Family Background, School-Track and Macro-Area: the Complex Chains of Education Inequalities in Italy

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FAMILY BACKGROUND, SCHOOL-TRACK AND MACRO-Area: THE COMPLEX CHAINS OF EDUCATION INEQUALITIES IN ITALY¹

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ABSTRACT: The main aim of this paper is to analyse the effect of social and territorial inequalities on educational outcomes in the Italian upper secondary school. For this purpose, the paper means to respond to 4 general questions: first, to what extent family background affects upper secondary school-choice and whether it has been changing during the last decade. Second, how strong is the school-track effect on learning outcomes net of other main independent variables. Third, to what extent the average family background at school level has an added role in the general explanatory model of inequalities in learning outcomes. Finally, throughout OLS models based on macro-area as a split dependent variable, we aim at accounting for structural explanatory differences between Northern and Southern regions. Findings shows a clear explanatory pattern: rather than the individual factors, it's a chains of family background, school-choice as well as average school social status to play a determinant role in explaining learning outcomes. This explanatory pattern keeps being valid when splitting up for Italian macro areas (North-West, North-East, Centre, South and South-Islands). Two important exceptions stand out: 1) the effect of school-choice is stronger in South and South-Islands and 2) the effect of the average social status of schools is stronger in Centre and North-East.

KEYWORDS: education inequalities, social origins, schooling tracking, Italy, regional divides

JEL Classification: I21, I28, J24

1. INTRODUCTION

The issue of stability and change in educational inequalities over time is a classic topic in sociology of education and a substantial issue of the long tradition of sociological studies on stratification and social mobility. In addition to the classical statistical analyses estimating the effects of ascriptive variables such as class, social, cultural and economic inherited capitals on educational attainments (Shavit and Blossfeld, 1993; Breen and Jonsson, 2005), data availability from test based large-scale international assessments (OECD-PISA, PIAAC, IEA, TIMMS etc.) have paved the way to new research approaches to gauge and compare the impacts of other relevant factors. One of the most crucial opportunity is to calculate the effects of the outlined variables not only on the level and field on educational attainments, but also on learning

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outcomes conceived as a set of learned skills measured via standardized items, ordered via numerical scores and ranked along a scale of quantified values (Barone, 2006; Martins and Veiga, 2010; Giancola and Viteritti, 2014; Oppedisano and Turati, 2015).

In this paper, we comment outcomes from multiple estimations and correlations statistically obtained in order to assess the effects of ascriptive variables on educational inequalities among Italian students’ achievements measured via OECD PISA scores in school skills and educational expectations. Additionally, we split the effects deriving from ascriptive variables and those from students’ track choices among the three upper secondary options available: Liceo (lyceum), Istituto tecnico (technical track) and Istituto professionale (professional track). We aim at finding out social and educational mechanisms generating differentials in skills outcomes and at intercepting and evaluating the influence of ascriptive variables on track choices.

There is substantial agreement among scholars that the levels of average students’ achievements and the effect of parental background on these achievements vary systematically across national educational systems. The consensus seems to be that students have on average higher scores in comprehensive educational systems compared with equivalent students in highly stratified educational systems: countries where students follow the same curriculum up to age 16 score higher results on achievement tests than countries where students are selected into different tracks of secondary education at earlier age. Moreover, the effect of parental background on the achievement of their children is much lower in the comprehensive systems than in the highly stratified ones (Breen and Jonsson, 2000; Buchmann and Hannum, 2001; OECD, 2005; Giancola, 2010). Nonetheless, in comprehensive systems such as the Italian one, stratification occurs once parents and children have to choose the upper-secondary track to enrol in.

In a separate analysis, we assess the impact of both type of variables – social origins and track choices – on skills scores obtained by 15 years-old students after PISA tests in Reading, Mathematics and Science, by employing all the available PISA waves. Finally, we compare the effects of ESCS, of ESCS controlled by PISA test scores in Reading, Mathematics and Science and of ESCS controlled by scores and school-track on students’ propensity to enrol in tertiary education. ESCS is the PISA index of economic, social and cultural status, created using student reports on parental occupation, combined with the highest level of parental education and a sub-index of home possessions related to family wealth, home educational resources and the availability of ‘classical’ cultural items such as classical literature, books of poetry, and works of art.

