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The Human Development Index in Historical Perspective: Italy from Political Unification to the Present Day

Abstract: The aim of this research is to provide a long run estimate of the Human Development Index (HDI) for Italy. To this purpose we have reconstructed Italian historical series relative to life expectancy, literacy rate, school enrolment rates and income. All the series presented are the result of a study which has produced, starting from primary sources, original series disaggregated to the regional level. The possibility of having, for Italy, a basis of comparison with the main developed countries has permitted us to show that, even though there has been significant progress in the values of the single variables, the country has not appreciably improved its position in the world ranking. This seems to be due, in large part, to the trend of the education variables that displays values decidedly distant from those of the main industrialized countries. As far as regional trends are concerned, we can observe a slow process of alignment of the values of the Southern regions to the values of the other Italian regions for levels of education and longevity, while income levels for the 1990s still remain quite distant.

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1. Introduction

In the last years a number of studies have contributed to improving our knowledge of the main macroeconomic indicators for Italy, at least from the time of the latter's political unification (Rey, 1991; 1992; 2000; 2002). Although much work still remains to be done, income series are available for Italy on the par with other developed countries. Less information is, however, available for the levels of well-being achieved by the Italian population in the course of the years. From this viewpoint, the principal aim of this study is to reconstruct Italy's standard of living through the use of the *Human Development Index* (HDI from now on), a synthetic indicator, introduced by the United Nations, that allows for the measurement of development in terms of capability and not only in terms of wealth. Pursuing this aim has involved the reconstruction, from primary sources, of the series relative to the life expectancy of the population and of some variables concerning different levels of education. Thanks to a few studies carried out at the international level (Crafts, 1997; 2002; Prados de la Escosura, 2002), the series reconstructed for Italy can be read from a comparative viewpoint, which allows us to place Italy's process of economic development within the dynamics of the more developed countries.

The existence, often emphasised by the literature, of important regional differences in the Italian economic development process, has advocated the reconstruction of the series for different areas of the country. Taking this approach, the study became decidedly more complex, in that, especially with regard to income, the information available was very inconsistent. This part of the analysis has however, permitted the realization of a double objective, allowing the comparison of both the diverse levels of well-being characterizing the Italian regions and the comparison of the results reached in the different areas of the country with those of other developed nations.

Finally, this study also intends to achieve a number of methodological results by verifying some of the limits, especially when a long run perspective is adopted, of the

heuristic abilities of the HDI. To this end we suggest some solutions which allow for a more correct understanding of the data presented.

2. Evolution of conventional (and non) measurements of economic growth

After World War II, the necessity of favouring a rapid return to efficiency of productive systems and the desire to ensure the well-being of the population induced social scientists and statesmen to concentrate on the processes of economic growth. The prospect of allowing the comparative measurement of national economic systems, and in particular the different phases of the cycle, favoured the adoption of the income indicator, and of its historical series, as a standard for the analysis of growth. The United Nations suggested the introduction of the System of National Accounting (SNA), the explicit objective being that of having an efficient instrument with which to measure the cyclical changes of overall economic activity (Studenski, 1958). Since then the various national economies have been monitored by international organisms (IMF, OECD) through the use of a proxy standard, namely, production. This operation – at the same time both scientific and political – though it gave the SNA the status of universal macroeconomic language (Keuning, 1998), was not exempt from criticism, which stressed the inability of the indicator to capture non-market aspects. On this point, particular reference can be made to the debate on the links between market production and well-being carried on, amongst others, by Hicks and Kuznets on the eve of the introduction of the SNA (Eisner, 1988).

Therefore, considerations linked to welfare, because they are often associated with non-monetary transactions such as, for example, those within the family or between families, the civil service and private non-profit social institutions had no influence on the SNA (Bos, 1993). The centricity attributed to growth as a phenomenon coinciding with the increase in disposable income, however, never concealed the social dimension which accompanied growth. In particular, Galbraith (1958), Riesman (1964) and Mishan (1967) called attention to the cost of growth in human terms, highlighting the possible concurrent decline in well-being.

The 1970s witnessed a revival of interest in the methodology of national accounting. Economic growth with troubles in the form of pollution, congestion and crime stimulated interest in broad welfare measures. In response to the criticism on the use of GDP as a measure of well-being, there were developments from both inside and outside the tradition of national accounting.

From within came attempts to redefine the GDP, «extending» the national accounting system, in such a way as to focus more on well-being and on quality of life. Nordhaus and Tobin (1972) and many others (see Eisner, 1988) adjusted GDP for leisure, non-market work and disamenities of urban life. The problem, which becomes obvious in the light of the review of the aforementioned debates (Streeten, 1994), arises from the insecure micro-economic foundations of the SNA, namely from the difficulties entailed by the transition from aggregate data on a national basis to family and individual data. These problems have induced international organizations to revise the structure of the SNA and concurrently the relationships between growth of per capita income and individual well-being. These debates can, in synthesis, be led back to the following two approaches.

The first envisages a close link, with reduced temporal delay, between growth in the economic dimensions of production – measured by per capita GDP – and growth in terms of the socio-economic welfare of the community (Srinivasan, 1977). Below a causal nexus is postulated between economic growth and social well-being. In these cases, obviously, there is little space for analyses in terms of social well-being and for criticism of theoretical foundations and operative implications of GDP (McGillivray, 1991).

The second holds that economic growth can lead to well-being, but with relatively consistent temporal delays that are unacceptable from a social and political point of view; and furthermore, that economic growth can influence well-being positively in certain contexts (education) but negatively in others (environment) without the possibility of relying on prompt corrective measures on the part of market mechanisms (Zolotas, 1981). From the above, the necessity for assessing the social manifestations of well-being and the appropriateness of the active politics of institutions with regard to education, health, social security and distribution becomes evident (Stewart, 1985; Beckerman, 1993).

The United Nations' decision to adopt the HDI, based on the studies by Amartya Sen (1984; 1985a; 1987; 1991) as an analytical instrument as from 1990 was due to the abandonment of the prevailing view of growth as essentially based on per capita income. The index drew attention to the standard of living, that is, as in Sen's definition, the functionings «the different living conditions that individuals in a specific economic and social community are able to achieve» and, as a correlation to these, their capabilities, their ability to achieve them. In even more explicit terms (1985b) Sen distinguishes between: i) the result obtained through achievement (agency achievement); ii) personal well-being and standard of living.

The index draws attention to the standard of living. This concept is apparently intuitive, but nonetheless difficult to describe. In the first place it must be emphasized that since it refers to specific conditions which allow for the wellbeing of a person, it cannot be defined in a «situational» way, but requires a «global» type of analysis (Sen 1984)[1]. In order to be able to choose the variables belonging to the «global» condition it is necessary to choose a classifying criterion for wellbeing. The criterion which can be representative of the standard of living is that of freedom. This association is rendered explicit when considered in a social context. In this way it is possible to define a few of its forms: i) that which coincides with the liberty of not gaining a personal advantage from the social context of one's action (e.g. deciding to die for a civil cause); ii) that which allows one to remain in a condition of personal well-being without it being due to any action (e.g. the enjoyment of a privileged position); iii) that which allows one to be placed by the social context in a position to act and to derive an increase in wellbeing from one's actions (e.g. the possibility of access to education).

