25
Lithuania	23	25	21	23	12	24	7	23	24
Luxembourg	10	1	1	7	19	13	25	4	10
Malta	17	17	12	17	20	12	15	21	15
Netherlands	4	7	6	2	14	7	14	3	4
Poland	22	21	19	24	8	20	19	22	17
Portugal	13	15	18	6	6	19	5	14	11
Slovak Republic	24	23	25	25	22	22	11	25	22

[a] The contribution to the first common factor from GDP is negative, while that from RRPG is positive, in the aggregation of the two relevant indicators through factor analysis. Thus the values of the Economic QOL can be interpreted as an aggregate measure of economic deprivation. Therefore, to make interpretation of the relative rank consistent, we have ordered the values from the lowest to the highest (i.e., Luxembourg, the lowest one, ranks 1, Slovak Republic, the highest one, ranks 25), thus making the Economic QOL ranking conversely one of economic welfare

for this may be the role of the poverty indicator (RRPG) used, which may testify to a greater vulnerability of weaker groups in those societies.

The Employment QOL is by and large consistent with the general QOL, apart from the poorer performances of Mediterranean countries, historically characterized by higher levels of unemployment.

The Education QOL is particularly interesting in regard to the very good results achieved by some newcomers, such as Eastern European and Baltic countries. This is not surprising, given the social status associated with education in those countries, and the important role that it has traditionally performed, also as a policy goal for the ex-socialist regimes.

The Health and Security QOL is largely in line with the general QOL. France and Germany are exceptions: their higher positions may be due to the relatively greater weight of the health sector on their public budgets.

Finally, the Environmental QOL, as said, is particularly problematic in interpretation of some positions in the ranking. For instance, Germany is at the bottom: this is not to say that environmental quality does not matter in Germany. Rather, a possible reason might be that its legislative system is very efficient and it can properly regulate environmental issues even through a limited number of environmental laws.[33]

4.3 Correlations Through Matrices

Struggle against unemployment and growth are the crucial objectives of EU policy and the primary yardsticks against which to measure the 'shape' of the EU in terms of its broad level of well-being (Stewart 2005), as well as its main policy goals. GDP per capita and TU are therefore the indicators usually chosen to perform comparisons between countries. For this reason we correlated both GDP per capita and TU against our QOL Indexes in order to verify the robustness of the analysis performed and to derive some policy-relevant results. For this purpose, we constructed correlation matrices, which are an immediate means to compare correlations and to identify clusters of variables that covary.

Table 6 synthesizes the figures of the correlation matrices between GDP per capita, TU and the different QOL Indexes (correlations above 0.5 are considered high correlations).

The results set out in Table 6 confirm both our theoretical assumptions and the empirical findings of Sect. 4.2: GDP is highly correlated with most of the other dimensions of welfare (and there is the expected negative sign for the environment, which confirms the potential conflict between pro-growth and environmental policies). Education QOL is not highly correlated with GDP. There is the expected positive sign but a low coefficient: that is to say, on the one hand income as 'command over resources' is not decisive in determining Education QOL (as evidence from Eastern Europe confirms); on the other, it may also imply that markets fail to reward skills gained through education.

All the QOL Indexes are highly correlated with each other: the only low correlation rate is the one between the overall QOL Index and the Environmental QOL: this is probably due to the particular nature of the indicators selected for the latter, as we pointed out in Sect. 4.2. But it may be also possible to advance a policy interpretation consistent with EU practices: the EU rhetoric on environmental issues has not yet turned into a fully-fledged

[33] Besides, in the construction of our Environmental QOL Index the NEL factor loading (partial QOL Indexes factor loadings are not reported in the article) shows a greater weight than the ones of the two other indicators selected (TRET and RE).

Table 6 Correlations (GDP, TU and QOL Indexes)

	GDP	TU	Economic QOL	Employment QOL	Education QOL	Environment QOL	Health/Sec QOL	Reg. Disparities QOL	Soc. Bonds QOL	QOL index
GDP	1	–								
TU	–	1								
Economic QOL	+0.878	0.674	1							
Employment QOL	0.676	−0.905	−0.721	1						
Education QOL	0.272	−0.175	−0.353	0.329	1					
Environment QOL	−0.069	0.061	−0.034	0.116	0.553	1				
Health/sec QOL	0.756	−0.586	−0.737	0.616	0.327	0.098	1			
Reg. Disparities QOL	0.851	−0.624	−0.792	0.743	0.350	0.058	0.761	1		
Soc. Bonds QOL	0.738	−0.626	−0.766	0.802	0.529	0.284	0.837	0.871	1	
QOL index	0.833	−0.663	−0.838	0.792	0.505	0.219	0.909	0.917	0.970	1

policy priority, because EU bureaucracy is somehow conscious that the environmental dimension of welfare is the least correlated with the quality of life.

