Equity in school: a challenge for regional based educational systems

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1. Introduction: equity in the Italian educational system

An initial assessment of data collected in these last years by the INVALSI[1] and the OECD-PISA surveys suggests that the equity issue is becoming a problem for the Italian educational system. In the last decade, differences among Italian regions are increasingly large, and INVALSI data show clearly that the problem is not only related to differences in result levels, but in a high between-school variability of results, especially in the regions where the larger number of students shows low skill levels (INVALSI, 2012).

The aim of this paper is to give to the stakeholders a tool to assess the impact of decisions taken at regional level on the quality of education, and hence their contribution to improving the overall equity of the system. The approach of this applied research work is based on the idea of education as a common good, accessible to all, to ensure the cultural and economic growth of the country.

In the last decade the equity issue in the Italian educational system acquires a remarkable relevance, especially because the increasing level of regional autonomy in school administration. Until some years ago, equity was considered as the capacity of a system to ensure to a large percentage of young people the access to the school system. Nowadays, this definition seems to be too reductive. Developed countries have to guarantee to new generations a high level of skills in order to ensure to individuals and to the system the capability to face the new challenges of a globalized world. Therefore, an educational system is truly equitable if and only if it is able to give to a very large students portion high quality skills, so that they are able to take actually part to the society in which they live and act.

This paper is aimed to study the main characteristics of regional school systems in terms of equity, that is analysed by calculating Sen's indicators of skill poverty, as described in the following paragraphs. Furthermore, this work takes into account also the social segregation and the segregation of students with an immigration background.

[1] Italian National Institute for Educational Evaluation.

The above-described measures are particularly relevant for the policymakers in order to reduce differences among schools and to plan remedial actions that are able to increase the overall equity of the school system and to reduce the educational poverty.

2. Aims of the study and theoretical framework

Nowadays it is commonly accepted that achieving equity in education is necessary for giving to each individual adequate opportunities of growth, and the spillover effects of greater equity in education are increasingly at the core of the social and political debate for its theoretical and practical implications. Italy is not an exception, and the relevance of the equity issue grew even faster in the last decade since the Italian educational system started moving towards a more decentralized organization, based on the autonomy of the schools. Although the Italian educational system is theoretically characterized by a high grade of homogeneity, several national and international researches has showed a very different pictures characterized by strong regional differences. Hence, it is necessary to create tools that can give to the stakeholders empirical based information about the achieved levels of overall equity of educational system.

In this paper we suggest the use of a set of indicators, which can measure the equity of the regional educational systems in comparison with the whole country. The main idea is to find robust measures of the portion of students below a certain level of basic skills. The assumption underlying this approach is that the equity of a school system could be measured by the number of students who complete their schooling without achieve a level of basic skills, which would allow them to proactively exercise their citizenship rights. That is, the higher is the number of students who reach a certain level of basic skills, the more a school system is equitable (Meuret, 2001).

In this work we apply to Italian regions the methodology proposed by Sen to measure poverty (Sen, 1976, 1992). As proposed by GERESE research group, we intend the poverty not in a strictly economic sense, but we understand poverty as lack of competencies (GERESE, 2004). Starting from school year 2008-09, INVALSI has begun to measure basic competences (Reading comprehension, grammar, and Mathematics) for grade 2, 5, 6, and 8 by means of census surveys. From school year 2010-11, the survey has also been extended to grade 10.

We apply the method originally proposed by Sen to the INVALSI data[2] on all Italian secondary schools (grade 6 and 10) to study the differences existing in the Italian school system.

[2] In this work data of the survey referring to the school year 2011-12 are used. More specifically, the proposed analyses are based on data collected in the so-called *sample classes*, where the test administration is entirely controlled by an external observer named by INVALSI.

Furthermore, the variability of the social student background is taken into account. Because the sample design, the variability is split in three parts: between-school, between-classes, and within-classes. As known, the latter breakdown is particularly relevant in order to study if a region tends to segregate in the same schools or classes students with similar levels of background.

In the last two decades also in Italy the number of student with an immigration background has significantly increased. For this reason, the regional school systems are also analyzed by considering how these students are distributed among schools.

In order to summarize different aspects that are able to depict more in depth the equity of a regional school system, an overall indicator is calculated. It assumes high values if the system is particularly equitable, that is, if the system is able to ensure to its students good levels of competencies (*skill equity*), is characterized by a low level of socio-economical segregation (*social equity*), and by a high level of integration (*integration equity*).

