



**MEASURES OF WEALTH AND WELL-BEING.
A COMPARISON BETWEEN GDP AND ISEW**

**Valentina Carta
Mariano Porcu**

WORKING PAPERS

2010/06



**CENTRO RICERCHE ECONOMICHE NORD SUD
(CRENoS)
UNIVERSITÀ DI CAGLIARI
UNIVERSITÀ DI SASSARI**

Il CRENoS è un centro di ricerca istituito nel 1993 che fa capo alle Università di Cagliari e Sassari ed è attualmente diretto da Stefano Usai. Il CRENoS si propone di contribuire a migliorare le conoscenze sul divario economico tra aree integrate e di fornire utili indicazioni di intervento. Particolare attenzione è dedicata al ruolo svolto dalle istituzioni, dal progresso tecnologico e dalla diffusione dell'innovazione nel processo di convergenza o divergenza tra aree economiche. Il CRENoS si propone inoltre di studiare la compatibilità fra tali processi e la salvaguardia delle risorse ambientali, sia globali sia locali. Per svolgere la sua attività di ricerca, il CRENoS collabora con centri di ricerca e università nazionali ed internazionali; è attivo nell'organizzare conferenze ad alto contenuto scientifico, seminari e altre attività di natura formativa; tiene aggiornate una serie di banche dati e ha una sua collana di pubblicazioni.

**www.crenos.it
info@crenos.it**

CRENoS - CAGLIARI
VIA SAN GIORGIO 12, I-09100 CAGLIARI, ITALIA
TEL. +39-070-6756406; FAX +39-070- 6756402

CRENoS - SASSARI
VIA TORRE TONDA 34, I-07100 SASSARI, ITALIA
TEL. +39-079-2017301; FAX +39-079-2017312

Titolo: MEASURES OF WEALTH AND WELL-BEING. A COMPARISON BETWEEN GDP AND ISEW

ISBN: 978 88 84 67 580 4

Prima Edizione: Aprile 2010

© CUEC 2010
Via Is Mirrionis, 1
09123 Cagliari
Tel./Fax 070 291201
www.cuec.it

Measures of wealth and well-being. A comparison between GDP and ISEW

Valentina Carta *

Mariano Porcu *

University of Cagliari and CRENoS

Abstract

It is well known that, as a measure of well-being, the Gross Domestic Product does not reflect the real wealth of a country but just its monetary counterpart. Thus, it is not fit to differentiate between the costs that enhance welfare and those which, instead, undermine it. For this reason some corrective measures of well-being have been advanced in the literature, one of the most important is the so called Index of Sustainable Economic Welfare. The aim of this work is to explore some of the features of this measure and to calculate it for Italy up to year 2006 comparing it with the time series of Gross Domestic Product. In particular our purpose is to analyze whether the ISEW for Italy registered a decreasing trend as well as the ISEW of other countries. This negative trend was not visible in the previous studies because of the lack of recent data which could not allow to register the threshold point of the index.

Keywords: well-being, corrective measures, ISEW, GDP

Jel Classification: I31, C43

* Correspondence: Università degli Studi di Cagliari, Dipartimento di Ricerche Economiche e Sociali, Viale S. Ignazio 78, 09123 Cagliari. Email: val.cart@gmail.com; mrporcu@unica.it.

Introduction

In 1934, the young economist Simon Kuznets, defined in a seminal paper the concept of the Gross Domestic Product (GDP) (Kuznets, 1934). The three letters of the acronym express ‘*the market value of all final goods and services produced within a country in a given period of time*’ (Mankiw, 2008). It is considered as a general measure of well-being of a country and can be regarded as the economic aggregate of reference in the framework of national accounts. Nevertheless, the GDP expresses the wealth of a nation in its monetary terms and for this reason it can’t be considered as a ‘genuine’ measure of national well-being; a condition that also involves non-monetary aspects of a country’s life². Despite its limitations, there are some motivations that explain the widespread use of GDP. Cheli (2000) identifies three possible reasons: (a) the high correlation between this measure and well-being; (b) the interests of those who benefit from the growth of GDP without caring about the negative externalities for the collectivity; (c) the alternative measures are unquestionably difficult to calculate because they try to account for activities and non-monetary assets that often have not a market price. These evidences explain the persistence of GDP as an indicator of a country’s well-being.

So, although GDP is strongly related with some important indicators of well-being (such as life expectancy, high levels of education and low child mortality), it has several weaknesses: (i) its components are quantities (money) that could be indefinitely cumulated by a single economic agent and, consequently, (ii) it does not take into account the unequal distribution of well-being, a decisive factor in the definition of a society’s welfare. For these reasons, the GDP should be reduced by any costs for the prevention or the remedy to damages, called by Hawtrey (1926) *defensive* items, and added by any goods that produce satisfaction or a positive gratification, *creative* items³. Considering the single components, the GDP does not take into account (or does not adequately account for) many aspects of a nation’s life as (Cheli, 2000):

- * quality of goods;
- * leisure time;
- * distribution of income;
- * self-consumption and the market’s external services;

²The word well-being was connected, to a first approximation, with a physical state. Over time it has been applied to a broader spectrum of conceptual areas and currently has its own field of definition in economics. Fuà defines it as ‘a fascinating but nebulous name’ (Fuà, 1993). The issue has been explored also by Pigou (Pigou, 1952) and Sen (Sen, 1984).

³For a more detailed discussion of this issue, see Esteve Mora (1997).

- * public services efficiency;
- * consumption of durable goods.

The so called *corrective measures* of GDP have been advanced to overcome these limits by building up indexes that reflect the welfare of a nation more plausibly (meaning that do not simply represent the monetary side of its economy). With this aim, at the beginning of 2008 following a French government's initiative, the *Commission on the measurement of economic performance and social progress* was created. The report of the Commission, chaired by Joseph E. Stiglitz, Amartya Sen, Jean-Paul Fitoussi, is the most recent and important attempt to calculate better measures of economic performance, taking into account the quality of life, the sustainable development and environment (Stiglitz *et al.*, 2009).

The aim of this paper is the re-construction for Italy of one of the most representative *corrective measure* of GDP, the so called Index of Sustainable Economic Welfare (ISEW) proposed in literature by Daly and Cobb in 1994 (Daly and Cobb, 1994). The only work currently available for Italy is a paper by Guenno and Tiezzi (1998). In their paper, the authors introduce several changes to the ISEW methodology as it was proposed by its creators, and being aware of the differences they called their index *Reconstruction of an Index of Well-being* (RIBES)⁴.

The work is divided into two parts: the first section analyzes ISEW, its calculation and its drawbacks; the second section presents an application of the index to Italy, based on the construction of a time series over the period 1990–2006. Therefore we will distinguish between RIBES, the Italian 'variant' of ISEW, and the index originally devised by Daly and Cobb.

1 Beyond GDP: the ISEW

Since the 60s, the paradigm of GDP began to crumble under the criticism that arose around this measure. The debate originated a new strand of research: the *social costs of growth*. The attempts to construct measures that reflect more closely the concept of welfare can be divided into:

- *corrective measures*: that, starting from the national accounts indexes, such as GDP or GNP, try to improve them subtracting or adding some components;
- *alternative measures* (Goossens *et al.*, 2007): that give an innovative interpretation of well-being and build *new* indicators to represent this concept. The most famous and used ones are: the *Human Development Index* (HDI), the

⁴Nevertheless, in literature this application is almost always regarded as the calculation of ISEW for Italy.

Human Poverty Index (HPI), the *Gross National Happiness* GNH (Revkin, 2005), the *Happy Planet Index* HPI (Abdallah *et al.*, 2006), and the *Ecological Footprint* EF (EEA and GFN, 2005).

One of the threads of the corrective measures is the concept of income, exhaustively defined by John Hicks as the ‘*maximum value which a person can consume during a week, and still expect to be as well off at the end of the week as he was at the beginning*’ (Hicks, 1939). This definition includes implicitly the concept of *sustainability*, that after many years, in 1987, was linked to the concept of development in the *Brundtland Report*⁵. Neither GDP nor the Gross National Product⁶ (GNP), or the Net National Product⁷ (NNP) are representative of the *hicksian* income or of the *sustainable development* concept; therefore the measures of national accounts can not be considered as the *empirical rules*, according to the definition of Daly and Cobb, that countries should follow in order to decide the amount of consumption without increasing their poverty.