The signs of the correlations of TU are as well as expected: unemployment is negatively correlated with health, reduction of regional disparities, and social bonds. These inverse correlations once again confirm what we have argued throughout this article concerning the impact of unemployment on welfare in many respects, and not only in terms of income deprivation.

4.4 Correlation Through Graphs

Finally, some further evidence is presented graphically. Firstly, to reinforce the correlation analysis of Sect. 4.3, we plot GDP and TU against the QOL Index:

The graph of Fig. 1 shows the highly linear correlation between GDP and QOL Index. Once again, this circumstance confirms the reliability of the first indicator as a good proxy for the quality of life in an advanced region like the EU, in analyses monitoring social change. The only relevant outlier is Luxembourg, which, as pointed out in Sect. 4.2, performs very well in terms of GDP but not in overall welfare (Fig. 2).

Data on unemployment show an almost quadratic relation with the quality of life. This may be partly due to the fact that the Scandinavian inclusive model of welfare state traditionally dispenses unemployment subsidies and pensions, which make unemployment a more tolerable social condition. In general, countries in the Central-Northern EU have a higher QOL Index value associated with a higher unemployment rate than do other EU countries.

The final plot relates the QOL Index to an index based on subjective indicators. Our QOL Index is based only on (objective) social indicators, but, as proposed by Diener and Suh (1997), it is useful to check the fit of the countries' ranking based on it with a ranking similar in scope but based on subjective indicators. For this purpose, we used a ranking taken from the 'World Database of Happiness'.[34]

Indicators of subjective well-being, showing the attitudes to life of respondents to the questionnaire, represent the dimension of life satisfaction as perceived by citizens. Information incorporated in these indicators may sometimes be inconsistent with that of objective indicators, perhaps signalling the existence of widespread pessimism, rather than other elements influencing the community's behaviour and not associated with objective conditions.

Ranking European countries on the basis of subjective indicators and plotting the result against the rank obtained with the 'QOL' index highlights the existence of a robust correlation between objective and subjective indicators, which indeed reinforces the reliability of our findings (Fig. 3).

[34] The World Database of Happiness (Internet: http://www1.eur.nl/fsw/happiness/, accessed January 4 2007) is an ongoing register of scientific research on the subjective appreciation of life directed by Ruut Veenhoven. It brings together findings scattered among many studies and provides a basis for synthetic studies. Specifically we take the answer to the question 111C, '4-step verbal happiness': "Taking all things together, would you say you are?: very happy; quite happy; not very happy; not at all happy" which is available for every country in analysis for 1999.