3. Methods and data sources

In his seminal work, Sen proposed an indicator for poverty measurement that is able to capture this dimension by considering three crucial aspects simultaneously: 1. rate of poverty, 2. intensity of poverty, and 3. inequality of income distribution among poor. Sen's indicator is able to measure if the income distribution changes also below the poverty level while a traditional poverty index is not sensitive in the case of changes of income distribution among poor without overcoming the poverty level. Theoretically, if we imagine to take the income of some poor and to distribute it to other poor so that some have an income equal to zero, but nobody who receives some of this additional income reaches above the poverty level, a traditional poverty index is not able to detect the change of the poverty intensity. Sen's indicator not only captures the percentage of poor (percentage of people below a certain level of income), but it also pinpoints the average distance from the income that represents the poverty level, and the variability of income distribution.

In the last years, Sen's indicator has been used in educational research by considering *poverty* as *lack of competencies* (Morlaix, 2004). In this perspective is possible to calculate an indicator of student weakness or student excellence.

Sen's indicator could be adapted in this way:

$$W = T\left[I + (1 - I)G\right]$$

where W represents the indicator of student weakness.

Other quantities are:

- *T* is the rate of weak students in a certain area. In this work we define as *weak student* a pupil with a reading score (or mathematics score) below the average score (*z*) of the Italian students in the first tenth percentile in the scale defined by INVALSI in the national measurement;
- *I* is the level of school weakness, that is:

$$I = \sum_{i \in S(z)} \frac{g_i}{qz}$$

where

  - *S(z)* is the set of individuals below *z* with cardinality *q*,
  - $g_i = z - y_i$ and y_i is Reading score (or Mathematics score) of individual *i* belonging to *S(z)*;

- *G* is a Gini index able to measure the dispersion of the results for the weakest students. *G* is defined as:

$$G = 1 + \frac{1}{q} - \frac{2}{q^2 m} \cdot \sum_{i=1}^{q} y_i (q + 1 - 1)$$

where *m* is average Reading score (or Mathematics score) of students belonging to *S(z)*. Gini's index is ranging to 0 (maximum of homogeneity, i.e. all pupils obtain the same score) to 1 (maximum of heterogeneity).

In a very similar way it is possible to define and calculate an indicator of excellence (*E*). The difference between these two indices is assumed as a measure of equity and defines an index of *elitism*, that is index of excellence. After the calculation of the index of elitism, regions are compared by using the value of this index and the average performance level in Reading or Mathematics.

In this paper breakdown of the background[3] variance and student segregation by immigration status are taken into account, as well.

[3] In this work the student background is measured by the ESCS (Economical-social-cultural-status) indicator (Campodifiori *et al*., 2010).

Regions are considered more equitable if the incidence of background variance between-schools and between-classes over the total variance of the background is lower than in the whole country. That is, if the first two components of variance are relatively small, it is possible to argue that a certain region is more able to spread among schools students with different social and economical background. As known, this latter aspect is very important, perhaps crucial, to give to all the student population similar education opportunities.

In the last twenty years an increasing number of immigrants has moved to Italy. Consequently, the percentage of students with an immigrant status has hugely increased, especially in some regions, in the Italian school system. Integration is not a simple process and is only partially under the control of school system. By the way, it is very important to verify if the allocation policies of immigrant students are able to guarantee a quite homogeneous distributions among schools.

In this work, the segregation index of Gorard is considered (Gorard, 2000). The segregation index (*SG*) proposed by Gorard, does have strong composition invariance (and unlike the *Matching Marginals*, or the calculation of *Yule's Q* and related methods such as *odds ratios*, is not restricted to consideration of 2X2 tables). The segregation index of Gorard uses the difference between the proportion of a particular group in a single sub-area and the proportion of all group members in the same sub-area. Gorard's segregation index ranges from 0 (no segregation) to 1 (maximum of segregation). Using the same terms as above:

$$SG = \frac{1}{2} \cdot \left(\sum_{i \in Sc(i)} \left(\left| \frac{F_i}{F} - \frac{ST_i}{ST} \right| \right) \right) \cdot$$

where *Sc(I)* is the set of schools belonging to a given area, F_i is the number of immigrant student in the school *i*, ST_i is the total number of student in the school *i*, *F* is the total number of immigrant student in the given area, and *ST* is the total number of student in the considered area.