An alternative approach has been proposed by El Serafy (1991). This author, by maintaining the concept of income expressed by Hicks, make also the assumption that the rest of revenues should be invested in renewable assets to compensate the run out of the unrenovable resources.

Finally, there is a third approach that reflects the *fisherian* vision of income. According to the interpretation of Fisher, all physical assets subject to possession that are able, directly or indirectly, to meet human needs, are considered as capital, thus ‘economic welfare depends on the psychic enjoyment of life’, not just on the production of goods (Fisher, 1906).

Starting from these different approaches several corrective indexes have been comprised. We will focus on one of them, the measure proposed by Daily and Cobb: the ISEW. It is, probably, the most successful and spread measure in the literature, to overcome the GDP limits. It lies within the so-called ‘*threshold theory*’ of Max-Neef (1995), who empirically observed that ‘*for every society there seems to be a period in which economic growth (as conventionally measured) brings about an improvement in the quality of life, but only up to a point – the threshold point – beyond which, if there is more economic growth, quality of life may begin to deteriorate*’ (Max-Neef, 1995).

⁵The Brundtland Report is a document published in 1987 by the World Commission on Environment and Development that provided a key statement on sustainable development, defining it as: development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987).

⁶GNP is defined as ‘the value of all goods and services produced in a country in one year, plus income earned by its citizens abroad, minus income earned by foreigners in the country’. So, compared to GDP, it includes, for example, the added value produced by Italians living abroad and it subtracts that produced by foreign residents in Italy.

⁷NNP is calculated as the difference between GDP and depreciation.

So far, most of the studies for different countries have underlined that the trend of ISEW follows the GDP trends up to a given threshold (around Seventies or the early Eighties depending on the country). Afterwards, the trend changes and the ISEW begin to decline, creating a gap with the GDP.

The construction of ISEW, often defined as *green* GDP, can be summarized in three steps (Clifford *et al.*, 2007):

1. calculation of personal consumption weighted for the index of income's inequality;
2. sum of the benefits arising from unpaid work (volunteer, do-it-yourself, domestic work);
3. subtraction of defensive expenditures and environmental damage.

Even if the ISEW has many strengths, some scholars point out some criticisms on it. The first fault-finders of ISEW were its designers, who summarize the principal limits of their measure in the following points:

- the main variable of ISEW and GDP is private consumption, which, according to Daly and Cobb, it is not a completely correct measure of welfare;
- it does not take into account happiness as a determinant of well-being, mainly because it is difficult to calculate;
- it leaves out some possible positive items (such as 'underground' economy) or negative ones (such as the consumption of goods of poor quality or harmful to health);
- there are 'heroic' assumptions, especially in the case of environmental damage or long-term costs imposed on future generations for the depletion of natural resources.

In order to contain the subjectivity associated with the latter point they proceeded to calculate a second set of ISEW components from which the two most questionable variables were excluded. Other critics to ISEW were explained and summarized in the studies of Eric Neumayer (Neumayer, 1999, 2000, 2004), some of them in collaboration with Giles Atkinson and Simon Dietz (Atkinson *et al.*, 2007; Dietz and Neumayer, 2006) in four main areas ⁸:

1. ISEW has not theoretical basis;

⁸see: Neumayer, E. (1999). The ISEW – Not an index of sustainable economic welfare. Social Indicators Research, 48, 77 - 101. (Neumayer, 1999).

2. the results depend on arbitrary assumptions;
3. GNP / GDP are not born as indicators of welfare;
4. ISEW is methodologically inconsistent.

These problems, especially the arbitrariness of assumptions, are closely connected with the lack of data and make ISEW series not calculable for all countries. Even for Italy it exists just an ISEW time series, calculated by Guenno and Tiezzi (1998), who were forced to make several changes, the most important of which is the exclusion of two components: *net capital growth* and *change in net international position*. Given such relevant differences the new index was denominated RIBES (Reconstruction of an Index of Well-being). In the next section we focus on the updating of the Italian ISEW and RIBES up to 2006 in order to compare them with the series of GDP for the same period.

2 Calculating the ISEW. An Application for Italy

Some hypothesis have to be stated in order to cope with the missing data for some of the index components. In fact, it was possible to calculate only 9 variables out of the 19 variables that make up the ISEW: the environmental variables were not available. Moreover the series of services of household labour had a gap in 1990, so it was used the value calculated by Guenno–Tiezzi. Data for the cost of car accident were available just for five years (2000, 2001, 2002, 2004 and 2005). Finally, the series for streets and highways services was completely unavailable, as it was the case for the environmental damages.

The main data sources used for the calculation of ISEW are: ISTAT, OECD and Bank of Italy.

The methodology applied is the same used by Guenno and Tiezzi (1998), with some differences according to the availability of the data. All variables are expressed as concatenated values with 2000 as the reference year. The variables expressed in current values were converted to values referred to 2000 using the transformation coefficients of the value of money calculated by ISTAT.

Next, we analyze the methodology used to calculate the nine variables. The environmental damages are not calculated in this work but they are constructed using the Guenno and Tiezzi series.

2.1 Income inequality weighted consumption

1. Weighted consumption The variable *weighted consumption* plays a key role in the construction of ISEW. It is calculated with the deciles of income published by the Bank of Italy in the report *Bilanci delle famiglie italiane (Balance sheet of Italian families)* from the year 1980 to 2006. As the data were not available for each year we calculated the missing values as the mean between the previous and the following available year. After converting the current values in the values referred to 2000, three indices of income distribution are calculated. The average of the three indices is normalized with respect to the year 1980.

$$I^1 = \frac{\sum_{i=1}^9 \frac{d_9}{d_i}}{9} \quad (1)$$

$$I^2 = \frac{d_9}{\left(\frac{\sum_{i=1}^9 d_i}{9}\right)} \quad (2)$$

$$I^3 = \frac{\sum_{i=1}^9 \frac{d_i}{d_1}}{9} \quad (3)$$

where d indicates the decile of the income distribution. The results are reported in Table 1. The normalized index I has been used to calculate the ratio between household consumption and the index of income distribution.

2.2 Sum of the benefits arising from unpaid work

2. Services of household labour The variable *services of household labour* is included in the calculation of the ISEW to encompass the unpaid work of the housewives. According with the Guenno and Tiezzi's methodology, the first step to calculate this variable is the average annual salary of domestic workers (AUSH):

$$\text{AUSH} = \frac{\left(\frac{\text{annual gross total income from domestic labour}}{\text{total number of workers in this category}}\right)}{\text{average number of hours worked per workers}} \quad (4)$$

The AUSH was used to calculate the value of unpaid household labour (VSD):

$$\text{VSD} = \text{AUSH} \times \text{hours spent on domestic labour pp} \times \text{pop}>14 \text{ py} \quad (5)$$

where: pop= population, pp= per person, py= per year.

The hours dedicated to housework and paid work were obtained from an ISTAT survey of 2007, about the daily spending of time (ISTAT, 2007a). The average of the available values, 1988-1989 and 2002-2003 was used for the period of analysis.