The third case is the liberty that Sen, and the UN Commission which drew up the Report in 1990, have suggested as equivalent to the standard of living. It is defined as a «positive liberty» that is, the acquisition of those abilities which permit, through choices, to activate those functions capable of increasing the state of wellbeing of a person (Sen, 1992).

That is, in elementary terms, a good standard of living is achieved through good life expectancy, good nutrition, health, and education. The possibility of possessing material goods (property) may derive from the above-mentioned capacities, but its relevance is extremely variable since it is linked to the individual's different psychological, social and cultural conditions. Populations tend to give priority to goods with respect to capability only when they find themselves in conditions of extreme poverty and have to avoid hunger or death.

The use of this index in the analysis of development has been subjected to two kinds of criticism: i) the inappropriateness of the criteria for the measurement of social

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[1] The differences are the following: in the first case we evaluate whether during a certain year person A, whom we assume to have the same utility function, has the same desires as in the preceding year, and is if it's situation is such as to allow it to acquire a different bundle of goods to that of the preceding year; in the second we evaluate if during a certain year, person A is in a better or worse condition than in the previous year. In the first case the change is measured through the evaluation of the bundle of goods, in the second it is necessary to evaluate the entire set of variables that can influence the wellbeing of person A.

phenomena from which the index components and weights attributed to the latter are derived in order to create the synthesis; ii) the inappropriateness of keeping their relations unchanged for the different phases of development.

As far as the first criticisms are concerned the most promising solutions to our view are: the application of elasticity to longevity and to educational levels in order to render the index' structure more sensitive, as regards surveys, to different space and time contexts (Noorbakhsh, 1998); and Sagar and Najam (1998) who proposed the geometric mean as a method of obtaining the result of the synthesis.

Dasgupta and Weale (1992) have devoted their attention to the insufficient representativeness of the chosen components, such as the elements for a synthesis on the standard of living. Their proposal is to extend the initial scheme and to construct an ordinal index that also includes conditions of social democracy.

It is important to emphasize that the variations applied to the estimation criteria as from the 1999 report take nearly all of these suggestions into account and that at the same time, despite its limits – the HDI has become the preferential tool used in development surveys on the par with the more consolidated per capita GDP (Offer 2000)[2].

Development as a change in standard of living has also been the object of economic history studies, that have not only discussed it according to the views of «pessimists» and «optimists» but that have also promoted research relative to the measurement of the change. Among the most relevant of these are the studies conducted by Morris (1979) who proposed an index, the PQLI which does not greatly differ from that adopted by the UN in 1990[3]. More recently Crafts (1997; 2002) and Prados de la Escosura (2002) have drawn up historical series of the HDI for the major countries. These are seminal research projects whose object is not that of advancing conclusions on the history of economic development, but rather that of expanding the dimension of the analysis. This article whose analytical objective is to verify the efficacy of the index in measuring processes of change, heads in the same direction.

By following this approach, this work (which is part of a more comprehensive project that intends to investigate, also through the construction of further explicative

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[2] On the basis of 1994 U.N. Reports, different thresholds of longevity have been accounted for depending on the type of country examined; this same procedure has been adopted since 1999 also with regard to educational structures; furthermore in 1999 elasticity was introduced in the estimation of income progression (United Nations, 1994; 1999).

variables, the relations between economic growth and human development) aims at verifying, by means of the HDI estimate for Italy, broken up into regional levels, the explicative capacities of the Index in illustrating the dynamics of long-term Italian economic development.

The text is organised as follows: after the Introduction (§ 1) and the literature review (§ 2), § 3 describes the characteristics of the Index, § 4 presents the estimates and places Italy in a comparative perspective to other developed countries. § 5 contains an analysis of regional differentials with a focus on the development processes in Southern Italy and § 6 presents several concluding remarks. The work ends with a methodological Appendix which summarises the sources and instruments utilised for the construction of the HDI for Italy.

3. HDI: definitions and open issues

The HDIs "capture the three essential components of human life: longevity, knowledge and basic income for a decent living standard" (United Nations, 1994; 1999).

Longevity. Indicates the capacity to lead a long and healthy life, and is defined by life expectancy at birth, i.e. by the number of years that a new-born child can live if the mortality conditions existing at the moment of birth were to remain unchanged for the child's entire life. The index is calculated by estimating the distance of the value of a given country from a minimum and a maximum value: 25 and 85 years, respectively.

Knowledge. Indicates the possibility of access to certain defined levels of cultural knowledge. It is determined by the weighted mean of two indexes: the Adult Literacy Rate (ALR) and the Gross Enrolment Ratio (GER). These represent, respectively, adult literacy (ALR), i.e. the percentage of the population over 15 years of age able to read, write and understand a short text on daily life; and the rate of gross enrolment in the various levels of education (GER), i.e. the number of students registered (apart from age) expressed as a percentage of the population included in the age bracket relative to the levels of elementary, secondary and tertiary school attendance. Generally, this indicator is defined as being "adjusted", in the sense that the age groups to which the calculation refers depend on the structure of the educational system of the country considered. The two variables,

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[3] The historical series of the PQLI for Italy was drawn up by Federico and Toniolo (1991).

ALR and GER, have a natural variation of between 0% and 100%, and are *weighted* in order to calculate the *knowledge* variable at 2/3 and 1/3, respectively, of the total.

Resources. Indicates the ability to satisfy material needs. The indicator, which is expressed in logarithmic form, is obtained by transforming the distance of the real per-capita GDP from a minimum and a maximum value included between the threshold values of 1990 US$ 100 and 40,000. The logarithm of the income is assumed, as this makes it possible to take into consideration decreasing yields that were registered during the transformation of income into well-being [welfare]. In fact, it is believed that "people do not need excessive financial resources in order to guarantee themselves a decent life" (United Nations, 1999).

In order to build each component, we resorted to the following formula:

$$\text{Index} = \frac{\text{actual } x_i \text{ value} - \text{minimum } x_i \text{ value}}{\text{maximum } x_i \text{ value} - \text{minimum } x_i \text{ value}}$$

If, for example, the life expectancy at birth for a country is 60 years, the longevity index will be the following:

$$\text{Life expectancy index} = \frac{60 - 25}{85 - 25} = \frac{35}{60} = 0.583$$

Subsequently, once the three indexes have been calculated, the HDI is defined as the simple mean of the three indicators.

There are some difficulties in using HDI as it is formulated. There are two reasons for this: *i)* the choice of the individual variables and the importance attributed to them; and *ii)* the definitions of the threshold values for the longevity and resources variables. As far as the first aspect is concerned, both the necessity of including variables regarding the efficiency of the health-care system, for example, so as to capture in the most appropriate manner -with respect to life expectancy- the possibility of leading a healthy life, and also the need to extend the variables considered to the population's civil and political rights, have been asserted (Dasgupta-Weale, 1992). We can add to these observations, with which we completely agree, that variables capable of specifying the possibility of access to information -freedom of the press, radio and television broadcasting, etc.- would be

equally useful, as would those relative to the degree of safety of the population and to the quality of its living environment.