In this paper INVALSI data on the national assessment of student achievement at grade 6 and 10 as well as student background information (socio-economic and family characteristics and attitudes towards the subject) and background questionnaires are used.

4. Results and discussion

The aim of this applied research is to show the relevance of quantitative indices in order to assess the impact on school equity of the decentralisation of school system. The paper tries to shed some new light on the above-described problem by showing the relevance of national assessment in order

to ensure an effective control on the equity maintenance. First results show that in the South of Italy the impact of strong differences among schools is particularly relevant. The concern is not only about the high number of regions in the South that have weakness index (*W*) strongly higher than Italy, but the same regions have at the same time quite low indices of excellence *E*.

In this work only grade 6 and grade 10 are taken into account. These two grades are very important because they approximately represent the starting point of the two secondary school tracks (low secondary school and high secondary school). Tables 1 to 4 show at regional level the values of index *W* and index *E* in the Italian regions.

Table 1. Value of index *W* (weakness) for grade 6[4].

	Reading comprehension and grammar				**Mathematics**			
Region	**I**	**T**	**G**	**W**	**I**	**T**	**G**	**W**
Valle d'Aosta	0.18	5.69	0.11	1.53	0.25	5.70	0.10	1.85
Piemonte	0.24	7.13	0.12	2.33	0.25	7.30	0.10	2.37
Liguria	0.26	6.82	0.15	2.50	0.24	7.49	0.11	2.40
Lombardia	0.24	6.53	0.13	2.20	0.25	5.36	0.11	1.74
Prov. Aut. Bolzano (It. L.)	0.27	5.68	0.12	2.05	0.26	3.69	0.10	1.24
Prov. Aut. Trento	0.22	5.36	0.13	1.71	0.23	3.89	0.10	1.21
Veneto	0.21	5.88	0.11	1.74	0.24	4.69	0.11	1.52
Friuli-Venezia Giulia	0.19	5.47	0.10	1.49	0.24	3.29	0.10	1.06
Emilia-Romagna	0.22	8.03	0.11	2.40	0.24	6.89	0.11	2.22
Toscana	0.25	7.86	0.14	2.75	0.25	6.26	0.11	2.11
Umbria	0.21	7.95	0.10	2.33	0.23	6.83	0.09	2.03
Marche	0.23	6.63	0.12	2.16	0.24	6.18	0.11	1.99
Lazio	0.21	6.09	0.11	1.81	0.24	7.03	0.10	2.27
Abruzzo	0.22	7.42	0.11	2.26	0.24	7.01	0.11	2.29
Molise	0.22	7.30	0.10	2.11	0.27	7.98	0.12	2.87
Campania	0.23	12.75	0.12	***4.14***	0.28	14.24	0.14	***5.39***
Puglia	0.24	8.83	0.13	***3.01***	0.28	9.74	0.14	***3.67***
Basilicata	0.23	8.09	0.13	2.66	0.27	7.93	0.13	2.89
Calabria	0.26	14.71	0.14	***5.40***	0.30	13.85	0.15	***5.65***
Sicilia	0.26	15.02	0.14	***5.49***	0.30	14.59	0.15	***5.92***
Sardegna	0.24	11.15	0.13	***3.75***	0.28	13.42	0.13	***5.05***
Italy	**0.23**	**10.00**	**0.12**	**2.94**	**0.26**	**10.00**	**0.12**	**3.12**

[4] Values above the national average are written with bold, underlined, and italic numbers.

Table 2. Value of index *E* (excellence) for grade 6[5].