Several surveys relying on data from PISA or INVALSI already proved that the variation in test scores by Italian upper secondary students depend more on school track choices and lesser on social origin, usually measured by the ESCS index (Giancola and Fornari, 2011; Contini and Scagni, 2013; Azzolini and Vergolini, 2014; Giambona and Porcu, 2015; Barone and Ruggera, 2018;
Nevertheless, what available studies do not tell so far is whether and at what extent the influence of social origin both on school track choices and on test scores has been changing over time, from a generation to the next. Previous studies do not state whether social origin and educational choice generating separate as well as joint effects have increased, decreased or stabilized over time. Our paper seeks to answer to these questions for the period 2000-2015.

2. DATA AND METHODOLOGY

The Programme for International Student Assessment (PISA), which was designed and implemented by the Organisation for Economic Co-operation and Development (OECD), is one of the most relevant programmes internationally in the area of the assessment of the educational performance of students. The Programme assesses 15-year-old students in the three major learning performance areas of Reading, Mathematics and Science. In this context, the assessment evaluates the knowledge and skills expected of students more or less at the time they complete their compulsory schooling. Apart from these skills and knowledge tests, PISA also gathers information on students’ socio-cultural and economic background, as well as on the learning environment of the schools they attend, including detailed information about their family background and context. The theme of equity in education is undoubtedly one of the parameters that underlies the assessment system developed by PISA, which offers many opportunities for handling comparative studies and interpretations of its results at a national or subnational level.

We relied on data of the Italian national samples from the six first OECD-PISA waves of test assessment, which have been conducted in 2000, 2003, 2006, 2009, 2012 and 2015. A robust statistical probe based on national data on Italian enrolment rates in first and second year of upper secondary education is the basis to observe changes occurred in the distribution of students among upper secondary schools.

We thereafter show changes and continuities in the ratio distribution of students among school tracks considering the reform occurred in 2010. The reform enacted in from school year 2010/2011 and the process ended in school year 2014/2015, when the new system was completed for all grades: curricula in Licei were revised, adding specific learning objectives for each type of Liceo and detailed learning rationales that students are expected to acquire as the basis for implementing competences. Istituti tecnici (technical schools) have been rationalized into economics and technology sectors, with 2 economics-based programmes and 9 different technology-based programmes, resulting in 11 different options. Istituti professionali (vocational schools) offer vocational education in the service sector, the industry and crafts sectors, with 4 service sector programmes and 2 industry and crafts programmes. One of the semi-hidden rationale of the reform was to mitigate the unbalance in terms of status,
prestige and hence qualities of teaching between the higher social ranked Licei and the stigmatised lower census image of technical and vocational schools (Istituti tecnici and Istituti professionali) by promoting a wider bulk of educational offers from the formers in order to intercept students from a wider spectrum of social classes and a straightened quality learning in the latter. In order to observe the strength of effects of family background, gender, geographical macro-areas, native or foreign background on school track choices, we developed a binomial logistic regression model for each of the six waves (2000, 2003, 2006, 2009, 2012, 2015).

We then conducted a diachronic analysis of the effect of the same independent variables and of the school-choice effects on students’ scores on standardized tests (OLS regressions per wave). This analysis assesses whether and how much the variation in the allocation of students among the three school-tracks (Licei, Istituti tecnici and Istituti professionali) is associated to higher or lower scheme of reproduction of inequalities in students’ scores or at the opposite, to significant changes in the relation between ascriptive versus school-tracks variables.

Firstly (see paragraph 3), we present the correlations between the variable of family background (ESCS), two aggregative variables (average school’ ESCS and ESCS heterogeneity/homogeneity at school) and the scores students attained in Reading, Mathematics and Science at the OECD-PISA tests. In this step, we find out, in bivariate mode, the dominance of the school’ ESCS, (i.e. family backgrounds of school population) in explaining students’ scores. Secondly, (see paragraph 3), we focussed instead on the school-track variable in order to assess the track-effect on students’ scores. Via binomial logistic regression models, we firstly examined the effects of the social background (still via ESCS) on the choices of upper secondary school-tracks (Licei or Istituti tecnici or Istituti professionali), through binomial logistic regression models. Secondly, via regression models (OLS), we estimated individuals’ social backgrounds, schools’ social backgrounds and school-tracks as factors of variation in both students’ scores and expectations on enrolling at university. Models have been run for each OECD-PISA wave in order to gauge the stability of the explanatory structure for students’ outcomes over the time.