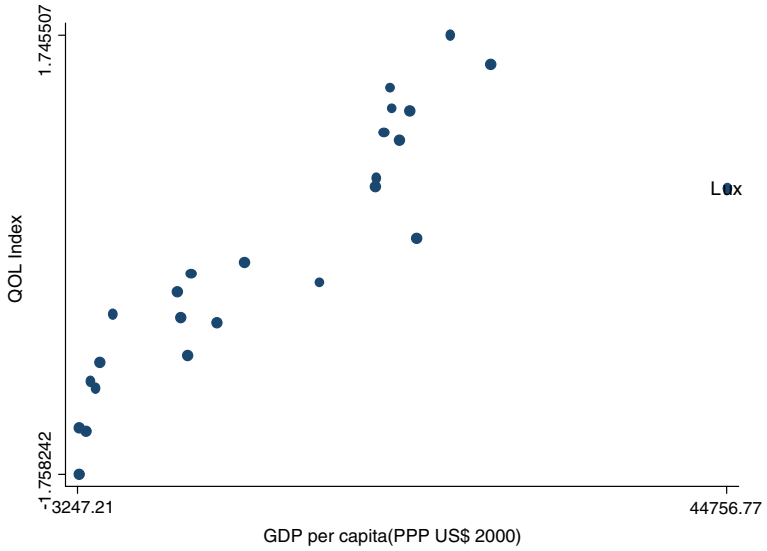

Fig. 1 GDP and QOL Index

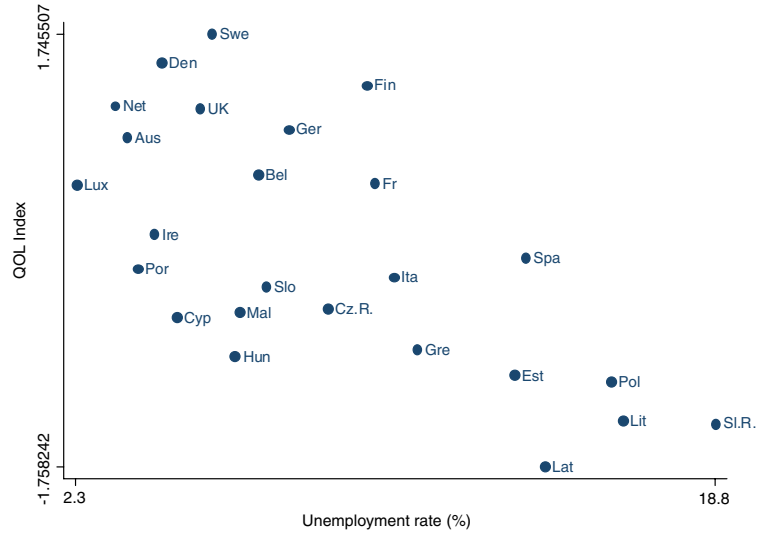

Fig. 2 TU and QOL Index

5 Summary and Conclusions

The social indicators approach takes account of the various elements determining the quality of life and yields a multifaceted notion of welfare. It ultimately makes the scope of welfare analyses wider than those based on material standards alone.

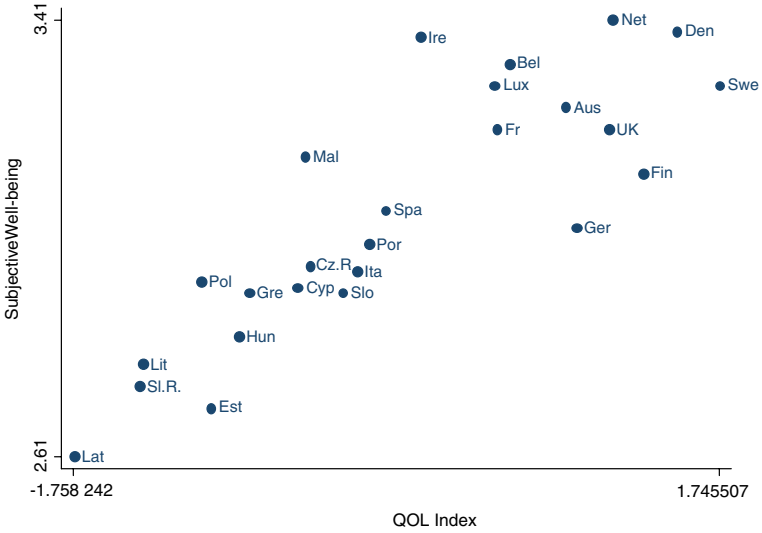

Fig. 3 Subjective well-being and QOL Index

The EU 25 is heterogeneous as regards quality of life. Our multidimensional analysis has measured welfare with both a general QOL Index and seven partial QOL Indexes referring to the goals of EU's policy-making. By and large, it has confirmed the impression that enlargement has generated an inevitable increase in internal diversity, and evidences the divide between the old EU countries and the newcomers. Another substantive finding of our analysis is the close correlation between the income dimension of welfare and the broader concept of quality of life, as well as the similarity between our social-indicators-based quantification of the quality of life with that conducted using subjective indicators of well-being.

In this final section, we stress some observations prompted by our analysis. First of all, it has been made clear that the economic dimension of welfare, as measured by GDP, is (in our context of analysis) a reasonable synthetic measure of the quality of life, as the close correlation between the QOL Index and GDP highlights, even though the latter has no theoretical claim to be so. We nevertheless maintain that our empirical analysis has shown that GDP is a useful summary measure of welfare for the EU is an advanced socio-economic context, where other relevant dimensions determining the quality of life (e.g., life expectancy, education, health and security condition) show limited relative variations. By contrast, in less developed regions, the weight of GDP on the quality of life is 'diluted' by the much greater variability of such dimensions, so that the correlation between income and the quality of life tends to be less stringent (Dasgupta 1990).

The reliability of GDP per capita as a synthetic proxy for individual welfare is also due to the availability and quality of the data employed in its construction. Statistical offices make considerable efforts to furnish information, which is statistically consistent, extremely accurate, and constantly updated. The variable 'income' is constructed by paying close attention to all the components of individual earnings, and these, thanks to the development of well-organised datasets, are increasingly exhaustive and correct in depicting welfare. The more that data are available and consistent on a specific dimension (i.e., GDP per capita), the more the information comprised in them is helpful. In a context

like Europe, where there is no great variability of prices, and earnings are quite stable over time, GDP is therefore the best indicator of an individual's capacity to transform resources into welfare.