	Reading comprehension and grammar				Mathematics			
Region	**I**	**T**	**G**	**E**	**I**	**T**	**G**	**E**
Valle d'Aosta	0.06	11.71	0.02	0.92	0.13	11.07	0.04	1.80
Piemonte	0.06	12.64	0.02	0.98	0.12	10.97	0.04	1.65
Liguria	0.06	13.80	0.02	1.14	0.12	11.66	0.04	1.84
Lombardia	0.06	11.96	0.02	0.90	0.13	12.95	0.04	2.11
Prov. Aut. Bolzano (It. L.)	0.05	9.09	0.02	***0.58***	0.11	12.50	0.04	1.88
Prov. Aut. Trento	0.06	12.17	0.02	0.90	0.13	14.67	0.04	2.37
Veneto	0.06	12.92	0.02	0.95	0.12	12.89	0.04	1.94
Friuli-Venezia Giulia	0.06	15.07	0.02	1.08	0.12	15.01	0.04	2.40
Emilia-Romagna	0.05	11.51	0.02	0.82	0.12	11.36	0.04	1.77
Toscana	0.06	11.08	0.02	0.85	0.12	11.44	0.04	1.78
Umbria	0.06	13.98	0.02	1.03	0.12	9.68	0.04	1.49
Marche	0.06	11.65	0.02	0.93	0.12	10.54	0.04	1.65
Lazio	0.06	9.88	0.02	***0.71***	0.12	7.79	0.04	***1.16***
Abruzzo	0.06	10.50	0.02	0.82	0.13	7.54	0.04	***1.20***
Molise	0.05	8.58	0.02	***0.61***	0.12	8.62	0.04	***1.33***
Campania	0.06	6.39	0.02	***0.46***	0.11	5.57	0.04	***0.82***
Puglia	0.06	8.56	0.02	***0.64***	0.12	10.28	0.04	1.56
Basilicata	0.06	8.43	0.02	***0.70***	0.10	8.35	0.03	***1.10***
Calabria	0.06	5.98	0.02	***0.44***	0.10	5.21	0.03	***0.64***
Sicilia	0.05	5.05	0.02	***0.35***	0.11	4.08	0.04	***0.58***
Sardegna	0.06	6.11	0.02	***0.45***	0.10	4.97	0.03	***0.63***
Italy	**0.06**	**10.00**	**0.02**	**0.74**	**0.12**	**10.00**	**0.04**	**1.45**

Table 3. Value of index *W* (weakness) for grade 10[6].

	Reading comprehension and grammar				Mathematics			
Region	**I**	**T**	**G**	**W**	**I**	**T**	**G**	**W**
Valle d'Aosta	0.18	2.29	0.07	0.54	0.16	4.13	0.07	0.90
Piemonte	0.20	4.90	0.11	1.39	0.16	4.61	0.06	0.99
Liguria	0.24	6.45	0.14	2.23	0.25	6.91	0.13	2.40
Lombardia	0.17	3.71	0.09	0.92	0.20	3.35	0.09	0.91
Prov. Aut. Bolzano (It. L.)	0.17	3.79	0.09	0.92	0.13	2.53	0.05	0.44
Prov. Aut. Trento	0.25	1.84	0.17	0.69	0.18	2.63	0.09	0.67
Veneto	0.18	3.02	0.10	0.78	0.19	2.21	0.08	0.57
Friuli-Venezia Giulia	0.28	5.59	0.20	2.35	0.23	2.24	0.10	0.69
Emilia-Romagna	0.21	6.12	0.12	1.85	0.19	5.01	0.08	1.26
Toscana	0.25	8.40	0.14	***3.01***	0.21	7.09	0.11	***2.11***
Umbria	0.21	9.49	0.11	***2.80***	0.19	6.89	0.08	1.74
Marche	0.17	7.27	0.09	1.75	0.22	6.13	0.10	1.83
Lazio	0.26	8.22	0.18	***3.24***	0.25	8.49	0.14	***3.02***
Abruzzo	0.19	8.09	0.10	2.20	0.21	7.12	0.10	***2.02***
Molise	0.17	11.74	0.08	***2.74***	0.20	8.08	0.08	***2.13***
Campania	0.18	10.93	0.09	***2.75***	0.22	9.39	0.10	***2.78***
Puglia	0.17	8.03	0.09	1.98	0.22	6.80	0.10	1.98
Basilicata	0.18	10.92	0.10	***2.85***	0.20	8.42	0.09	***2.23***
Calabria	0.20	15.20	0.10	***4.26***	0.21	11.56	0.09	***3.27***
Sicilia	0.20	15.78	0.10	***4.40***	0.21	10.92	0.09	***3.11***
Sardegna	0.21	12.84	0.12	***3.94***	0.23	13.75	0.12	***4.41***
Italy	**0.20**	**10.00**	**0.11**	**2.37**	**0.21**	**10.00**	**0.10**	**2.01**

[5] Values under the national average are written with bold, underlined, and italic numbers.
[6] Values above the national average are written with bold, underlined, and italic numbers.

Table 4. Value of index *E* (excellence) for grade 10[7].