Table 1: Calculation of index of distribution inequality

Years	Index I ₁	Index I ₂	Index I ₃	Index I	I norm
1980	2.39	1.91	2.56	2.29	1.00
1981	2.27	1.87	2.30	2.14	0.94
1982	2.31	1.89	2.38	2.19	0.96
1983	2.44	1.95	2.53	2.31	1.01
1984	2.37	1.90	2.54	2.27	0.99
1985	2.40	1.92	2.52	2.28	1.00
1986	2.43	1.94	2.50	2.29	1.00
1987	2.42	1.95	2.46	2.28	0.99
1988	2.42	1.95	2.43	2.27	0.99
1989	2.42	1.96	2.42	2.26	0.99
1990	2.33	1.91	2.37	2.20	0.96
1991	2.25	1.87	2.32	2.15	0.94
1992	2.43	1.96	2.46	2.29	1.00
1993	2.60	2.04	2.60	2.41	1.06
1994	2.61	2.06	2.58	2.42	1.06
1995	2.62	2.07	2.56	2.42	1.06
1996	2.66	2.09	2.58	2.44	1.07
1997	2.69	2.10	2.60	2.46	1.08
1998	2.72	2.12	2.62	2.48	1.09
1999	2.67	2.09	2.60	2.45	1.07
2000	2.59	2.05	2.55	2.40	1.05
2001	2.60	2.05	2.57	2.41	1.05
2002	2.61	2.06	2.59	2.42	1.06
2003	2.60	2.05	2.55	2.40	1.05
2004	2.59	2.04	2.52	2.38	1.04
2005	2.58	2.05	2.50	2.38	1.04
2006	2.57	2.05	2.49	2.37	1.04

Source: Bank of Italy, (Balance sheet of Italian families).

The value obtained was multiplied by 365 to transform the daily hours in yearly hours.

Total workers and the workers' income in the sector of housekeeping were taken from National Economic Accounts, using the section *Attività condotte da famiglie e convivenze (Activities run by households and cohabiting people)*.

Data on resident population were taken from official sources. This values, divided regionally, were summed by over 15 years age groups. The first year available is 1991, thus, the value calculated by Guenno and Tiezzi was used for 1990.

Table 2: Hours spent on paid and domestic labour

	1988-1989	2002-2003
paid labour	2.18	2.17
mean		2.17
domestic labour	3.07	3.02
mean		3.04

Source: ISTAT (2007a)

3. Services of durable goods In our opinion the methodology applied to the calculation of this variable is not very clearly explained in the work of Guenno and Tiezzi. The stock of household expenditure on durable goods added to the expenditure on means of transport were considered as part of this item of expenditure. This stock was calculated as the expenditure minus the depreciation (which is assumed to be constant for both durable goods and means of transport). The depreciation rate used by Guenno and Tiezzi is not specified, thus, a 30% share of depreciation was applied for the means of transport, considering that this was the same share used in the calculation of the costs of commuting. Since the amount of depreciation is assumed as a fixed share for both categories of goods, the 30% was applied also to the expenditure in durable goods. These data were drawn from National Economic Accounts, in the section *Spesa delle famiglie (Households expenditure)*.

The value of the services of durable goods, which enter as a positive item in the calculation of welfare, was calculated as the 10% of the stock of the ten-year net expenditure in durables (as already proposed by Daly and Cobb according the hypothesis of a ten-years average life of durable goods).

Table 3: Calculation of Public expenditure on health and education

Years	Health				Education			
	CA	LA	Total	Values 2000	CA	LA	Total	Values 2000
1990	856	42798	43654	62630.39	29607	8728	38335	54999.22
1991	1243	48472	49715	67025.76	31745	9834	41579	56056.81
1992	1489	49945	51434	65789.23	33670	9969	43639	55818.64
1993	1618	49409	51027	62635.64	34080	9952	44032	54049.28
1994	1618	49163	50781	59972.36	30430	13614	44044	52015.96
1995	1991	48323	50314	56401.99	30970	13344	44314	49675.99
1996	2530	52013	54543	58846.44	34062	14310	48372	52188.55
1997	1272	56556	57828	61326.59	35390	14447	49837	52852.14
1998	1915	58960	60875	63419.57	36408	14972	51380	53527.68
1999	1685	61983	63668	65297.90	37625	14828	52453	53795.80
2000	1598	69394	70992	70992.10	40755	13470	54225	54225.00
2001	1595	76204	77799	75768.45	43150	14376	57526	56024.57
2002	1411	80396	81807	77782.00	44376	15636	60012	57059.41
2003	1440	82884	84324	78252.67	47673	16242	63915	59313.12
2004	1358	91437	92795	84434.17	45834	16747	62581	56942.45
2005	1394	97087	98481	88110.95	48414	17340	65754	58830.10
2006	1422	102591	104013	91240.20	47814	17932	65746	57672.39

Source:(ISTAT, 2008)

2.3 Subtraction of ‘defensive’ expenditures

4. Expenditure in health and education According to the methodology of Gueno and Tiezzi, who made some changes to the method of Daly and Cobb, we consider the entire share (and not just the 50%) spent in education by public administration, both centrally (CA) and locally (LA). Only in the case of health expenditure we considered just half of total expenditure. These values were available in the database on *Spesa delle amministrazioni pubbliche per funzione (General government expenditure by function)* for both health section and education. Also, for the case of private expenditure in health and education, the share of well-being (not defensive) is 50%. The data were from National Economic Accounts, in the section of *Spese delle famiglie (Household expenditure)* according to the three digits COICOP classification⁹.

⁹The classification COICOP (classification of individual consumption by purpose) is an International Classification methodology established by United Nations which contains 14 chapters of expenditure, 12 related to household consumption, and the last two referred to individual consumption of private non-profit institutions serving households and of public administrations.

5. Costs of commuting The costs of commuting express the decrease of welfare due to the daily commuting to workplace. The variable is calculated as the arithmetic mean of four expressions (as in the Guenno and Tiezzi's methodology, the first of which has been proposed by Daly and Cobb):

$$C = 0.3(A - 0.3A) + 0.3B \quad (6)$$

$$C^1 = 0.65(A - 0.3A) + 0.65B \quad (7)$$

$$C^2 = 0.3(A - 0.3A) + 0.3B + 0.3C \quad (8)$$

$$C^3 = 0.65(A - 0.3A) + 0.65B + 0.65C \quad (9)$$

where A: cost of own mean of transportation, 0.3A:rate A of car depreciation, B: cost of transport services, 0.3B: share of expenditure services due to commuting.

The data are drawn from National Economic Accounts in *Spese delle famiglie (Household expenditure)*, according to the three digits COICOP classification, in the entry 'transport'. In particular, A is the sum of the shares of expenditure for purchase vehicles and their maintenance cost, while B represents the entry related to the services of transport. The value of commuting's cost is reported in the Table 4.

Table 4: Calculation of commuting's cost

Years	A	B	C	C1	C2	C3
1990	65662.11	10391.75	16906.57	36630.90	21978.54	47620.16
1991	66696.89	10730.54	17225.51	37321.94	22393.16	48518.52
1992	70389.01	10693.35	17989.70	38977.68	23386.61	50670.99
1993	65795.94	10723.63	17034.24	36907.51	22144.51	47979.77
1994	69280.51	10923.83	17826.06	38623.12	23173.87	50210.06
1995	71434.78	11607.65	18483.60	40047.80	24028.68	52062.14
1996	72689.77	11700.65	18775.05	40679.27	24407.56	52883.05
1997	81732.50	11917.31	20739.02	44934.54	26960.72	58414.90
1998	85576.34	12365.59	21680.71	46974.87	28184.92	61067.33
1999	86403.74	12471.82	21886.33	47420.39	28452.23	61646.50
2000	86963.70	12993.60	22160.46	48014.32	28808.59	62418.62
2001	87343.00	12657.60	22139.31	47968.51	28781.10	62359.06
2002	88681.41	12661.58	22421.57	48580.07	29148.04	63154.09
2003	90060.78	12986.26	22808.64	49418.72	29651.23	64244.34
2004	90462.24	12705.01	22808.57	49418.58	29651.15	64244.15
2005	89088.40	12957.86	22595.92	48957.83	29374.70	63645.18
2006	88784.66	13420.48	22670.92	49120.33	29472.20	63856.43

Source: ISTAT, Conti Economici Nazionali, Spesa delle famiglie in trasporti (COICOP a 3 cifre)

6. Costs of urbanization The costs of urbanization cause a loss of well-being due to the increased costs of housing induced by the progressive urban growth. Both Daly and Cobb and Guenno and Tiezzi have used an increasing share (from 18% to 30%) for the period 1960–1990. However, for the period considered in this work, there isn't any empirical attempt to estimate this phenomenon. Given that assuming a 30% share constant on the period 1990–2006 was quite restrictive, we used the index numbers of the construction costs of residential building published by ISTAT. It is assumed that the growth rate of residential buildings could express quite accurately the rate of growth of urbanization. The 30% share is then added to the 1990 value to calculate the share of expenditure in housing, taken by National Economic Accounts.