Another specification is in order. We maintain that the use of GDP to measure the quality of life should be restricted to descriptive analyses undertaken to monitor social change and to measure individual and aggregate welfare. Conversely, it should not be used for 'fine-grained' prescriptive analyses of welfare, whose primary aim is to support policy-making. In this latter case, we believe that GDP is misleading, because it dissolves the complexity of the quality of life into the monolithic metric of money. Furthermore, we maintain that neither is a general QOL Index particularly useful for orienting policy-making, whereas on the other hand it may be effective in assessing social change, especially in less privileged areas. In short, we espouse Sen's position that "[t]he passion of aggregation makes good sense in many contexts, but it can be futile or pointless in others" (Sen 1987, p. 33). In fact our empirical analysis seems to confirm this conclusion, for it makes clear that in an advanced socio-economic context a multidimensional analysis of welfare aiming to provide decision-makers with policy-relevant information ought not to run the risk of over-aggregation. Rather, a 'fine-grained' perspective requires the disaggregation of a general QOL Index into partial ones, which are then used as yardsticks both to define and to assess policies—as made clear, for instance, by the particular evidences emerged from the analysis of Education and Environment QOL Indexes.

The scope of, and the rationale for, a multidimensional analysis of welfare based on social indicators therefore resides, in our opinion, mainly in the evidence yielded by partial QOL Indexes, especially when the goal of the analysis is to orient policy-making. Particularly when directly linked to the objectives and goals of policy-making, they can disclose a great deal of information and suggest novel and insightful lines of action for decision-makers.

Appendix

The Methodology Used: Factor Analysis

A widely applied approach used to analyze data from multivariate observations is to treat the relevant information (represented by a multivariate variable X) as originating from a limited number of latent factors. In a sample of indicators relative to the EU countries, for example, which contains information not only on income levels, but also on other social and economic aspects, the capture of multiple dimensions of welfare and its variation across data may be explained by a few main factors.

In our case we assumed that there was an underlying 'common factor' explaining the variability of such indicators, which we indicated as countries' 'quality of life'. Consequently, on its basis we constructed an index to be used for ranking economic and social conditions of the countries analysed.

Ideally, all the information in X can be reproduced by a smaller number of factors. These factors are interpreted as latent (unobserved) common characteristics of the observed $x \in X$.

The case just described occurs when every observed $x = (x_1,...,x_p)$ T can be written as:

$$x_j = \sum_{l=1}^{k} q_{jl} f_l + \mu_j, \quad j = 1, \ldots, p \tag{1}$$

where, for $f_i = 1,...,k$ denotes the factors. The number of factors, k, should always be much smaller than p.

A model similar to (1) can be written for X in matrix notation as follows:

$$X = \Omega \mathrm{F} + U + \mu \mathrm{I}_k \tag{2}$$

where F is the k-dimensional vector of the k factors. When using the factor model (2) it is often assumed that the factors F are centred, uncorrelated and standardized:

$$\mathrm{E(F)} = 0$$
$$\text{and } \mathrm{Var(F)} = \mathrm{I}_k$$

The factor analysis model used in praxis is a generalization of (2):

$$X = \Omega \mathrm{F} + U + \mu \tag{3}$$

where Q is a $(p - k)$ matrix of the (non-random) loadings of the common factors F$(k - 1)$ and U is a $(p - 1)$ matrix of the (random) specific factors. It is assumed that the variables' factors F are uncorrelated random vectors and that the specific factors are uncorrelated and have zero covariance with the common factors. These are the fundamental assumptions of the orthogonal factor model that we adopted.

References

Atkinson, A. B., & Bourguignon, F. (2000). Income distribution and economics. In A. B. Atkinson & F. Bourguignon (Eds.), *Handbook of income distribution* (pp. 67–83). Amsterdam: Elsevier.

Atkinson, A. B., Cantillon, B., Marlier, E., & Nolan, B. (2002). *Social indicators. The EU and social inclusion*. Oxford: Oxford University Press.

Blanchard, O. (1990). *Unemployment and wages: What have we learned from the European experience?* London: Employment Institute Lecture.