	Reading comprehension and grammar				Mathematics			
Region	**I**	**T**	**G**	**E**	**I**	**T**	**G**	**E**
Valle d'Aosta	0.04	11.01	0.01	0.58	0.18	8.72	0.05	1.92
Piemonte	0.03	9.66	0.01	***0.40***	0.14	7.82	0.04	***1.36***
Liguria	0.04	9.71	0.01	0.51	0.14	11.42	0.05	2.07
Lombardia	0.04	15.66	0.01	0.83	0.15	13.65	0.05	2.57
Prov. Aut. Bolzano (It. L.)	0.04	5.68	0.02	***0.31***	0.15	4.43	0.05	***0.86***
Prov. Aut. Trento	0.04	10.76	0.01	0.56	0.15	15.37	0.05	2.90
Veneto	0.04	14.46	0.01	0.76	0.14	18.54	0.04	3.28
Friuli-Venezia Giulia	0.04	11.02	0.01	0.57	0.14	14.16	0.05	2.51
Emilia-Romagna	0.04	13.34	0.01	0.71	0.15	13.69	0.05	2.54
Toscana	0.04	9.34	0.01	0.48	0.13	8.73	0.05	***1.49***
Umbria	0.04	8.49	0.01	***0.44***	0.12	8.34	0.04	***1.33***
Marche	0.03	9.86	0.01	***0.41***	0.12	12.16	0.04	1.91
Lazio	0.04	7.41	0.01	***0.38***	0.12	8.17	0.04	***1.24***
Abruzzo	0.04	8.30	0.01	***0.43***	0.13	8.02	0.04	***1.34***
Molise	0.04	7.02	0.01	***0.38***	0.14	8.44	0.05	***1.50***
Campania	0.03	5.09	0.01	***0.21***	0.14	7.05	0.05	***1.30***
Puglia	0.04	6.38	0.01	***0.33***	0.12	10.34	0.04	***1.60***
Basilicata	0.04	6.40	0.01	***0.34***	0.10	5.66	0.04	***0.77***
Calabria	0.04	3.93	0.01	***0.20***	0.10	4.01	0.04	***0.55***
Sicilia	0.04	4.25	0.01	***0.22***	0.11	5.72	0.04	***0.84***
Sardegna	0.04	5.24	0.01	***0.28***	0.11	4.55	0.04	***0.64***
Italy	**0.04**	**10.00**	**0.01**	**0.46**	**0.13**	**10.00**	**0.04**	**1.72**

Tables 1-4 show a very differentiate situation among Italian regions. For grade 6 all southern regions have weakness indices that are higher than the national average, both for Reading comprehension and Mathematics. Only Basilicata and Molise show for Reading comprehension a countertrend in comparison with the other regions of the same area. If one considers the other side of the coin, i.e. the excellences, results are even more worrisome. The number of regions with low levels of *E* is high and also Lazio and Bolzano (Italian language) seem to be not able to promote adequately excellences within their schools.

Tables 3-4 give for high secondary school the same analysis of Tables 1-2. They depict a situation that seems to become more difficult by moving from low secondary school to higher secondary school. It is remarkable that all regions of Middle and South Italy, with a few exceptions, show high values of *W* and low level of *E*. In more explicit words, this trend seems to indicate a worsening within the school system of different regions by going from the low grades to the highest. Furthermore, it is impressive that the phenomenon seems to involve regions of Middle Italy and one or two even of North Italy, as well.

However, levels of skills cannot be used as exclusive measure of the performance of a school system, although they represent, in a certain sense, its core business. In order to give a more

[7] Values under the national average are written with bold, underlined, and italic numbers.

detailed picture of the Italian regional educational systems, one considers the background and origin segregation, as well. Tables 5-6 show the results about the analysis of the two types of segregation.

Table 5. Segregation for grade 6[8].

	Socio-economical segregation			Immigration status segregation
	Variability of ESCS components over total ESCS variability (%)			
Region	**BETWEEN schools**	**BETWEEN classes**	**WITHIN classes**	
Valle d'Aosta[9]	11.25	-	88.75	0.45
Piemonte	4.52	***12.25***	83.24	0.34
Liguria	***26.46***	4.65	68.89	0.33
Lombardia	11.3	***9.72***	78.98	0.31
Prov. Aut. Bolzano (It. L.)	10.26	8.28	81.46	0.35
Prov. Aut. Trento	4.18	***11.9***	83.93	0.43
Veneto	11.89	3.68	84.43	0.28
Friuli-Venezia Giulia	10.04	6.35	83.61	0.33
Emilia-Romagna	16.54	4.72	78.74	0.28
Toscana	14.68	5.58	79.74	***0.49***
Umbria	3.8	***10.1***	86.1	0.27
Marche	4.85	***9.68***	85.46	0.27
Lazio	***28.61***	6.44	64.95	0.37
Abruzzo	6.58	***10.97***	82.45	0.35
Molise	3.18	***11.49***	85.33	0.45
Campania	***24.62***	***14.06***	61.32	***0.66***
Puglia	13.05	***10.72***	76.22	***0.49***
Basilicata	4.87	***11.00***	84.13	***0.62***
Calabria	12.07	***10.47***	77.46	***0.55***
Sicilia	17.47	***10.07***	72.46	***0.57***
Sardegna	10.78	***11.42***	77.81	***0.61***
Italy	**18.92**	**8.81**	**72.27**	**0.45**