The open issue of variables is accentuated by the adoption of a long-term perspective (Engerman, 1997). The diachronic comparability of the Index is limited by assuming minimum and maximum values that are always equal in time, for both the longevity and the resources variable, above all for the more developed countries. In recent years the index tends to approach unity in all countries, thus limiting the possibility of making significant comparisons. It therefore seems that we can suggest the choice of different threshold values as being more appropriate, although this would involve distortions that are not easily overcome. Despite the numerous criticisms to which the HDI has been subjected, its use, as shown above, has been rapidly affirmed in the study of the development dynamics of under-developed countries (Anand-Ravallion, 1993; Streeten, 1994; Ranis-Stewart-Ramirez, 2000).

4. Italy within a comparative perspective

The estimates of the HDI for Italy are presented in this section, through a comparative perspective with other developed countries. In Table 1, the data relative to the HDI for Italy and for the other sixteen «Advanced capitalist countries», using Maddison's terminology (1995), are reported for several *benchmark* years. In order to have a more complete framework, the estimates for Spain have been added to these. The data for the latter countries were obtained from Prados de la Escosura which makes eleven benchmark years available some of which relative to the period between the two world wars. As can be noted from the following table, the comparison between the estimate obtained by Prados de la Escosura and ours, shows considerable similarities[4]

Years	Prados de la Escosura	Crafts (2002)	Our estimates
1870	0.276	0.268	0,288 (1871)
1890	0.357	n.a.	0,358 (1891)
1910	0.461	0.485 (1913)	0,453 (1911)
1929	0.568	n.a.	0,549 (1928)
1938	0.615	n.a.	0,594
1950	0.655	0.668	0,651 (1951)
1960	0.730	n.a.	0,728 (1961)
1970	0.789	0.827 (1975)	0,791 (1971)
1980	0.825	0.827 (1975)	0,828 (1981)
1990	0.861	n.a.	0,861 (1991)

The analysis of the data should be preceded by a general remark, regarding the specificity of the index, which, as has already been mentioned, can only assume values

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[4]. The comparison with the results presented by Crafts (2002) also does not show significant differences. The data regarding the period between the two wolrd wars are not available in the series edited by Crafts (1997; 2002); it must furthermore be noted that the first work (Crafts 1997) is not comparable with the others because it is not elaborated according to the new criteria defined by the United Nations (1999).

between 0 and 1. This determines a rapid variation for poor countries and a semi-immobility for developed countries. It follows that the comparison over time with countries that at the moment of comparison start off with a higher index is by definition conducive to a process of compulsory convergence. These countries are unable to improve their relative positions and there is no sense in measuring the rate of variation between two dates and then conducting a comparison between countries, the only possible comparison is an ordinal one between two countries at a given time (Ray, 1998, 29).

Table 1. HDI for advanced capitalist countries *(1870-1990)*

	1870	**1890**	**1910**	**1913**	**1929**	**1938**	**1950**	**1960**	**1970**	**1980**	**1990**
Australia	0.564	0.604	0.663	0.674	0.711	0.735	0.766	0.799	0.820	0.845	0.871
Austria	0.337	0.438	0.547	0.549	0.643	0.668	0.698	0.760	0.805	0.830	0.858
Belgium	0.441	0.499	0.574	0.576	0.657	0.680	0.736	0.784	0.811	0.846	0.875
Canada	0.468	0.528	0.606	0.619	0.688	0.701	0.761	0.798	0.830	0.866	0.904
Denmark	0.525	0.573	0.641	0.644	0.696	0.717	0.765	0.795	0.828	0.851	0.871
Finland	0.224	0.302	0.424	0.438	0.578	0.629	0.682	0.759	0.791	0.833	0.876
France	0.450	0.498	0.573	0.585	0.648	0.667	0.720	0.772	0.819	0.844	0.883
Germany	0.473	0.523	0.582	0.600	0.675	0.715	0.727	0.775	0.814	0.841	0.875
Italy	**0.288**	**0.358**	**0.453**		**0.549**	**0.594**	**0.651**	**0.728**	**0.791**	**0.828**	**0.861**
Japan	0.235	0.331	0.436	0.458	0.542	0.580	0.629	0.728	0.804	0.852	0.891
Netherlands	0.482	0.515	0.612	0.626	0.708	0.722	0.771	0.803	0.832	0.860	0.871
New Zealand	0.589	0.636	0.703	0.694	0.730	0.748	0.788	0.806	0.821	0.840	0.859
Norway	0.519	0.551	0.604	0.613	0.672	0.700	0.755	0.794	0.820	0.861	0.878
Spain	0.267	0.318	0.406	0.412	0.528	0.521	0.607	0.685	0.768	0.818	0.869
Sweden	0.510	0.573	0.633	0.637	0.682	0.690	0.768	0.805	0.838	0.865	0.878
Switzerland	0.508	n.a.	0.616	0.627	0.698	0.715	0.764	0.803	0.831	0.859	0.890
UK	0.488	0.558	0.623	0.626	0.676	0.717	0.758	0.781	0.814	0.833	0.867
US	0.511	0.556	0.625	0.628	0.716	0.738	0.793	0.814	0.847	0.874	0.896

Source: for Italy our elaborations, based on original sources reported in the Appendix, referred respectively to 1871, 1891, 1911, 1928, 1938, 1951, 1961, 1971, 1981, 1991; for the other countries data provided by Prados de la Escosura regarding longevity and knowledge components and Maddison (1995) for GDP.

Let us now observe the performance of Italy, in other words the pattern of the HDI and subsequently the pattern of its three sub-components which are the causes of the variations. In 1870 the HDI value (0.276) is higher than that of Finland and Japan and, as reported, substantially aligned with that of Spain, but it remains far behind that, not only of the more advanced countries, like the United States, France and Germany, but also of Austria and other less developed countries. In 1890, the situation is substantially identical in comparative terms: Italy is still in 15th position in the list of the countries considered, preceding Japan, Spain and Finland. In 1910, the position of Italy, in the HDI still has not reached the value of 0,500 – the generally accepted threshold for an acceptable standard of

living, and is still very distant with respect to the more advanced countries: it ranks in front of Spain and Finland, and is more or less in line with Japan. However, it remains very far from the levels of France and Germany and those of all the other developed nations. The situation is obviously not very different in 1913, either in terms of value of the index or in terms of ranking.

In the two benchmark years in the period during the two wars there is a slight decline in the ranking of Italy, which is overtaken by Finland and has values greater only than those of Japan and Spain. In 1929 the HDI for Italy (0.542) has the same values as those already reached by Great Britain and the United States as early as 1890 and reached by Germany and France in 1910. Analogously, in 1938, Italy has an HDI of 0.615 which is slightly inferior to the values for Great Britain and the United States on the eve of the First World War and in line with the values for France and Germany in the same period.

After the Second World War the situation is not substantially different. In 1950, Italy continues to precede only Japan and Spain and is in 16th position in the ranking, behind Austria and Finland. In 1960 the situation is still unchanged in terms of ranking, and Italy's HDI (0.730) is the same as that of the United States and Great Britain in 1938. If one wants to interpret Italy's progress in comparative terms positively, and not just register an increase in the value of the index, one can note how the temporal distance in catching up the value of the index for the leading countries decreases from a lag of approximately 40 years in 1929, to one of approximately 20 in 1960. In 1970, Italy's position again worsens as Japan moves up a position and Italy takes 17th position, ahead of Spain, out of a total of 18 countries. The situation changes little even in 1980 e 1990 when Italy is still one of the last among the developed countries[5].