Blanchard, O. (2004). Reforming employment protection. Project Syndicate. Retrieved December 29, 2006, from http://www.project-syndicate.org/commentary/blanchard10

Brock, D. (1993). Quality of life in health care and medical ethics. In M. C. Nussbaum & A. K. Sen (Eds.), *The quality of life* (pp. 95–132). Oxford: Oxford University Press.

Dasgupta, P. (1990) Wellbeing and the extent of its realisation in poor countries. *The Economic Journal, 100*, 1–32.

Dasgupta, P. (1993). *An inquiry into well being and destitution*. Oxford: Clarendon Press.

Dasgupta, P (1999). Valuation and evaluation: Measuring the quality of life and evaluating policy. London School of Economics and Political Sciences, the Suntory Centre. Retrieved January, 12, 2007, from www.beijer.kva.se/publications/ pdf-archive/artdisc127.pdf.

Dasgupta, P. (2001a). *Human well being and the natural environment*. Oxford: Clarendon Press.

Dasgupta, P., & Weale, M. (1992). Measuring quality of life. *World Development, 20*, 119–131.

Diener, E., & Suh, E. (1997). Measuring quality of life: Economic, social, and subjective indicators. *Social Indicators Research, 40*, 189–216.

Erikson, R. (1993). Description of inequality: The Swedish approach to welfare research. In M. C. Nussbaum & A. K. Sen (Eds.), *The quality of life* (pp. 67–83). Oxford: Oxford University Press.

Grasso, M. (2002). Una misurazione del benessere nelle regioni italiane. *Politica Economica, 2002*(2), 261–292.

Hanushek, E. A. (1998). The evidence on class size. Rochester, NY: W.A. Wallis Institute Occasional Paper 981. Retrieved January 12, 2007, from www.wallis.rochester.edu/WallisPapers/wallis_10.pdf

Harsanyi, J. C. (1988). *L'utilitarismo*. Milano: Il Saggiatore.
Johansson, S. (2002). Conceptualizing and measuring quality of life for national policy. *Social Indicators Research, 58*, 13–32.
Kaufmann, D., Kraay, A., & Mastruzzi, M. (2006). Governance matters V: Governance indicators for 1996–2005. Washington: The World Bank. Retrieved January 11, 2007, from http://web.worldbank.org/WBSITE/EXTERNAL/WBI/EXTWBIGOVANTCOR/0,contentMDK:21045419~menuPK:1976990~pagePK:64168445~piPK:64168309~theSitePK:1740530,00.html.
Land, K. C. (1983). Social indicators. *Annual Review of Sociology, 9*, 1–26.
Noll, H. H. (2002). Towards a European system of social indicators: Theoretical framework and system architecture. *Social Indicators Research, 58*, 47–87.
Noll, H. H. (2004). Social indicators and quality of life research: Background, achievements and current trends. In N. Genov (Ed.), *Advances in sociological knowledge over half a century* (pp. 151–181). Wiesbaden: VS Verlag für Sozialwissenschaften.
Olson M. (1969). *Toward a social report*. Washington, DC: US Department of Health, Education, and Welfare.
Sen, A. K. (1979). Utilitarianism and welfarism. *The Journal of Philosophy, 76*, 463–489.
Sen, A. K. (1982). *Choice, welfare and measurement*. Oxford: Basic Blackwell.
Sen, A. K. (1987). *The standard of living*. Cambridge: Cambridge University Press.
Sen, A. K. (1992). *Inequality re-examined*. Cambridge: Harvard University Press.
Sen, A. K. (1997). Inequality, unemployment and contemporary Europe. *International Labour Review, 136*, 155–171.
Sen, A. K. (1999). *Development as freedom*. New York: Anchor Books.
Sirgy, M. J., Michalos, A. C., Ferriss, A. L., Easterlin, R. A., Patrick, D., & Pavot, W. (2006). The Quality-Of-Life (QOL) research movement: Past, present, and future. *Social Indicators Research, 76*, 343–466.
Stewart, K. (2005). Dimensions of well-being in EU regions: Do GDP and unemployment tell us all we need to know? *Social Indicators Research, 73*, 221–246.
Treaty establishing the European Community—Treaty of Rome (1957). Retrieved January 11, 2007, from http://www.ena.lu/mce.cfm.
Treaty of Amsterdam (1997). Retrieved January 11, 2007, from http://eurotreaties.com/amsterdamtreaty.pdf.
Treaty on the European Union—Treaty of Maastricht (1992). Retrieved January 11, 2007, from http://www.ena.lu/mce.cfm.
Veenhoven, R. (1996). Happy life-expectancy—A comprehensive measure of quality-of-life in nations. *Social Indicators Research 39*, 1–5.