[8] Values above the national average are written with bold, underlined, and italic numbers.

[9] Because the peculiarity of the school system in the autonomous provinces/regions. in some cases the sample design doesn't allow estimation of the component *within classes* of ESCS variance.

Table 6. Segregation for grade 10[10].

	Socio-economical segregation			Immigration status segregation
	Variability of ESCS components over total ESCS variability (%)			
Region	**BETWEEN schools**	**BETWEEN classes**	**WITHIN classes**	
Valle d'Aosta[11]	***28.35***	-	71.65	***0.52***
Piemonte	13.77	6.73	79.50	0.34
Liguria	***22.67***	6.32	71.00	0.40
Lombardia	18.62	5.25	76.14	0.36
Prov. Aut. Bolzano (It. L.)[12]	16.35	-	83.65	0.33
Prov. Aut. Trento	7.02	***9.95***	83.03	0.37
Veneto	***19.14***	6.02	74.84	0.44
Friuli-Venezia Giulia	17.28	***8.22***	74.49	0.37
Emilia-Romagna	18.50	7.43	74.07	0.34
Toscana	***19.27***	***8.36***	72.37	0.40
Umbria	***21.39***	5.01	73.60	0.39
Marche	12.97	***9.40***	77.64	0.34
Lazio	***19.66***	7.21	73.13	0.40
Abruzzo	11.36	***11.25***	77.39	0.39
Molise	15.54	***8.29***	76.17	0.40
Campania	17.43	***9.51***	73.07	***0.50***
Puglia	16.45	***10.08***	73.47	***0.51***
Basilicata	17.84	6.17	75.99	***0.57***
Calabria	16.36	***7.78***	75.86	0.43
Sicilia	18.00	7.10	74.91	***0.49***
Sardegna	14.52	***11.43***	74.05	***0.59***
Italy	**18.79**	**7.60**	**73.62**	**0.45**

In this work one uses the incidence (in percentage) of ESCS variance components over its total variance as a proxy of socio-economical segregation in the school system. The greatest part of the ESCS variance is within classes and it indicates a moderate socio-economical segregation at national level. However, in some regions one observes a remarkable relevance of the incidence of ESCS variability between schools. This latter aspect seems to show a relevant problem of segregation, even in the grade 6, i.e. in the comprehensive track of the Italian school system.

Because the social relevance of immigration in the last twenty years, in this work the segregation on the basis of the immigration status is considered. Before any consideration, it seems to be opportune to exercise some attention by considering this latter index. As known, immigration is a complex phenomenon that is related with different aspects. The structure of the economy, the distribution of the population, the general live cost levels of different areas play a very important role and influence strongly how immigrants are spread out. Therefore, it is possible that some high values of

[10] Values above the national average are written with bold, underlined, and italic numbers.
[11] See footnote 9.
[12] See footnote 9.

this index of segregation in the southern regions are principally connected with the very heterogeneous distribution of immigrants.

In order to summarize all the aspects that are considered in this work an additive indicator is calculated. The indicator ranges from 0 to 6. Table 7 shows the indicator components and their values.

Table 7. Indicator of overall equity (OE).