The most relevant piece of information can be grasped by analysing the importance of the four components of the HDI, shown in Table 2 in which, for each variable, the value and the ranking of Italy compared to the other 18 countries is taken into consideration.

The first aspect that emerges is how the evolution of the values of the different variables shows differentiated patterns. With regard to GDP, Italy maintains a relatively stable position preserving a lead, in each benchmark year, over a minimum of two to a

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[5] International comparisons for 1999 have been avoided because data on education presented by United Nations (2001) are based on the UNESCO projection that at a first glance seems to be uncertain. For example Italian GER grows from 64% in 1991 to 84% in 1999 while from our estimate, based on recent ISTAT data, it passed from 65.0% to 71.3%.

maximum of four countries in the world ranking of advanced capitalist countries. Considerable progress can be noted as regards life expectancy at birth, which from the Sixties, shows such an increase as to permit Italy to reach, in 1991, the seventh position in the world ranking. As far as the *knowledge* variables –ALR and GER- are concerned, the situation, even though it shows a decided progress, remains practically unchanged in terms of ranking for the entire period with Italy in one of the last positions. Even if Italy's illiteracy levels are substantially in line with those of other countries, its levels for the GER -which weights only 1/9 in the total calculation of the HDI- remain very distant from those of the more developed countries as confirmation of the fact that the organization of the Italian system of education remains, to this day, one of the major weak points of the country (Zamagni 1993; Vasta, 1999).

Table 2. HDI components: Italy in comparative perspectives (1871-1991)

Years	Life expectancy		ALR		GER		GDP		HDI	
	years	Ranking	%	ranking	%	ranking	US$PPP	ranking	Index	Ranking
1871	33.1	16	32.1	15	19.4	16	1,473	14	0.288	15
1891	39.3	15	43.9	16	23.7	16	1,615	16	0.358	14
1911	44.1	16	61.4	16	30.0	17	2,407	14	0.453	15
1928	52.8	17	75.6	17	34.1	18	2,949	14	0.549	16
1938	58.1	15	80.2	17	34.3	18	3,243	16	0.594	16
1951	65.0	15	85.8	17	34.0	18	3,658	16	0.651	16
1961	69.7	14	90.5	17	43.4	17	6,236	16	0.728	17
1971	72.3	8	93.9	17	59.0	17	9,598	15	0.791	17
1981	74.0	11	96.5	17	63.4	17	13,145	14	0.828	17
1991	77.0	7	97.6	18	65.0	17	16,112	14	0.861	16

Sources: As for table 1. The ranking positions are calculated by comparing the value of years reported in the first column for Italy with those used by Prados de la Escosura (cfr. Table 1), but for GDP for which all values and rankings are referred to the year reported in column 1. For this reason we can not calculate the differences between GDP and HDI as we have done in table 3 by using rankings of the same years.

Notwithstanding the difficulties which such a brutal schematization entails, from the analysis of the reported data it can be affirmed that Italy has, in the long run, been able to close in on more developed countries as far as income is concerned, without, however, managing to reach them (Rossi-Toniolo, 1993). The process of closing the gap becomes even more apparent when one observes events after World War II: Italy's rate of income growth is one of the highest among industrialized countries. However, this brilliant performance does not lead to a better world ranking.

This evaluation doesn't change much as far as Italy's *performance* on the standard of living in the long run is concerned. In the period from 1870-1913, as other studies using the PQLI (Federico-Toniolo, 1991) have already noted, Italy, though its level improves, remains far behind all the other countries especially with regard to the two sub-components of the knowledge variable, while gaining in terms of longevity. After World War II, Italy while gaining considerably on the leading countries in terms of standard of living, is once again unable to substantially improve its position in the ranking of countries. Table 3 compares differences in the ranking of the HDI and the GDP for all the countries analysed.

Table 3. GDP rank minus HDI rank for advanced capitalist countries *(1870-1990)*

	1870	1890	1910	1913	1929	1938	1950	1960	1970	1980	1990
Australia	-1	-1	-1	-1	3	2	-1	0	-1	1	2
Austria	-4	-5	-3	-3	-1	1	1	-1	-1	-6	-7
Belgium	-9	-6	-6	-6	-5	-3	-1	2	-1	0	0
Canada	2	3	-2	-4	2	3	-3	2	1	1	2
Denmark	5	5	6	7	2	1	2	-1	-2	-1	-5
Finland	-1	-1	0	0	2	0	-1	0	0	2	4
France	-1	-2	0	0	-3	-3	-2	-2	-1	-6	2
Germany	-1	-2	-1	-2	1	-1	1	-4	-7	-8	-5
Italy	**-1**	**0**	**-1**	**-2**	**-1**	**0**	**0**	**-1**	**-3**	**-3**	**0**
Japan	1	2	2	2	1	0	1	0	0	6	2
Netherlands	-5	-4	0	1	-1	4	6	5	4	3	0
New Zealand	2	2	1	2	3	0	1	1	3	4	0
Norway	12	8	5	5	3	3	2	5	9	8	2
Spain	-1	-3	-3	-2	-2	0	-1	0	0	0	4
Sweden	6	9	8	9	4	-1	3	1	1	3	2
Switzerland	0	n.a.	-2	0	-3	-5	-5	-3	-3	-5	-2
UK	-6	-3	-2	-4	-4	-2	-3	-6	0	0	0
US	1	-2	-2	-3	-1	1	0	1	1	1	-1

Sources: as for table 1 for HDI, Maddison (1995) for GDP.

The analysis captures the different patterns in the economic growth models: positive values show the greater capability of a country in transforming income levels into improvements in the means of its population; vice versa negative values show how reaching certain levels of income does not translate into a corresponding improvement in standard of living. Even though they exhibit relevant changes in the course of time, the results, for example, show generally positive values for Sweden, whose close attention to the standard of living of the population is well known or negative ones for Switzerland. The comparison of the position of Italy in the two rankings, as regards income and standard of living, shows a certain similarity in the long run, even though no positive

value is ever registered in all the years analyzed, the classification in the ranking of the HDI is always worse or equal to that for income. This leads to the hypothesis, which, however, needs to be further evaluated, that Italy was not particularly skilful when it came to transforming its economic growth into improvements in quality of life.

5. Human development, economic growth and regional differences in Italy

In considering the conclusions drawn from the calculation of the HDI for Italy and taking into account what is commonly known in the literature with regard to Italian economic development (which for some time has evidenced the existence of considerable regional imbalances as an important phenomenon in the growth process), we have considered it appropriate to extend the comparative analysis of the HDI's one-hundred and thirty-year trend at a regional level by comparing it with the national series; the estimate of regional income takes account of the differences in purchasing power. To this end, the data on the variables knowledge and longevity were processed in a completely autonomous manner from information available from secondary sources by reconstructing the official series from primary sources. As for income, the rare regional disaggregations available were used: namely, those of Esposto (1990; 1997) for the 1871-1911 period, those of Tagliacarne (Svimez, 1961) for the years between the two World Wars and, lastly, the Istat estimates as from 1951. To maintain comparability with the other countries, after converting the values of the individual authors to American dollars at the 1990 Purchasing Power Parity (PPP), the estimates obtained were brought back to those of Maddison. The income levels of the individual regions therefore represent the differences obtained by applying the differentials proposed by the three studies mentioned above, but in absolute value they are based on Maddison's estimates. Furthermore, the series for building trade wages have been reconstructed for all the benchmark years considered, the series for building trade wages includes 2 categories of workers: labourers and bricklayers. The data were gathered at a provincial level selecting the median value for each category of workers and then calculating the arithmetic mean between the 2 categories. The regional income derived through the estimates mentioned above was subsequently weighted on the basis of the wage differences for the single regions. The reader is referred to the Appendix for the procedures used to carrying out these operations. The estimates for 11 *benchmark* years of the HDI for Italy and those for the macro-areas that compose it are presented in Table 4.