7. Costs of road accidents The information about the social cost of road accidents are available for the years 2000, 2001, 2002, 2004 and 2005. This value is taken from *Statistiche degli incidenti stradali (Road accident statistics)*, by ISTAT together with A.C.I. The value, originally expressed in billions of Italian Liras, was converted in Euros. The social cost of road accidents estimated by ISTAT includes:

- present and future non-production for the deceased and injured (temporarily and permanently);
- moral and biological damage;
- hospital expenditure for the first aid and rehabilitation;
- material damage;
- judicial and administrative costs.

Similar surveys for the years of analysis before 2000 are not available.

8. Net capital growth Net capital growth is the variable that represents the sustainability of economic growth based on labor force and population. For the calculation of this variable we used the values of the labor force from an OECD's survey for the period 1984–2004 (OECD, 2005). Then we calculated the growth rate using the five years average to avoid an excessive impact of annual variation.

The values of capital were taken by National Economic Accounts, in the section of *Capitale netto in totale per branca proprietaria (Total net capital by owner's branch)*. Also this variation is calculated using a five-year mean. The capital requirement (CR) is given by:

$$CR = \frac{\Delta L}{L_{-1}} K_{-1} \quad (10)$$

where Δ means the 5 years variation of labour force calculated according to:

$$\Delta L = L - L_{-1} \quad (11)$$

By using the capital necessary to compensate the growth of labour force it is possible to calculate the net capital growth (NCG) as:

$$\text{NCG} = \Delta K - CR \quad (12)$$

where ΔK means the variation of capital calculated according to:

$$\Delta K = K - K_{-1} \quad (13)$$

Table 5: Calculation of Net capital growth

Years	ΔL	ΔK	CR	NCG
1990	204.00	72081.70	23981.45	48100.25
1991	149.60	75198.43	17883.99	57314.43
1992	63.40	75913.59	7728.54	68185.06
1993	-247.92	69487.40	-30914.76	100402.16
1994	-275.50	61965.50	-35499.52	97465.02
1995	-328.88	55663.93	-43720.71	99384.63
1996	-325.20	50215.13	-44604.45	94819.59
1997	-249.40	46312.93	-35226.37	81539.30
1998	71.88	48828.56	10407.86	38420.70
1999	130.50	52632.07	19113.38	33518.69
2000	169.88	56383.54	25126.86	31256.68
2001	185.60	60138.21	27700.57	32437.64
2002	196.80	64800.55	29643.53	35157.02
2003	173.24	66978.05	26351.51	40626.55
2004	166.40	68586.93	25594.01	42992.92
2005	146.28	67874.65	22760.74	45113.92
2006	152.20	67391.49	23965.53	43425.96

Source: ISTAT, Capitale Totale per branca proprietaria; (OECD, 2005)

9. Net international position Net international position is the dependence of a country from foreign loans of money. If it is a positive value the country proves to be self-sufficient and is able to finance foreign countries. A negative value indicates a debt with foreign countries. The values of this variable were taken from the National Economic Accounts, in *Transazioni Internazionali (International transactions)*, expressed in current values and then converted into constant 2000 values.

Table 6: Calculation of Net International Position

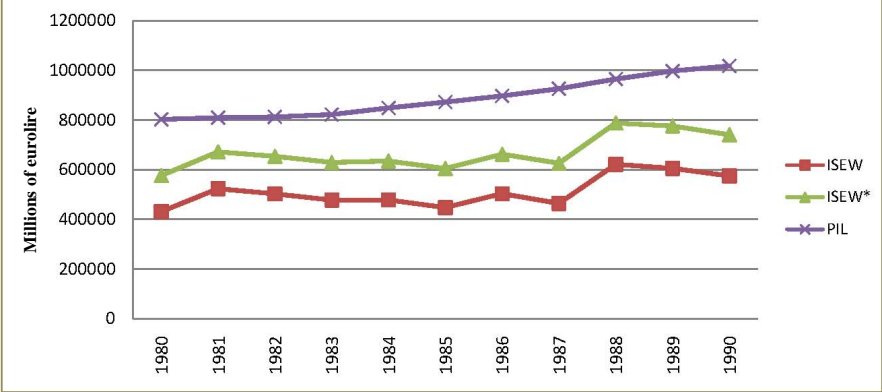
Years	Credit (+) / Indebtedness(-)	Values 2000
1990	-10200.80	-14635.09
1991	-15265.10	-20580.41
1992	-18622.40	-23819.91
1993	8595.00	10550.36
1994	11095.10	13103.31
1995	21746.70	24378.05
1996	30764.40	33191.71
1997	32968.30	34962.88
1998	23462.30	24443.02
1999	14375.50	14743.51
2000	1497.00	1497.00
2001	4513.00	4395.21
2002	-4371.60	-4156.52
2003	-9740.20	-9038.91
2004	-5894.50	-5363.41
2005	-15872.70	-14201.31
2006	-27234.00	-23889.67

Source: ISTAT, Conti Economici Nazionali, Transazioni internazionali; (ISTAT, 2007b)

The values of all items and the ISEW (1990-2006) are in Tables 11 and 12 in the Appendix. As mentioned in the previous section, some variables are excluded from the calculation due to the lack of data. The missing data did not allow us to complete the construction of the index. Since it was impossible to calculate the complete set of 19 variables that make up the ISEW, some hypothesis were made. We used the series of RIBES of Guenno–Tiezzi for the years 1980-1990 and we calculate it without the missing values in period 1990-2006.

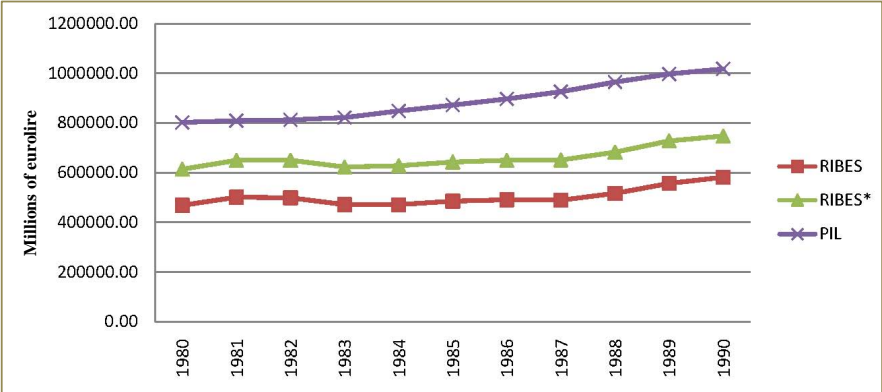
The ISEW and RIBES after the ‘deflation’ of the missing variables (marked with ISEW* and RIBES*) are depicted in Figure 1 and 2.

Figure 1: Comparison between GDP and ISEW (1980-1990)



Source: ISTAT, National Economic Accounts; (Guenno and Tiezzi, 1998)

Figure 2: Comparison between GDP and RIBES (1980-1990)



Source: ISTAT, National Economic Accounts; (Guenno and Tiezzi, 1998)

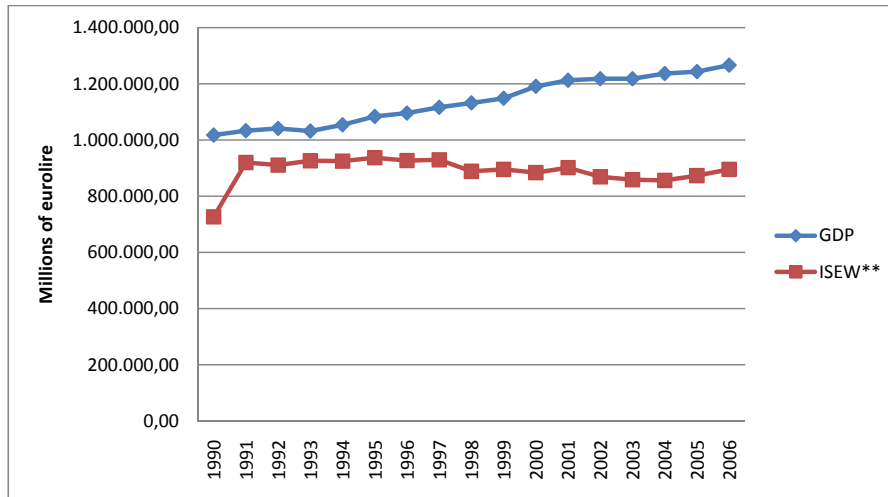
It is clear that the missing items of the two series are a constant share for the decade considered. We assume that this trend will be constant even in the next 16 years, on the bases of the hypothesis that the complete ISEW for the years 1990-2006 is equal to the 9 variables available plus the distance between $ISEW_{1980-1990}$ and $ISEW^*$. The ratio between these two series is equal to an average share of 24%. Repeating the procedure for RIBES there is again a constant distance between RIBES and $RIBES^*$ and the share is equal to that between ISEW and $ISEW^*$. The index $ISEW^{**}$ is calculated applying the same share to $ISEW_{1990-2006}$.