Finally, (see paragraph 5) we carried out a synchronic analysis aimed at estimating the effects of school-track individual choices and territorial variables on students’ learning outcomes (OECD-PISA 2015 students’ scores). In that case, we proceeded by applying an incremental statistical pattern (see Figure 1): the first model is based only on individual variables; the second model includes individual variables plus schools level and track variables; the third model was run by adding grade repetitions to the former variables. Finally, a series of territorial dummies have been added to produce a first estimation of the consistency of the Italian territorial divide (Northern versus Southern regions) in educational outcomes. In the last analyses we replicated the former estimations for each of the 5 Italian macro areas (North-Western regions,
North-Eastern regions, Central regions, Southern regions and Southern-islands regions).

FIGURE 1: Sequences of statistical models based on ordinary least squares

3. REPRODUCTION OF INEQUALITIES: SOCIO-ECONOMIC AND CULTURAL BACKGROUNDS

There is a growing recognition among international organizations, scholars and policymakers that education systems should focus not only on raising standards, but also on reducing inequalities. Focusing on inequality of outcome, previous researches had found that Italian socio-economically advantaged students outperform disadvantaged ones in learning outcomes. The latest PISA-OECD assessment conducted in 2018 shows that higher-status Italian students outperform disadvantaged students 75 score points in Reading. Ten years before, in PISA 2009, the performance gap related to socio-economic status was 85 score points. Furthermore, socio-economic status is still a strong predictor of performance in Mathematics and Science. In PISA 2018, for Italian students it explains 11% of the variation in Mathematics performance and 9% of the variation in Science performance.

In order to understand how and at what extent socio-economic status affects students’ performances in Italy, we used the ESCS Index on PISA 2015 data. The ESCS is a composite score built by the indicators parental education (PARED), highest parental occupation (HISEI), and home possessions (HOMEPOS) including books in the home via principal component analysis (PCA). The rationale for using these three components is that socio-economic status has usually been seen as based on education, occupational status and income. As no direct income measure has been available from the PISA data, the existence of household items has been used as a proxy for family wealth (OECD, 2017). We compared the effects on Reading, Mathematics and

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2 PISA 2018 data were not yet available at the time our analyses has been developed.
Science of individual ESCS, ESCS school average and ESCS heterogeneity in school by running a bivariate correlation test (Table 1).

**TABLE 1.** Bivariate correlation matrix: individual ESCS, ESCS school average, ESCS heterogeneity in schools and Italian 15 years-old scores at PISA 2015 tests in Reading, Mathematics and Science

<table>
<thead>
<tr>
<th></th>
<th>ESCS</th>
<th>ESCS school average</th>
<th>ESCS heterogeneity in school</th>
<th>Reading</th>
<th>Mathematics</th>
<th>Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESCS</td>
<td>1</td>
<td>0.517</td>
<td>-0.112</td>
<td>0.346</td>
<td>0.32</td>
<td>0.314</td>
</tr>
<tr>
<td>ESCS school average</td>
<td>0.517</td>
<td>1</td>
<td>-0.218</td>
<td>0.514</td>
<td>0.477</td>
<td>0.484</td>
</tr>
<tr>
<td>ESCS heterogeneity in school</td>
<td>-0.112</td>
<td>-0.218</td>
<td>1</td>
<td>-0.116</td>
<td>-0.166</td>
<td>-0.155</td>
</tr>
<tr>
<td>Reading</td>
<td>0.346</td>
<td>0.514</td>
<td>-0.116</td>
<td>1</td>
<td>0.8</td>
<td>0.88</td>
</tr>
<tr>
<td>Mathematics</td>
<td>0.32</td>
<td>0.477</td>
<td>-0.166</td>
<td>0.8</td>
<td>1</td>
<td>0.895</td>
</tr>
<tr>
<td>Science</td>
<td>0.314</td>
<td>0.484</td>
<td>-0.155</td>
<td>0.88</td>
<td>0.895</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: our elaboration from OECD-PISA data (2015)