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A reading of the data reveals the extreme heterogeneity of the index values among the macro-areas, especially with regard to the initial period. Further on, we shall see the dynamics of the Italian regional differentials; for the time being, we shall concentrate on a comparison of Italian macro-areas with the developed nations. From this, we can draw at least four important conclusions.

Table 4. HDI for Italian macro-areas (1871-1999)

	1871	1891	1911	1928	1938	1951	1961	1971	1981	1991	1999
Northwest	0.367	0.439	0.527	0.605	0.644	0.696	0.756	0.802	0.838	0.869	0.899
Northeast	0.290	0.390	0.493	0.581	0.624	0.676	0.745	0.805	0.841	0.871	0.906
Central		0.366	0.475	0.561	0.608	0.665	0.741	0.807	0.846	0.878	0.908
South	0.230	0.286	0.365	0.475	0.527	0.598	0.687	0.759	0.800	0.835	0.864
ITALY	0.288	0.358	0.453	0.549	0.594	0.651	0.728	0.791	0.828	0.861	0.891

Source: our own elaborations.

Firstly, if we consider the North-West, i.e. the Italian area with the highest index values -at least up until the 1960s- we can observe that, in 1871, this area was in an intermediate position between the values of the whole of Italy and those of the more developed countries, even though, in terms of ranking, with respect to Italy as a whole, only Austria ranked above. In 1911, this distance was slightly diminished: North-West Italy ranked a little above the levels of Austria, which occupied 14th place in the world ranking. In the period between the two World Wars the situation remains practically identical and also, soon after World War II, the HDI levels for the North-West were aligned with the less advanced nations among the 18 examined above at higher levels than Finland, Japan and Spain.

Secondly, it is striking that, during the period of our country's great economic growth, known as the *Italian miracle*, the HDI levels of the regions of the North-West did not rise as much as could have been expected. They passed, in fact, from 0.696 in 1951 to 0.802 in 1971. In comparative terms, the HDI level of the regions of the North-West in 1971 was lower than that of all 18 countries in the analysis, with the exception of Spain, Australia and Finland. It must also be noted that the distance from the more developed countries was considerably reduced, even if this phenomenon can, in large part, be attributed to the frequently-recalled limitations of the Index. The hypothesis of being incapable of transforming economic growth into an analogous improvement in quality of

life seems valid also as regards the wealthier regions, seeing as in 1991 their income is equivalent to that of the world's richest countries but is still far in terms of HDI ranking.

Thirdly, it can be noted that the regions of North-East and Central Italy reached, the HDI levels of the regions of North-West Italy as early as 1971, when the regions of Central Italy became those with the highest HDI levels. This in spite of the fact that they still remained behind in terms of GDP, compared to the regions of Northern Italy. It confirms the existence of a peculiar pattern of development for these areas.

Lastly, the concluding observation concerns an analysis of the dynamics (of Southern Italy. With respect to world rankings, the South showed a radically different trend from that of the other areas of the country. At the beginning of the period (1870), in terms of HDI the South was clearly outdistanced by all the developed nations and also by Spain and Japan, remaining only slightly above Finland. The situation of backwardness is confirmed by examining the values for 1911, when there the value for South is behind all countries. In 1950, the South was still in a relatively backward position, with an HDI index lower than that of Spain. The partial catching-up process in regard to the rest of Italy and also to the more developed countries becomes apparent during the period from 1950-1970. At the end of this period, in fact, while still far from the levels of Italy and even farther from those of the other countries, the distance had been considerably reduced.

The process of growth in the Southern Italian regions is particularly significant within the context of the proposed analysis since it is the only case in which the growth of income and the improvement in the standard of living expressed by the HDI do not move in the same direction. Table 5, which illustrates the comparison between the South and Italy as whole relative to the different components of the HDI, provides a clear demonstration of this relationship.

Compared to the whole of Italy, on the one hand the Southern regions remained in a position that was very distant from the rest of the country in terms of GDP, to the point of strengthening the idea of *dualism* as one of the original characteristics of the Italian economic development (Cafagna, 1971).

On the other hand, they show complete convergence as far as living standards are concerned. Over the entire period between 1871 and 1999, in terms of income the distance passed from an index value of 87 to 70 (Italy = 100), and in terms of HDI, from 80 to 97. As can be seen in the analysis of the single HDI components, the process of converging to the rest of Italy in life expectancy occurred fairly rapidly: already in 1928, the index with

respect to Italy was equal to 92; it reached 94 in 1938 and reaches the value for the rest of Italy in 1961. Growth in the overall *knowledge* variable was not as rapid, reaching the value of 92 only in 1961. However, by separating the two different components, it becomes evident that the literacy process proceeded more slowly, following the demographic dynamics. On the other hand, the rate of school attendance showed an unexpected improvement during the period from 1911 to 1928. This was probably the effect of the Daneo-Credaro Law of 1911, which led to *advocation* of primary schools by the State, but it is also in part due to the characteristics of the index as we shall see further on.

Table 5. HDI and its components: the Southern regions versus Italy, (1871-1999)

	1871	1891	1911	1928	1938	1951	1961	1971	1981	1991	1999
HDI	80	80	81	87	89	92	94	96	97	97	97
GDP	87	94	76	78	77	77	69	80	71	72	70
Life expectancy	85	78	83	92	94	96	100	99	100	100	99
Knowledge	53	59	68	77	81	87	92	94	96	98	98
ALR	52	56	66	72	77	84	89	93	96	97	99
GER	60	69	76	92	93	97	100	98	98	99	97

Source: our own elaborations.

The literature attributes the reasons for a rooted *dualism*, understood as differences in the production factors and in the make-up of income, to two phenomena: *i)* the endurance of the choice made during the first half of the 19th century to favour integration in the regional areas of Central-Northern Italy, on the one hand, and the South, on the other, with the international market, rather than reciprocally (Ciocca-Toniolo, 1999); and *ii)* the continued presence in the growth process of the Italian economy of a production level lower than the international one. This phenomenon led to an increase in the income position of several entrepreneurial classes, meagre investments in the regions in which production costs were higher, but above all, to the persistence of a higher rate of unemployment (Fenoaltea, 1994; Del Monte-Giannola, 1997). The structural inefficiencies indicated as characteristics of the South render its performance in terms of income coherent; it remains difficult to understand why these inefficiencies do not negatively affect the HDI.