The ISEW constructed under the hypothesis of constancy of the missing variables is compared with GDP in Figure 3. The trend of ISEW shows that the series grows until the 1992. For 1992 onward, however, the ISEW follows a downward trend and then it stabilizes in the last years.

The RIBES' trend, Figure 4, shows that the result are not so different from the ISEW's values. The differences are due to the fact that on constructing RIBES the two items with the greatest variability, the net growth of capital and the net international position, were excluded. These are the variable that have the greatest standard deviation but not an heavy weight in the construction of the index, as show by the boxplot in Figure 5 and 6 that provide an immediate visual impression of the range of variation of each item. However, in both cases, the rate of growth in the corrective measure does not appear to be much lower than that of GDP. This is probably due to the strong hypothesis of constancy of the missing values during the sixteen years, 1990-2006. Especially for environmental damage, this is quite unrealistic, since pollution and depletion of natural resources have increased a lot in the time span considered. In fact, the series would decline sharply if the restrictive hypothesis about the constant share of the environmental damages for the entire period were released.

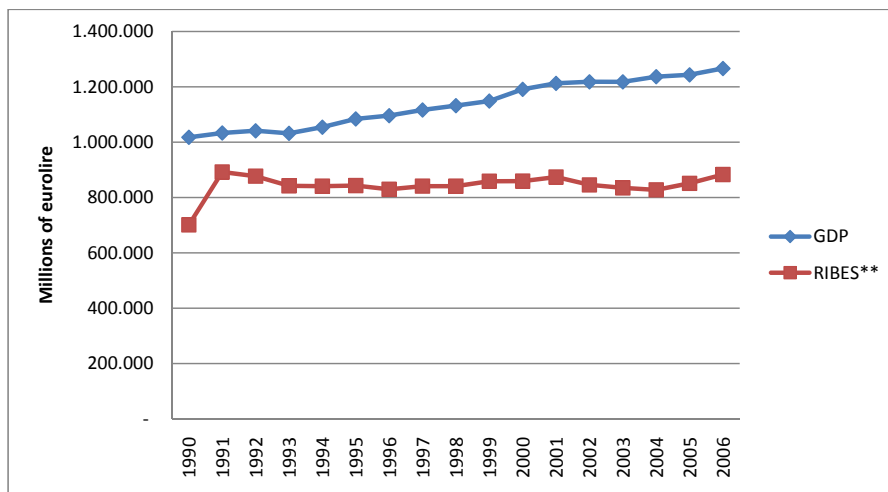
The summary statistics for both indices are in Table 9 and 10 in the Appendix.

Figure 3: Comparison between GDP and ISEW (1990-2006)



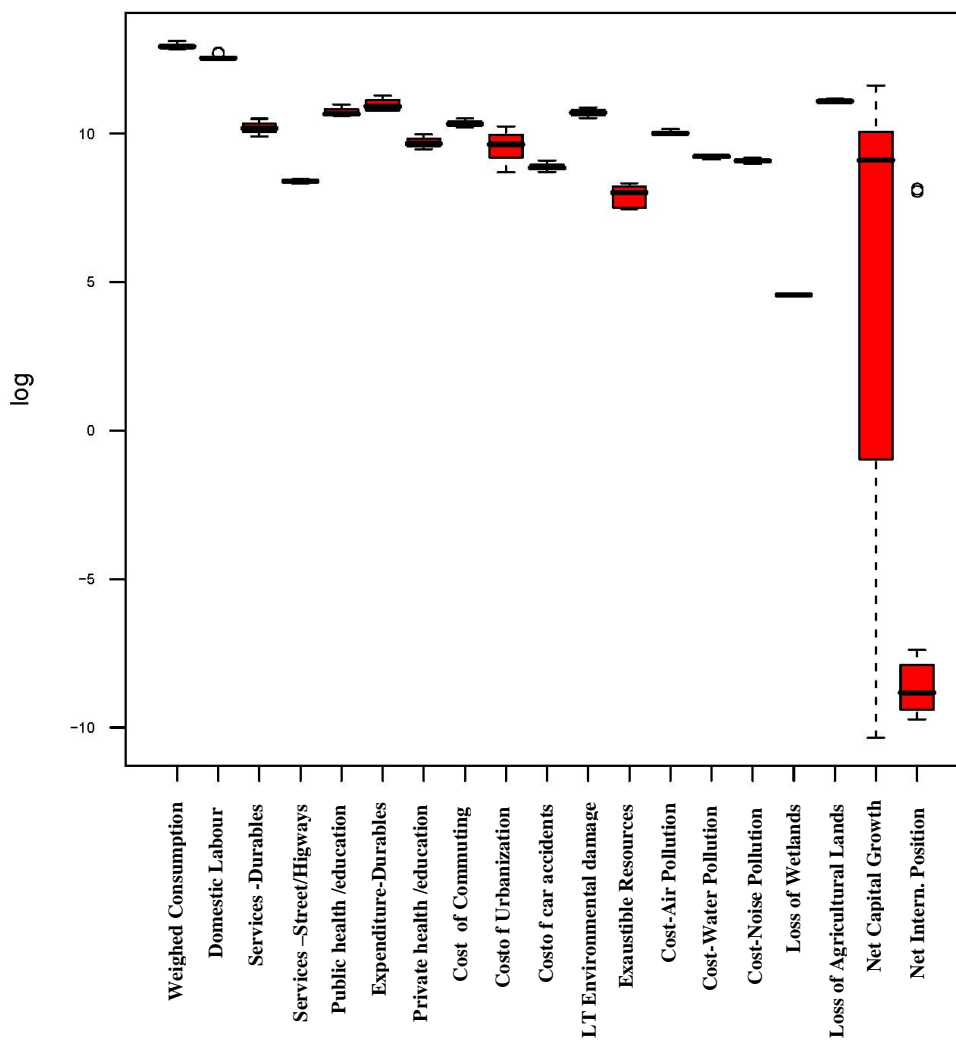
Source: ISTAT, National Economic Accounts; (Guenno and Tiezzi, 1998)

Figure 4: Comparison between GDP and RIBES (1990-2006)