**FIGURE 2.** Italy, Linear relation between Reading scores and a) individual ESCS index and b) school average ESCS.

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Family background heterogeneity in schools is estimated as standard deviation of students individual ESCS.
Findings confirm the strong ESCS effects on student performances: individual ESCS exerts a significant influence on performances, especially on Reading scores. But the effect of the ESCS school average is even stronger. It clearly stands out that the impact of the average social status of a school is stronger than the single student family background. That means single school socio-economic and cultural composition exerts a key role in paving the way to learning outcomes. As a matter of fact, social heterogeneity in school has an inverse correlation with PISA scores in Reading, Mathematics and Science.

The relevance of schools’ socio-economic and cultural compositions is furtherly proved by comparing the two linear relation of the two Index – individual ESCS and ESCS school average– to Reading scores (Figure 2 a and b). This result suggests the existence of a pattern that cumulatively reinforces the effects of social advantage: higher-status populations in a school play a central role, as recent literature confirmed for other European countries too (Thrupp et al., 2002; Hattie, 2002; Harker and Tymms, 2004; Dumay and Dupriez, 2008; Parker et al., 2015).

4. SCHOOL TRACK EFFECTS

We have just remarked that social inequalities have a strong impact on the performances of Italian students. We have also just highlighted the influence of the single school in terms of social composition. However, in the Italian case, not only territorial segregation between schools with different social backgrounds is significantly crucial; also, school-track effect seems to play a very strong role. Thus, the key point seems to be in the transition to upper secondary school. This occurs typically at age 14, when students leave comprehensive education and choose among a variety of educational programmes with different curricular contents and learning scopes.

Today’s Italian education system is the result of a major comprehensive reform that was adopted in 1962. This reform replaced the former system with a new middle school (scuola media unica, the actual lower secondary school) and postponed the age at first tracking from 11 to 14. As a consequence, after completing lower secondary education, all students today are faced with the choice between three school tracks. This transition is mandatory, as school leaving age is currently 16.

The three tracks offer general curricula (Licei), technical education (Istituti tecnici) or vocational education (Istituti professionali). All these tracks last five years and allow students who successfully complete a final state exam to access tertiary education. However, curricular differences between the three tracks are quite pronounced: Licei provide a general and academic oriented curriculum. Istituti tecnici aim at preparing students for technical employment in economic or technological sectors. Vocational schools have traditionally lasted three years with the possibility of additional two years, but they now last five years and aim at developing vocational oriented skills and attitude in the services.
sectors, industry and handicraft. Sociological literature proves that if the majority of students with high social backgrounds attend upper secondary schools in the most prestigious tracks – *Licei* –, the ones with low parental socio-economic and cultural resources are more likely to enrol on technical and vocational schools, i.e. *Istituti tecnici* and *Istituti professionali* (Contini and Scagni, 2011a; Panichella and Triventi, 2014; Contini and Triventi, 2016). Other studies confirm that social origins play a major role in determining educational choices after compulsory school that goes well beyond ability differences: choices of the upper secondary school track are mediated only partially by prior performance (Contini and Scagni, 2011b; Contini and Triventi, 2016). Despite the system’s openness in terms of absence of ability barriers in the upper secondary school transitions, the choice stands out as a crucial turning point in students’ likelihood to get positive learning outcomes, particularly for those of low social origins.

But yet access to the different upper secondary schools is completely open, fully resting on families’ decisions. Even access to tertiary education – characterized mostly by public universities – is not conditional on the type of school-track requirements. Hence, from one side there are no formal skill-requirements for parents and students in order to choose a school track over another and there are no strong external incentives for them to achieve well on the other side.

Enrolment data among the three tracks of the Italian upper secondary schools for the period 2000-2015 show a steady growth in attractiveness by *Licei* at the expenses of *Istituti tecnici* and *Istituti professionali* (Figure 3).

**FIGURE 3.** Italian students enrolled in upper secondary education by years and school-track [%]

![Enrolment data graph](image)

Source: our elaboration from MIUR data.