This extreme variance in activity has led to an inability to create infrastructures and behaviour capable of supporting the growth of productive activity either in terms of

secondary industry or in terms of a network of services. There has thus been a process of "precarious innovation" (Salvemini, 1995) which, in the long term and with the support of *welfare* policies, has enabled the growth of the education and longevity components. It has not, however, supported the *income* component (Bevilacqua, 1993).

It must also be noted that the *knowledge* component, which has the greatest influence on recovery, is mainly defined by the behaviour of one of its components: the GER. At the same time, it does not seem to be linked to an identical efficiency within the school system. In fact, with respect to the rest of the country, a difference exists in the quality of the education system, which continues to be large even in recent years. Research carried out on the education system in the South maintains that the recovery of Southern Italy with respect to areas of the North is a sort of "inertia of decadence" that is partly due to the *ceiling effect*: permanence and regularity cannot in any case exceed thresholds of 100% (Trivellato-Bernardi, 1995). It points out that the schooling process is characterised by abandonment/expulsion, and that there is still often a failure to comply to compulsory schooling. Furthermore, it emphasises the deficiencies still present in the structural conditions of schools and training centres.

In the light of a picture presented by Trivellato and Bernardi's study, we must ask ourselves why the *knowledge* variable of the Index shows such positive values for the South of Italy. This may be due to two reasons: *i)* the variable does not measure the efficiency of the system, but registers only the enrolment figures for the three different levels of school attendance; *ii)* there is a composition effect in the estimate of the GER that partly distorts the results obtained. In fact, the GER consists of the gross rate of enrolment for the three different levels of education. It is not calculated as the mean of the three different rates, however, but rather as a single quota of all the enrolments over the entire population of a school-attending age (from 6 to 23 years). As no differences exist in the gross rate of enrolments between North and South as far as primary school is concerned, the greater presence of young people in the South leads to a rise in the GER, the calculation of which thus suffers a distortion that is due to the different demographic dynamics.

To conclude, we can say that the increase in the HDI indicator for the Southern Italian regions does not actually coincide with an equal increase in capacity to made goods and services which have a form recognizable by the national accountancy standards. For example, it is well-known that the incidence of a shadow economy is much greater in the

Southern regions than in other regions of the country besides having a more structural than a conjunctural nature (Meldolesi, 1998; Bovi-Castellucci, 2001).

6. Conclusions

The conclusions to this paper can be divided into two orders of observations. The first concerns the long-term dynamics of Italian economic development; the second deals with methodological problems.

As far as the first issue is concerned, three aspects must be underlined. The first concerns the Italian economic growth rate. In the span of a century, between 1870 and 1970, Italy converged towards the level of the main industrialized countries for per capita income. This growth is, however, not associated with a substantial improvement in the relative position of Italy in relation to the main developed countries. A process of continuity is however evident -firmly contiguous ranking positions- between Italy and Japan until World War II, and between Italy and Spain up until the present.

The second aspect regards the significant difficulty Italy experienced in transferring the success obtained in terms of increase in per capita income to an improvement in quality of life. If we observe the sequence of intervals during the span of the century it becomes evident that Italy remains firmly entrenched in the last positions of the world ranking. It must, furthermore, be stressed that this continuity stems from the inability of Italy to promote growth in the standard of living on the educational front. It is the latter component of the HDI which remains the farthest from that of other developed countries. It is also interesting to note that this phenomenon remains valid even in the interval closest to the present: that of the post World War II years in which Italy presents a rapid growth in the other two components of the standard of living i.e. income and life expectancy. Finally, it is interesting to note that the common performance of Italy and Japan comes to an end in the post World War II years when Japan initiates a process of major convergence with high income countries, a period which coincides with an increase in Japanese education rates.

The third aspect concerns the development process in Southern Italy. It was manifested in much more marked fashion during the period following World War II and has given rise to a convergence process in terms of the HDI towards the Northern regions, instead, this convergence does not take place relative to income. However, it must be recalled firstly that the improvement of the *knowledge* component in the South, which has

the greatest influence on recovery, is not to be linked to an identical efficiency of the education system and secondly that there is a composition effect in the estimate of the GER that partly distorts the results obtained.

This last comment supplies us with a handy cue for the second order of conclusions which can be drawn: the methodological conclusions. In the comments on the data regarding Southern Italy, we have already explained the technique used to unite the GER components. The attribution of the same weights to primary and secondary schooling can lead to an apparent reduction in the distance between the standard of education in two different areas – when in the two areas there is an important demographical difference, the common rule of compulsory education and the difference in the number of children present "artificially" inflates the education component. This is just one of the traps that the reading of the HDI index can lead to because of its structural limits.

The other important defect already noted in the text but which it is useful to recall is the inadequacy of the measurement of the level of the HDI from one interval to the other with percentage increases. The index is constrained to the values 0-1 and therefore doesn't respond in an entirely satisfactory manner to a diachronistic analysis which measures the changes in the social, political or demographic regime of the population in cardinal terms, except in the case of macroscopic events. The use of the HDI index in a diachronical sense must therefore always be planned so as to present a country at significant intervals and in the context of a panel in which it can be compared to others, rather than, particularly when a certain threshold has been overcome, measured in terms of growth rates.

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Methodological Appendix for Italian variables

The construction of the long-term HDI series for all the Italian regions involves a string of difficulties linked to the sketchiness of the data that are broken up on a regional basis[6]. This compels us to utilise the Census years as a reference for the estimates: due to the fact that separate information on longevity, school attendance and illiteracy is almost always available for these years. Unfortunately, the availability of data on per-capita regional income does not always coincide with the Census years, thus making it necessary to resort to compromises. For example, the availability of data on regional incomes for several years that are not those of the Census years (such as 1891, 1928 and 1938) forces us to determine the HDI for these years by resorting to appropriate calculation methods for the other variables: for example, to linear interpolation when the values of school attendance, longevity and illiteracy cannot be calculated directly from the official data[7]. In this Appendix we shall therefore illustrate how we proceeded to construct the elementary indices of life expectancy, literacy rate (ALR), gross enrolment ratio (GER), and the logarithm of per-capita income, which constitute the three fundamental dimensions of the HDI. For each, we shall specify *i)* the hypotheses introduced to overcome the gaps in information recalled above, *ii)* the calculation procedures utilised, and *iii)* the sources of the unrefined data.

Life expectancy at birth

For the first two years taken as reference for our evaluations (1871 and 1891), since it was impossible to calculate the life expectancy as a measurement that could be obtained from the mortality tables because the series of deaths according to age classes at a regional level were missing, we determined this quantity by using the programme for "Inverse differentiated projection" of the demographer, Alessandro Rosina[8].

Very schematically speaking, the peculiarity of this procedure, the scope of which is to rebuild, on an aggregated level, measurements of mortality -among which, life expectancy, mortality rates, etc.- and distributions according to age relative to populations of the past, is that it utilises the series of births and deaths. The projection is thus *inverse* with respect to normal projection techniques which, as is well-known,

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[6] We shall briefly recall the order of territorial succession that has characterised the Italian regions from the Unification up until now: 1) the Valle d'Aosta was established as an autonomous region in 1945 (previously, the entire province of Aosta was part of Piemonte); 2) the Veneto region and Rome were annexed to Italy after the Unification of 1861 (in 1866 and 1870, respectively); 3) up until 1871, a single department called 'Province Napoletane' included the five regions that currently constitute Southern Italy (i.e. Campania, Basilicata, Calabria, Puglia, Abruzzi-Molise); 4) starting from 1919, the national territory was increased by the territories ceded to Italy following the 1919 peace treaty. A large part of these territorial areas went to make up two new regions: "Venezia Tridentina" (today known as "Trentino Alto Adige") and "Venezia Giulia e Zara" (today known as "Friuli Venezia Giulia").