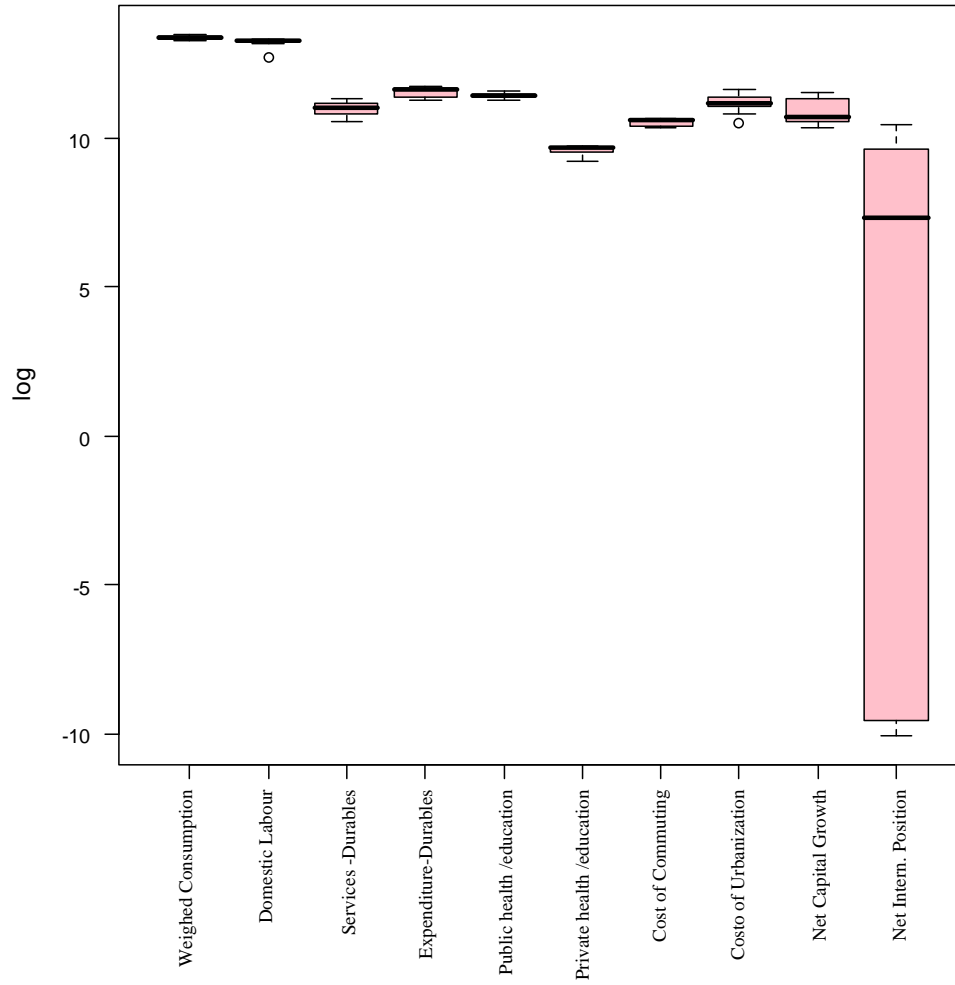
Source: ISTAT, National Economic Accounts; (Guenno and Tiezzi, 1998)

Figure 5: Box-plot of the components of RIBES (1980-1990)



Source: ISTAT, National Economic Accounts

Figure 6: Box-plot of the components dell'ISEW (1990-2006)



Source: ISTAT, National Economic Accounts

3 Final remarks

The aim of the paper was to verify if the Italian ISEW series registered in the recent years follows a decreasing trend. To attain this goal we propose a new way to calculate the ISEW for Italy over the period 1990–2006. The work starts from a brief discussion of the limits and the advantages of GDP as a measure of well-being. In literature there are different examples of attempts to overcome these limits. In particular there are two principal approaches: the alternative measures and corrective measures. We considered the second one, calculating the index proposed by Daly and Cobb, ISEW, for the period 1990–2006 in Italy. The Italian ISEW has been already calculated in a working paper of Guenno and Tiezzi for the period 1960–1990 and it represents our benchmark.

However, the work of Guenno and Tiezzi made different changes to the original methodology. We calculated the Italian ISEW for the recent years using the Guenno and Tiezzi's methodology, although some new assumption are made about the missing data, as the environmental variables and the streets and highways services. In order to overcome this lack of data we calculate the RIBES and the ISEW index for the decade 1980-1990 subtracting the missing items. The result is that the missing variables are a constant share of the complete index. This share is added to the ISEW 1990-2006, assuming that the share of 24% would be constant in the following 16 years.

Unlike the previous study (Guenno and Tiezzi, 1998) which was updated till 1990, the index that we calculated shows a trend quite similar to the other nations. However, the trend of the index series does not strongly decrease. This is probably due to the changes in the original methodology, the hypothesis that the share of missing data is constant during the period analyzed, and finally to some social Italian conditions, as the 'underground' economy, that in Italy is more widespread than in other countries.

In conclusion, even if the GDP has important advantages, as its widespread use and its simple calculation, it can not be considered a reliable measure of well-being. Nevertheless, the ISEW includes important variables, as the environmental damages, the income distribution, the unpaid work, but some arbitrary assumptions due to overcome the lack of data could undermine its reliability. Thus, it should represent a motivation to improve and standardize the methodology of calculation of ISEW to make it applicable to all countries. 'To move from the culture of Gross Domestic Product to that of Gross Domestic Welfare', as proposed by Lorusso and de Padova (Padova and Lorusso, 2007), it is certainly desirable to provide policy makers with a comprehensive measure of well-being to base their policies on.

A Tables of calculation

Table 7: Calculation of domestic labour's income

Years	Coefficients	Income from employment (activities of households and cohabitations)	Income expressed in 2000 values
1990	1.435	5198.200	7457.858
1991	1.348	5914.500	7973.929
1992	1.279	6635.300	8487.212
1993	1.228	6944.400	8524.251
1994	1.181	7184.900	8485.367
1995	1.121	7700.200	8631.924
1996	1.079	8479.900	9148.964
1997	1.061	8768.800	9299.312
1998	1.042	8749.100	9114.812
1999	1.026	8829.600	9055.638
2000	1.000	9219.300	9219.300
2001	0.974	9710.400	9456.959
2002	0.951	10378.600	9867.973
2003	0.928	10707.700	9936.746
2004	0.910	11318.600	10298.794
2005	0.895	11954.700	10695.870
2006	0.877	12495.400	10960.965

Source: ISTAT, Conti Economici Nazionali, Reddito da Lavoro Dipendente, Attività svolte da famiglie e convivenze

Table 8: Employed in domestic work and resident population >15 years

Years	Resident population >15 years	Total employed (activities of households and cohabitations)
1991	48024114.000	964.200
1992	48198556.000	994.500
1993	48347516.000	994.600
1994	48449874.000	989.500
1995	48532903.000	997.000
1996	48618428.000	1087.400
1997	48693247.000	1078.200
1998	48738129.000	1083.700
1999	48778709.000	1078.000
2000	48839034.000	1091.900
2001	48884353.000	1083.800
2002	49172932.000	1201.300
2003	49172932.000	1344.300
2004	49697896.000	1356.300
2005	50206663.000	1366.100
2006	50809387.000	1420.000

Source: ISTAT, Conti Economici Nazionali, Occupati Totali (in migliaia); Atlante Statistico dei Comuni, Altri dati comunali, Popolazione residente per singolo anno e classi di età (1991-2000)

Table 9: Descriptive statistics of RIBES (1980-1990)

Variable	Observation	Mean	St. Dev.	Min	Max
Weigh private consumption	11	424072.600	37162.370	377050.100	495660.600
(+) Services - domestic labour	11	286612.000	20370.530	267904.900	331033.200
(+) Services - consumer durables	11	27125.340	5294.505	19910.950	36361.560
(+) Services streets and highways	11	4450.124	180.865	4086.270	4741.907
(+) Public health care and education costs	11	46051.730	6303.331	39951.520	58491.050
(-) Costs - consumer durables	11	58964.360	12583.350	47349.000	79180.000
(-) Private defensive expenditure for education and health care	11	16414.550	2779.742	13055.000	21314.500
(-) Costs of commuting	11	31168.620	2973.308	27037.900	36438.790
(-) Urbanization costs	11	16040.550	7295.908	5964.252	28102.090
(-) Costs of road accidents	11	7209.710	822.311	6081.361	8874.580
(-) Long-term environmental damage	11	44909.640	5180.877	37262.950	52972.030
(-) Depletion of non-renewable resources	11	2883.974	961.305	1740.987	4147.035
(-) Cost of air pollution	11	22694.290	1423.552	21144.470	25498.280
(-) Cost of water pollution	11	10162.440	577.249	9217.816	10890.040
(-) Costs of noise pollution	11	8790.131	575.954	7947.499	9684.218
(-) Loss of wetlands	11	96.090	3.220	91.210	100.918
(-) Loss of agricultural land	11	66136.720	3252.643	61391.390	71041.980