Component	Values	Meaning
W (Reading comprehension)	0 ; 1	0 if *W* of the region is greater or equal to the national value, 1 otherwise
W (Mathematics)	0 ; 1	0 if *W* of the region is greater or equal to the national value, 1 otherwise
E (Reading comprehension)	0 ; 1	0 if *E* of the region is less than the national value, 1 otherwise
E (Mathematics)	0 ; 1	0 if *E* of the region is less than the national value, 1 otherwise
ESCS *between schools*	0 ; 0.5	0 if the incidence of *between schools* variability of ESCS of the region is greater or equal to the national value, 0.5 otherwise
ESCS *between classes*	0 ; 0.5	0 if the incidence of *between classes* variability of ESCS of the region is greater or equal to the national value, 0.5 otherwise
Immigration status segregation (*SG*)	0 ; 1	0 if *SG* of the region is greater or equal to the national value, 1 otherwise

The overall equity indicator (*OE*) of a region assumes value 6 if the considered region has better values in comparison with the whole country for each component. Indicator *OE* may be useful to have a comprehensive picture of Italian regions in order to understand if different negative or positive aspects tend to concentrate in some particular areas of the country. Therefore, *OE* permits to take simultaneously into account several aspects. Indeed, their concomitance may represent a heaviness of inequality greater than the simple sum of the single components of Table 7.

Figure 1 and 2 show the value of *OE* for low secondary and high secondary schools, respectively.

Figure 1. Overall equity indicator *OE* in Italy (grade 6)