[7] The availability of data on regional income therefore makes it possible to calculate the HDI for 1871, at the level of macro-areas (North-West, North-East and Centre, South), and for 1891, 1911, 1928, 1938, 1951, 1961, 1971, 1981 and 1991, at the level of the individual regions.

[8] For an exhaustive treatment of this method, please refer to Rosina A., Rossi F., "Un'estensione dell'Inverse Projection con mortalità differenziata per età", in *Statistica*, LIII, n. 4, 1996, pp. 619-631; Barbi E., "La classe delle proiezioni inverse: rassegna delle recenti soluzioni per l'analisi dei processi evolutivi delle popolazioni", in *Bollettino di Demografia Storica*, n. 24/25, 1996, pp. 7-19..

start from a series of specific rates -mortality, birth-rate, migration, etc.- in order to estimate sequences of births, deaths and distributions according to age[9].

For the following years (1911 and 1921), however, on a regional level the series of deaths distributed according to age classes are available. Therefore, for these years and also for those subsequent to the Second World War (1951, 1961, 1971, 1981 and 1991), life expectancy at zero age was obtained as a function of the mortality tables, by expressing, the mean number of years lived by a generation of births. To calculate the life expectancy relative to 1928 and 1938 (for these years, data are available on regional incomes, but not of the series on regional deaths sub-divided according to age), we interpolated in linear manner with a passing line for the two points corresponding, respectively, to the mean ages for 1921 and 1951, by utilising the square minimum method[10]. Finally, for 1999, given that an official value as supplied by the Istituto centrale di statistica (Institute of Statistics - ISTAT) was not available, we used both the data present in the tables for regional mortality compiled by the ISTAT for 1998 and the projections elaborated by the ISTAT for life expectancy for the year 2000. In other words, in order to determine the 1999 values, we multiplied the mean regional age at death for 1998 by the mean annual rate of growth obtained by comparing the values for 1998 with those estimated for the year 2000[11].

Sources

For the series of births and deaths relative to 1871 and 1891 -in order to apply the "inverse projection" method-, we used the following sources:

Ministero dell'Industria, Agricoltura e Commercio, *Annuario Statistico Italiano* (ASI), 1884, Table XI, p. 46 – Number of births during the years from 1862 to 1881 in the individual regions; and Table XIII, p. 47 – Number of deaths during the years from 1862 to 1881 in the individual regions.

For the series of deaths regrouped according to age classes and relative to subsequent years (1911-1991) in order to construct the mortality tables, we made reference to:

T. Bagni, "Tavole di mortalità e tavole monetarie basate sulle statistiche italiane del dodicennio 1901-1912", in *Annali di statistica*, series V, vol. 10, 1919, table 10 – New distribution according to age and the regions of dead persons of both sexes, reported in each year of the 12-year period 1901-1912 (for 1911);

C. Gini, L. Galvani, "Tavole di mortalità della populazione italiana", in *Annali di statistica*, series VI, vol. 8, Table I-A – Deaths during the 1921-1922 biennium (for 1921);

ISTAT, *Annuario di statistiche demografiche* 1951, chap. III, table 68, pp. 98-100 – Deaths according to age and sex. Regions.

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[9] We can point out that the compartments making up the "Napoletano" had the same life expectancy for these two years (1871 and 1891), seeing that until the end of the century the Italian Statistical Annual (ASI) did not break up the series of births and deaths among the five Southern regions (Campania, Basilicata, Puglia, Calabria, Abruzzo, and Molise).

[10] It can be pointed out that the compartments making up the Napoletano have the same life expectancy in these two years (1871 and 1891 given that the Annuario Statistico Italiano (Italian Statistical Yearbook ASI) does not disaggregate the series of births and deaths in the 5 southern regions (Campania, Basilicata, Puglia, Calabria, Abruzzo e Molise) till the end of the century.

[11] The mean annual rate of increase was obtained by extracting the square root of the percentage increase for life expectancy between 1998 and the year 2000, in such a way as to find that rate of growth that if repeatedly applied to the value for 1998 can give the value for the year 2000.

ISTAT, *ibid.*, 1961, part IV, table 141, pp. 242-245 – idem.

ISTAT, *ibid.*, 1971, part I, table 97, pp. 144-147 – idem.

ISTAT, *ibid.*, 1981, table 102, pp. 374-381 – idem.

ISTAT, *ibid.*, 1991, table 3.26, pp. 369-376 – idem.

In order to determine life expectancy for 1999 we made use of the following Web sites: the tables for regional mortality for 1998 can be found on the http://demo.istat.it/ site whereas the estimates for life expectancy elaborated by the ISTAT for the year 2000 can be found at the following URL: http://www.istat.it/Anotizie/Aaltrein/statinbrev/inddemo/inddemo.html.

Scholastic variables

Adult Literacy Rate (ALR) (years with Census)

The ALR was calculated on the basis of the number of illiterate persons and of the reference births and deaths of the population reported in the general population censuses. The subdivision of illiterates according to age classes that was used in the censuses is not always the same every ten years, and almost never coincides with the one used in this work to estimate the ALR -illiterates under the age of 15 and over the age of 15-. However, through the simple hypothesis of *spreading* the total of illiterate persons of a certain age class in a uniform manner over all the ages making up the said class, we arrive at estimates that are definitely more acceptable than other methods of estimation[12].

Gross Enrolment Rate (GER) (census years)

When it was not possible to obtain data on the number of enrolled students at the three levels of education -elementary, secondary, and tertiary- for the individual Census years from the ASI, we provided for filling in these information gaps in the way explained here as follows.

Elementary. For the 1881-82 school year, the ASI reported the national datum of the number of students enrolled in elementary school -both public and private-, but did not break it up at a regional level. This was, instead, done for the following year (1882-83). To obviate this gap, it was hypothesised that the total number of students enrolled in elementary school in 1881-82 be re-divided, among the different regions, according to the same percentage distribution as the subsequent school year. The same can be said for 1911. As the regional re-division of the total number of students enrolled in primary schools was not available, it was hypothesised that during the 1911-12 school year the students be re-divided on the basis of the same percentage distribution as that of 1907-1908.

Secondary schools. Regional data corresponding to the census years even for the secondary level of instruction was not always available. For this reason, we used the number of students enrolled in secondary

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[12] For example, during the course of our elaborations, we tried to estimate the number of illiterate persons above the age of 15 by subtracting from the total of illiterate persons above the age of 6 -easily calculated from the censuses- the sum of all the students enrolled in elementary schools -five years- and those enrolled in the lower middle schools -three years-. Nevertheless, this method created problems for several regions by providing a value for illiterates between the ages of 6 and 14 that was greater than the reference births and deaths of the population, due to the effect of having underestimated the repeating students.

schools ("ginnasio", "liceo", "scuole normali", professional schools, technical schools, and technical institutes) of the school years closest to those under examination[13].