Source: (Guenno and Tiezzi, 1998)

Table 10: Descriptive statistics of ISEW (1990-2006)

Variable	Observations	Mean	St. Dev.	Min	Max
Weigh private consumption	17	646574.00	46146.41	577211.00	719399.00
(+) Services - domestic labour	17	553159.80	61506.70	331033.20	597566.20
(+) Services - consumer durables	17	60194.82	13770.00	37506.32	82035.58
(+) Public health care and education costs	17	90000.61	7681.83	77876.99	103292.50
(+) Net capital growth	17	58245.00	26169.78	31257.00	100402.00
(+) Net international position	17	2681.17	19398.52	-23889.66	34962.88
(-) Costs - consumer durables	17	103627.80	17019.63	79405.41	123236.50
(-) Private defensive expenditure for education and health care	17	14528.16	2117.40	10035.99	16822.67
(-) Costs of commuting	17	37076.00	4272.42	30784.00	41531.00
(-) Urbanization costs	17	74912.47	20699.53	36079.02	111102.50
(-) Costs of road accidents	17	9688.29	15525.28	0.00	34733.00

Source: (Guenno and Tiezzi, 1998)

Table 11: Calculation of the series of ISEW and RIBES (1990-2006)

Years Variables	1990	1991	1992	1993	1994	1995	1996	1997	1998
ISEW**	726634	920050	910841	926462	924915	937204	926993	929646	888732
RIBES**	701200	892132	877124	842139	840883	843144	829704	841104	840956
GDP	1017666	1033275	1041261	1032013	1054220	1084023	1095897	1116415	1132060
Weight private consumption	534403	570078	597686	610688	621683	606235	589958	599442	628553
(+) Services - domestic labour	331033.17*	556389	576246	580491	582051	588657	573056	588348	574277
(+) Services - consumer durables	37506	40889	44398	46797	49373	51905	54287	57535	60739
(+) Services of roads and highways	-	-	-	-	-	-	-	-	-
(+) Public health care and education costs	86314	89570	88713	85367	82002	77877	81612	83515	85237
(+) Net capital growth	48100	57314	68185	100402	97465	99385	94820	81539	38421
(+) Net international position	-14635	-20580	-23820	10550	13103	24378	33192	34963	24443
(-) Costs - consumer durables	79405	82213	87130	79818	84744	88918	91770	104627	110433
(-) Private defensive expenditure for education and health care	10036	10678	11663	12343	13256	14599	14914	15357	15646
(-) Costs of commuting	30784	31365	32756	31017	32458	33656	34186	37762	39477
(-) Urbanization costs	36079	47807	54708	58612	62417	66147	67783	71038	71172
(-) Costs of road accidents	-	-	-	-	-	-	-	-	-
(-) Long-term environmental damage	-	-	-	-	-	-	-	-	-
(-) Depletion of non-renewable resources	-	-	-	-	-	-	-	-	-
(-) Cost of air pollution	-	-	-	-	-	-	-	-	-
(-) Cost of water pollution	-	-	-	-	-	-	-	-	-
(-) Costs of noise pollution	-	-	-	-	-	-	-	-	-
(-) Loss of wetlands	-	-	-	-	-	-	-	-	-
(-) Loss of agricultural land	-	-	-	-	-	-	-	-	-

Table 12: Calculation of the series of ISEW and RIBES (1990-2006)

Years Variables	1999	2000	2001	2002	2003	2004	2005	2006
ISEW**	895529	884185	901781	869070	858893	856268	874654	897757
RIBES**	858850	859292	873788	845510	834886	827670	851161	882909
GDP	1148636	1191057	1212713	1218220	1218013	1236671	1243525	1266420
Weigh private consumption	645495	664929	669171	678264	701159	704818	710968	711363
(+) Services - domestic labour	574043	577692	597566	565870	509199	528667	550692	549437
(+) Services - consumer durables	63603	66341	68767	71021	72930	76079	79104	82036
(+) Services of roads and highways	-	-	-	-	-	-	-	-
(+) Public health care and education costs	86445	89721	93909	95950	98439	99160	102886	103292
(+) Net capital growth	33519	31257	32438	35157	40627	42993	45114	43426
(+) Net international position	14744	1497	4395	-4157	-9039	-5363	-14201	-23890
(-) Costs - consumer durables	113245	116855	117129	118219	119612	122171	122145	123237
(-) Private defensive expenditure for education and health care	15652	15588	15701	15961	16137	16273	16351	16823
(-) Costs of commuting	39851	40350	40312	40826	41531	41531	41143	41280
(-) Urbanization costs	75213	79093	82445	88306	93672	100535	107381	111102
(-) Costs of road accidents	-	28354	33800	34108	-	33706	34733	-
(-) Long-term environmental damage	-	-	-	-	-	-	-	-
(-) Depletion of non-renewable resources	-	-	-	-	-	-	-	-
(-) Cost of air pollution	-	-	-	-	-	-	-	-
(-) Cost of water pollution	-	-	-	-	-	-	-	-
(-) Costs of noise pollution	-	-	-	-	-	-	-	-
(-) Loss of wetlands	-	-	-	-	-	-	-	-
(-) Loss of agricultural land	-	-	-	-	-	-	-	-

References

- Abdallah S., Marks N., Simms A. and Thompson S. (2006) *The unhappy planet index. an index of human well-being and environmental impact*, Technical report, nef (The new economics foundation).
- Atkison G., Dietz S. and Neumayer E. (2007) *Hanbook of sustainable development*, Edward Elgar.
- Cheli B. (2000) *Sulla misura del benessere economico: i paradossi del pil e le possibili correzioni in chiave etica e sostenibile, con uno spunto per l'analisi della povertà*, Technical Report 195, Università di Pisa.
- Clifford C., Halstead T. and Rowe J. (2007) *The Genuine Progress Indicator 2006. A tool for sustainable development*, Technical report, Redefinig Progress.
- Daly H. and Cobb J. (1994) *For the common good: redirecting the economy toward community, the environment, and a sustainable future*, Beacon Press, Boston.
- Dietz S. and Neumayer E. (2006) *Some constructive criticisms of the Index of Sustainable Economic Welfare*, in: *Sustainable development indicators in ecological economics*, Edwar Elgar, chapter 9, 186–208.
- EEA and GFN (2005) *National ecological footprint and biocapacity accounts*, Technical report, European Environment Agency and Global Footprint Network.
- El Serafy S. (1991) *The Environment as Capital*, Columbia University Press, New York, chapter 12.
- Esteve Mora F. (1997) *La falsa medida de la economía*, *Economiaz*, 39.
- Fisher I. (1906) *The nature of capital and income*, Macmillan, New York.
- Fuà G. (1993) *Crescita economica. Le insidie delle cifre*, il Mulino, Bologna.
- Goossens Y., Mäkipää A., Schepelmann P., van de Sand I., Kuhndtand M. and Herrndorf M. (2007) *Alternative progress indicators to gross domestic product (gdp) as a means towards sustainable development*, Technical report, Policy Department–Economic and Scientific Policy.
- Guenno G. and Tiezzi S. (1998) *The Index of Sustainable Economic Welfare (ISEW) for Italy*, working Paper No. ENV-5.98.
- Hawtrey R.G. (1926) *The economic problem*, Longmans, Green.