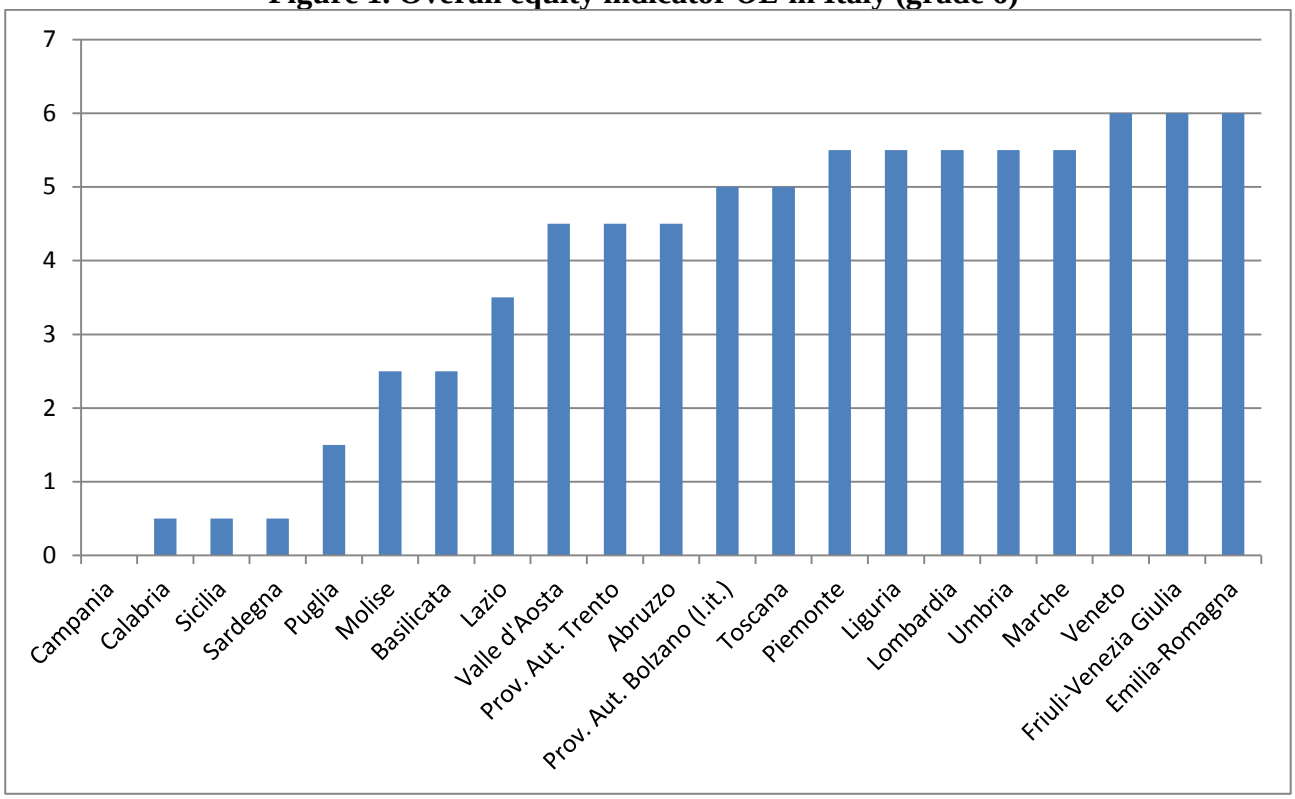
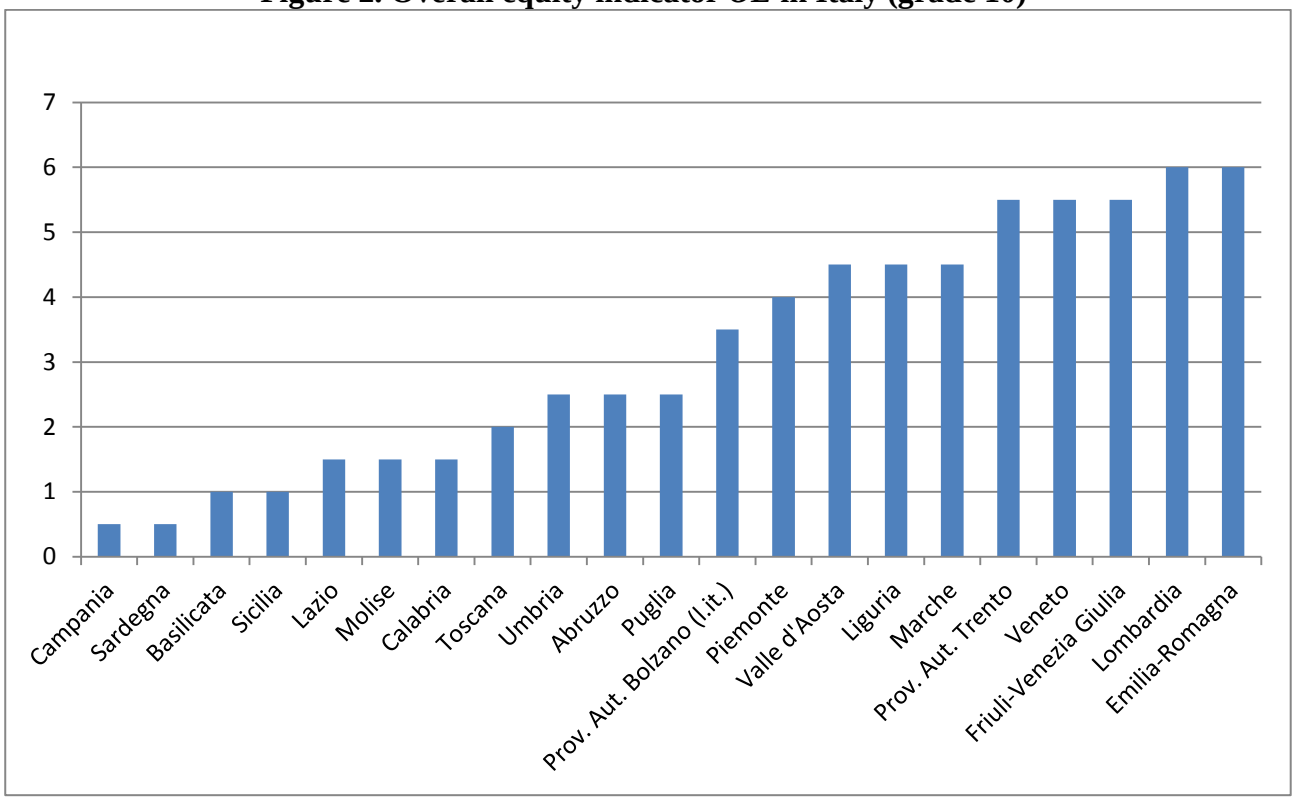


Figure 2. Overall equity indicator *OE* in Italy (grade 10)



The picture of Italian regions that comes out from Figure 1 and 2 is partially well known. It seems to confirm the sizeable differences among regions. At the other hand, one can see that there are some regions that have unexpected low level of *OE*, especially for grade 10. This is the case of Lazio, Toscana, and Piemonte, as well.

The analyses of this paper show the necessity to evaluate the performance of regional school systems not only by considering level of performance or achieving, but by taking into account different aspects (*W*, *E*, *ESCS*, *SG*, and so forth) that can be hidden under acceptable or even good mean results. Indicator *OE* may represent a simple tool for policymaker and stakeholders to have at disposal a comprehensive picture of the school system and of its dynamics that sometimes remain implicit.

The proposed analyses require to be further developed in order to depict more in depth the difference that characterize regional school systems. First of all, a further development to the study considered in this paper is represented by the calculation of *OE* for the different tracks of the high secondary school. It is reasonable to think that some differences are even more remarkable if one considers specific tracks, especially if they are chosen by students not only according to their attitudes, but also to their background.

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