*Licei* counted for the 35.6% of all the enrolments in upper secondary school in 2000 when *Istituti tecnici* attracted a higher share (40%) and *Istituti professionali* the remaining 24.4%. Fifteen years later the distribution reversed: *Licei* were
gone at half of the student population (50.5%), while Istituti tecnici and Istituti professionali were both declined, respectively down at 30.7 and 18.8%.

The recent steady growth in the number of students enrolling in Licei implies a plausible ‘democratization’ of the population of this school track. This phenomenon confirms the strength of social imitation and the diffusion, transversal to social classes, of the expectation that Licei offer a better social environment and the first step toward social mobility (Checchi and Flabbi, 2007; Ballarino et al., 2008; Panichella and Triventi, 2014).

Nevertheless, the enlargement of the student population attending Licei does not automatically imply that the whole tracking system is moving toward social heterogeneity. Instead, it may well be that the proportion of Licei students grows over time as more and more middle- and high-class families drive their children towards this kind of upper secondary school, increasingly shaping the family choice as a process of class connotation.

By measuring social heterogeneity via ESCS Index from PISA student population (average values of ESCS in the tracks), we find out that the 2010 reform reorganizing Licei, Istituti tecnici and Istituti professionali has had a redistributive effect for Licei, but not so much for Istituti tecnici and Istituti professionali, as Figure 4 illustrates. Putting it be more correctly, social heterogenization at Licei have been in place since before the 2010 reform, following a trend independently from educational policies. The other way around enrolments in Istituti tecnici and Istituti professionali in relation to ESCS index have been fluctuating with ups and downs.

FIGURE 4. Italian school tracks’ social heterogeneity measured via ESCS Index by PISA waves.

Source: our elaboration from OECD-PISA data

Binomial logistic regression models allow to substantiate the effect of social origin, gender, native or non-native background and geographical area on school choices. Findings in this regard prove that the odds of enrolling in Licei
still depend mainly on social origin and that the influence of social background has remained quite strong and quasi-stable over time (Figure 4).

We are not able to assess a direct and evidence-based effect of the 2010’s reform on the odds of enrolling at Licei according to social origin, but Figure 5 shows that social origins counted more for the 2015 than for the previous 2012 enrolment cohort. It might be that the 2010’s reform has had merely a short-term effect on heterogenization. Due to a lack of space, we cannot show all the single regression models contributing to the graphs in Figure 5.

**FIGURE 5.** Odds produced by ESCS (net effect) in enrolling in Licei by year of enrolment.

![Graph showing odds produced by ESCS (net effect) in enrolling in Licei by year of enrolment.](source: our elaboration from OECD- PISA data (2015))

Attending Liceo rather than Istituto tecnico or Istituto professionale entails a greater probability to score higher at PISA tests on Reading, Mathematics and Science even if this correlation is slightly declining over time as Figure 6 shows. Is this decline partly explained by the social heterogenizations going on at Licei? It may be a realistic composite effect which need to be explored. But, if we look at the effect of social class (ESCS Index) controlled by school track on test scores, we have a reverse picture, where a rising trend over time is at play (except for Science). The school track effect is quite constant over time (except anomalies resulting from the 2003 wave). Therefore, we overall observe: 

i) a significant effect of social origin (ESCS) on the scores obtained by upper secondary students in Reading, Mathematics and Science; 
ii) an even greater effect exercised by the school-track on scores; 
iii) still a remarkable effect produced by social origin on scores once the school track effect is controlled. It is then clear that a chain effect is at work: social origins affect learning outcome both as a driver of social, cultural and economic capital transmitted to students and as pattern of social influence on school choice.
FIGURE 6. Effects of ESCS, of ESCS controlled by school track and of being at Liceo, on PISA scores in Reading, Mathematics and Science for each OECD-PISA wave.

Since PISA scores are calculated on a standardized scale, it is possible to graphically represent ‘how much’ a variable (or one of its category) adds to or removes from the student’s starting score in terms of tests scores. Findings show a very clear explanatory structure (Figure 7): the foremost effects are those produced by territorial gaps, migration background and social origin. But, once more, above all, the effect of the school track stands clearly out.