- Hicks J.R. (1939) *Value and capital: an inquiry into some fundamental principles of economic theory*, Clarendon Press, Oxford.
- ISTAT (2007a) I tempi della vita quotidiana. un approccio multidisciplinare all'analisi del'uso del tempo, Technical report, Istituto Nazionale di Statistica (ISTAT), argomenti No.32. Disponibile online su: www.istat.it.
- ISTAT (2007b) Il valore della moneta in Italia dal 1861 al 2006, Technical report, Istituto Nazionale di Statistica (ISTAT), collana di Informazioni. Disponibile online su: www.istat.it.
- ISTAT (2008) Spesa delle amministrazioni pubbliche per funzione. serie. sec95 anni 1990-2006, Technical report, Istituto Nazionale di Statistica (ISTAT), statistiche in breve. Disponibile online su: www.istat.it.
- Kuznets S. (1934) National income, 1929–1932, Technical report, 73d Congress – Senate document no. 124.
- Mankiw N.G. (2008) *Principles of economics*, Mason, OH : South-Western Cengage Learning.
- Max-Neef M. (1995) Economic growth and quality of life: a threshold hypothesis, *Ecological Economics*, 15, 115–118.
- Neumayer E. (1999) The ISEW – Not an index of sustainable economic welfare, *Social Indicators Research*, 48, 77–101.
- Neumayer E. (2000) On the methodology of ISEW, GPI and related measures: some constructive suggestions and some doubt on the “threshold” hypothesis, Technical report, London School of Economics and Political Science.
- Neumayer E. (2004) Sustainability and well-being indicators, research Paper No 2004/XX.
- OECD (2005) Labour Force Statistics: 1984–2004, Technical report, OECD Publishing.
- Padova N.D. and Lorusso R. (2007) *Depiliamoci. Liberarsi del PIL superfluo e vivere felici*, Editori Riuniti, Roma.
- Pigou A. (1952) *The Economics of Welfare*, Macmillan, London.
- Revkin A.C. (2005) A new measure of well-being from a happy little kingdom, *The New York Times*.

Sen A. (1984) The living standard, *Oxford Economic Papers*, 36.

Stiglitz J., Sen A. and Fitoussi J. (2009) Report of the commission on the measurement of economic performance et social progress, Technical report.

WCED (1987) *Our Common Future (The Brundtland Report)*, Oxford University Press.

Ultimi Contributi di Ricerca CRENoS

I Paper sono disponibili in: <http://www.crenos.it>

- 10/05 *David Forrest, Miguel Jara, Dimitri Paolini, Juan de Dios Tena*, “Institutional Complexity and Managerial Efficiency: A Theoretical Model and an Empirical Application”
- 10/04 *Manuela Deidda*, “Financial Development and Selection into Entrepreneurship: Evidence from Italy and US”
- 10/03 *Giorgia Casalone, Daniela Sonedda*, “Evaluating the Distributional Effects of the Italian Fiscal Policies using Quantile Regressions”
- 10/02 *Claudio Detotto, Edoardo Otranto*, “A Time Varying Parameter Approach to Analyze the Macroeconomic Consequences of Crime”
- 10/01 *Manuela Deidda*, “Precautionary saving, financial risk and portfolio choice”
- 09/18 *Manuela Deidda*, “Precautionary savings under liquidity constraints: evidence from Italy”
- 09/17 *Edoardo Otranto*, “Improving the Forecasting of Dynamic Conditional Correlation: a Volatility Dependent Approach”
- 09/16 *Emanuela Marrocu, Raffaele Paci, Marco Pontis*, “Intangible capital and firms productivity”
- 09/15 *Helena Marques, Gabriel Pino, Juan de Dios Tena*, “Regional inflation dynamics using space-time models”
- 09/14 *Jaime Alvarez, David Forrest, Ismael Sanz, Juan de Dios Tena*, “Impact of Importing Foreign Talent on Performance Levels of Local Co-Workers”
- 09/13 *Fabio Cerina, Francesco Mureddu*, “Is Agglomeration really good for Growth? Global Efficiency and Interregional Equity”
- 09/12 *Federico Crudu*, “GMM, Generalized Empirical Likelihood, and Time Series”
- 09/11 *Francesca Mameli, Gerardo Marletto*, “Can national survey data be used to select a core set of indicators for monitoring the sustainability of urban mobility policies?”
- 09/10 *Emanuela Marrocu, Raffaele Paci*, “They arrive with new information. Tourism flows and production efficiency in the European regions”
- 09/09 *Oliviero A. Carboni*, “An Empirical investigation of the Determinants of R&D Cooperation”
- 09/08 *Fabiano Schivardi, Eliana Viviano*, “Entry Barriers in Retail Trade”
- 09/07 *Rinaldo Brau, Carlo Carraro*, “The Design of Voluntary Agreements in Oligopolistic Markets”
- 09/06 *Francesca Mameli, Gerardo Marletto*, “A participative procedure to select indicators of sustainable urban mobility policies”
- 09/05 *Claudio Detotto, Manuela Pulina*, “Does more crime mean fewer jobs? An ARDL model”
- 09/04 *Francesco Pigliaru*, “Persistent Regional Gaps and the Role of Social Capital: Hints from the Italian Mezzogiorno’s case”
- 09/03 *Giovanni Sulis*, “Wage Returns to Experience and Tenure for Young Men in Italy”
- 09/02 *Guido Ferrari, Giorgio Garau, Patrizio Lecca*, “Constructing a Social Accounting Matrix for Sardinia”

Ultimi Contributi di Ricerca CRENoS

I Paper sono disponibili in: <http://www.crenos.it>

- 10/05 *David Forrest, Miguel Jara, Dimitri Paolini, Juan de Dios Tena*, “Institutional Complexity and Managerial Efficiency: A Theoretical Model and an Empirical Application”
- 10/04 *Manuela Deidda*, “Financial Development and Selection into Entrepreneurship: Evidence from Italy and US”
- 10/03 *Giorgia Casalone, Daniela Sonedda*, “Evaluating the Distributional Effects of the Italian Fiscal Policies using Quantile Regressions”
- 10/02 *Claudio Detotto, Edoardo Otranto*, “A Time Varying Parameter Approach to Analyze the Macroeconomic Consequences of Crime”
- 10/01 *Manuela Deidda*, “Precautionary saving, financial risk and portfolio choice”
- 09/18 *Manuela Deidda*, “Precautionary savings under liquidity constraints: evidence from Italy”
- 09/17 *Edoardo Otranto*, “Improving the Forecasting of Dynamic Conditional Correlation: a Volatility Dependent Approach”
- 09/16 *Emanuela Marrocu, Raffaele Paci, Marco Pontis*, “Intangible capital and firms productivity”
- 09/15 *Helena Marques, Gabriel Pino, Juan de Dios Tena*, “Regional inflation dynamics using space-time models”
- 09/14 *Jaime Alvarez, David Forrest, Ismael Sanz, Juan de Dios Tena*, “Impact of Importing Foreign Talent on Performance Levels of Local Co-Workers”
- 09/13 *Fabio Cerina, Francesco Mureddu*, “Is Agglomeration really good for Growth? Global Efficiency and Interregional Equity”
- 09/12 *Federico Crudu*, “GMM, Generalized Empirical Likelihood, and Time Series”
- 09/11 *Francesca Mameli, Gerardo Marletto*, “Can national survey data be used to select a core set of indicators for monitoring the sustainability of urban mobility policies?”
- 09/10 *Emanuela Marrocu, Raffaele Paci*, “They arrive with new information. Tourism flows and production efficiency in the European regions”
- 09/09 *Oliviero A. Carboni*, “An Empirical investigation of the Determinants of R&D Cooperation”
- 09/08 *Fabiano Schivardi, Eliana Viviano*, “Entry Barriers in Retail Trade”
- 09/07 *Rinaldo Brau, Carlo Carraro*, “The Design of Voluntary Agreements in Oligopolistic Markets”
- 09/06 *Francesca Mameli, Gerardo Marletto*, “A participative procedure to select indicators of sustainable urban mobility policies”
- 09/05 *Claudio Detotto, Manuela Pulina*, “Does more crime mean fewer jobs? An ARDL model”
- 09/04 *Francesco Pigliaru*, “Persistent Regional Gaps and the Role of Social Capital: Hints from the Italian Mezzogiorno’s case”
- 09/03 *Giovanni Sulis*, “Wage Returns to Experience and Tenure for Young Men in Italy”
- 09/02 *Guido Ferrari, Giorgio Garau, Patrizio Lecca*, “Constructing a Social Accounting Matrix for Sardinia”

Finito di stampare nel mese di Maggio 2010
Presso **studiografico&stampadigitale Copy Right**
Via Torre Tonda 8 – Tel. 079.200395 – Fax 079.4360444
07100 Sassari

www.crenos.it

ISBN 978-88-84-67-580-4