Tertiary. To calculate the number of students enrolled at the University, we also considered those enrolled at the "Scuole Superiori Speciali" and at the "Istituti d'Istruzione Superiore". Unfortunately, the regional re-division of students enrolled for the 1911-1912 academic year was unavailable, even for the universities. Analogously to what we did for the elementary schools, we re-divided the national total of students enrolled for the 1911-12 academic year on the basis of the percentage re-division among the regions for the 1907-1908 academic year.

ALR and GER (non-census years of 1891, 1928 and 1938)

In order to calculate the GER and ALR variables for the years of 1891, 1928 and 1938, for which are available the data on the regional per-capita income, but not the composition of the population according to age bracket and the number of illiterate persons, we interpolated both the GER and the ALR corresponding to the year both previous to and following the census. To be precise, we took the data for 1881 and 1901 in order to estimate the data for 1891, those for 1921 and 1931 so as to estimate the data for 1928, and the data for 1931 and 1951 to estimate the data for 1938. In this way, the values of the two variables for 1891, 1928 and 1938 were obtained as interpolated ordinates (square minimum method).

The year 1999, did not present particular problems for the determination of the GER, in that regional data was available on the number of students enrolled (ASI 2001) and on the division of the population into classes by age (ASI 1999). With regard to the ALR, however, given that the official estimates of illiteracy were unavailable, we hypothesized the variation in the literacy rate from 1991 to 1999 on the basis of the tendential rate of growth registered in the previous ten years (1981-91)[14].

Sources

As for the number of illiterate people and the re-division of the births and deaths of the population, reference was made to the general population censuses. The privileged source for the number of students enrolled at the different levels of scholastic instruction was the Annuario Statistico Italiano. To be more precise, for the years between 1871 and 1938 the privileged source for enrolled students was l'*Annuario statistico italiano* (annual editions for 1878, 1884, 1886, 1887-88, 1898, 1904, 1905-07, 1911, 1912, 1913, 1922-25, 1928, 1929, 1932, 1933). For the first four benchmark years after World War II (1951, 1961, 1971 and 1981) the number of students enrolled at the different levels of scholastic instruction was taken from the *Annuario statistico dell'istruzione italiana* (in the 1951-52, 1963-64, 1973 and 1983 editions), whereas for 1991 we used the following specialist publications: *Statistiche della scuola materna ed elementare, anno scolastico 1991-92*, ed. 1994, annuario n. 3 (Nursery and primary school statistics, school year 1991-92,

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[13] For example, for the 1871-1872 school year, we took the data from the 1872-1873 school year; for the 1891-1892 school year, the data from the 1895-1896 school year; for 1921-22, those for the 1920-21 school year; and for 1931, those from the 1927-1928 school year.

[14] In practice, we extracted the tenth root of the increase in the ALR for the period 1981-91 to obtain the mean annual rate of growth, we then multiplied this rate (repeatedly eight times) by the 1991 ALR so as to obtain the corresponding value for 1999.

yearbook n. 3); *Statistiche della scuola media inferiore, anno scolastico 1991-92*, ed. 1994, annuario n. 5; *Statistiche delle scuole secondarie superiori, anno scolastico 1991-92*, ed. 1993, annuario n. 3; *Statistiche dell'istruzione universitaria, anno accademico 1991-92*, collana d'informazione, ed. 1993, n. 8. For 1999 we used the *Annuario statistico italiano* (ed. 2001) for all three levels of scholastic instruction. For secondary education, reference was made to E. Conti, *Istruzione tecnica e professionale e sviluppo economico italiano (1859-1940)*, Doctoral thesis, University of Bari, Faculty of Economics, 2002.

Per-capita income

In conformity with the calculation procedures used by the UNDP, we reported the data relative to the regional per-capita income in PPP 1990 US $, to enable us to compare the results with those of other countries to be made. To this end, the regional per-capita incomes were transformed into 1990 Lire, by utilising the transformation coefficients of the Lira calculated on the basis of the consumer price index for families of clerks and workers. Subsequently, we provided for re-transforming these values into PPP 1990 US $, by utilising the real lire/dollar exchange rate determined by the OCSE. It must be remembered that for 1928 and 1938, evaluation problems arose at a regional level, because the sources -reported below- provided only the income produced by the private sector. This problem was resolved by making several simple hypotheses on the incidence of the sector of Government on regional GDPs. In particular, in hypothesising as equal the added value of the Government at the source of wages and salaries of public employees, we proceeded to sub-divide this product on the basis of the regional division of public employees similarly to what results from the 1936 Census. The values for regional per-capita income thus obtained were subsequently multiplied by the relationship, calculated for each benchmark year, between national per-capita income taken from the long-run series in Maddison (1995) and our estimates, so as not to lose comparability.

Sources

For the regional incomes relative to the period between 1871 and 1911, reference was to Alfredo Giuseppe Esposto, "Estimating Regional Per Capita Incomes: Italy, 1861-1914", in *Journal of European Economic History*, Winter 1997, pp. 585-604.

For the regional incomes produced by the private sector and relative to the years 1928 and 1938: Svimez, *Un secolo di statistiche italiane Nord-Sud, 1861-1961*, Roma, 1961, p. 770.

For the value-added produced at national level by the public sector see the "Indagine statistica sullo sviluppo del reddito nazionale dell'Italia, 1861-1956", published in *Annali di statistica*, serie VIII, vol. 9, 1957, tav. 36, p. 250.

For regional incomes relative to the period between 1951 and 1991 see Paci R. e Saba A., *The Empirics of Regional Economic Growth in Italy*, *1951-1993*, n. 1/1997, paper made available on the following website: http://digilander.iol.it/crenos/dati/PDF/97-1.pdf; for the database containing regional incomes reference can be made to the following : http://www.crenos.unica.it/crenos/databank/ita_51-93.zip.

The source for the 1999 regional incomes is the Annuario Statistico Regionale della Lombardia, tavola 24.08.01.01, anno 1999, which can be downloaded from: http://www.ring.lombardia.it/asrnew/index.html in the folder Approfondimenti e confronti/24-Confronti regionali/24.08-Conti economici regionali e territoriali/24.08.01-Valore aggiunto e PIL.

The series for building trade wages for the period 1871-1913 are from: Vecchi, G., Del Papa, S., *Nota sulla disuguaglianza salariale in Italia*, 1861-1913, Roma, Università di Tor Vergata, mimeo 2003. Seeing that no series were available for the years 1928 and 1938, we used those drawn up respectively by: ISTAT, Bollettino mensile, Roma 1926, tab. LVI, p. 60; ISTAT, Annuario Statistico 1932, tab.XI, p.263. Per il 1951, Ministero del lavoro e della previdenza sociale, Statistiche del lavoro, Roma 1951, n.4-6, p. 27; per gli anni 1961, 1971, 1981 rispettivamente ISTAT, Annuario statistico, Tavole Lavoro e retribuzioni, anno 1962, p. 272; Idem, Roma 1972, p. 268; Idem, Roma 1982, p. 274; per il 1991 ISTAT, Lavoro e retribuzioni , Roma 1993, n. 7, p. 65.