FIGURE 7. Effects (as PISA score) on reading score of the variables assumed as independent

Source: our elaboration on data from OECD-PISA (2015, Reading score)
Analysis aimed at configuring the combined impacts of all the observed variables on students' training prospects have been carried out too, in order to assess the students’ propensity to enrol in university courses after completing upper secondary school (Figure 8). Operating logistic regression models, ascriptive variables are adopted as independent in a first round. Then the relation is controlled for scores at tests. Finally, the relation is controlled for school track. In Italy the expectation to enrol in tertiary education is a matter of social class: the higher the ESCS index, the more likely the propensity to attend university and that is true even after controlling between scores at tests in Reading, Mathematics and Science and those score and school-track together. Obviously, from a wave to another, results are heavily affected by students’ anticipated replies on expectation to enrol in tertiary education (replies are irregular over time).

**FIGURE 8.** Effects of ESCS, of ESCS controlled by scores and of ESCS controlled by scores and school track on the propensity to enrol in tertiary education.

However, the relevant finding is not the intertemporal deviation of the betas on the single trend (the dependent variable is a categorical with deep variation in the distribution over time), but rather the distances from one beta to another in the same wave. As illustrated by the model three and reported in the graph, an important part of the propensity to enrol in university courses – even more important than the performance measured by test scores – is explained by the school-track attended by the student, also considering the reduction of the ESCS effect absorbed by the school track.
5. The North-South divide

As it is well-known geographical cleavage is a key feature of the Italian educational system (INVALSI, 2010; 2012). Territorial divide in Italy has been identified as one of the main causes behind the exacerbation of education inequalities across the country (Bratti et al., 2007). Gaps among Italian macro-areas (North-West, North-East, Centre, South-West-Islands and South-East) are in literature one of the main explanatory factors for individual inequalities in educational careers (Triventi, 2014) and individual outcomes (Benadusi et al., 2010). Similarly, context effects are recognized as powerful exogenous variables affecting social reproduction of inequalities (Fornari and Giancola, 2011).

Existing studies suggest variations across macro-geographical areas in the levels of students’ performances with the major distance found between Northern and Southern regions (Montanaro, 2008; Matteucci and Mignani, 2014; Hippe et al., 2018). Students from Northern regions, on the whole, achieve decidedly better performances, which place them in a ranking close to some of the best performing countries in the PISA tests. Students from Southern regions, on the other hand, performances much less satisfactory. Hippe and colleagues (2018), for example, found that PISA 2015 Science scores in the North-East area are among the highest in Europe, whereas the scores in the Islands and Southern regions are quite low and the gap among the Italian macro-areas is 90 score points (See Figure 9 for an Italian macro-areas insight).

**FIGURE 9.** Regional PISA 2015 Science scores in Italy.

Source: Hippe et al., 2018, p.9. Classes of PISA scores defined according to equal intervals.
Furthermore, by comparing the PISA tests from the past, scholars have observed that the trend has remained unchanged over time (Fornari and Giancola, 2011). Several researches have suggested that historical inequalities in relation to economic growth and socio-economic development among territorial aggregates have led to disparities in the effectiveness-efficiency component of the education system. These studies, which examined geographical polarization trends in learning outcomes, have made clear the importance of analysing the region effect in the Italian North-South axis as one of the major determinants of an uneven distribution of educational opportunities nationwide (Checchi, 2004).

When analysing PISA data, researchers and commentators often focus on cross-country comparisons. However, as we have seen, vast within-country differences exist, also in terms of educational attainment and PISA test scores. Italy is a prominent example providing PISA samples at the regional level, and this is why we can focus on North-South divide relying on PISA 2015 dataset. In this analysis our research aim is to understand whether explanatory structures of students’ performances and inequalities are similar or vary according to macro-areas. Our estimation is an attempt to isolate and calculate factors referred to territorial, school-track, institutional (variations among schools’ choices due to aggregational impacts) and individual effects. Also, in this case the main source we used is the dataset provided by the PISA 2015 survey.

As a first analysis we have calculated the correlation between the track of upper secondary school, the macro-area and the scores obtained in Reading at PISA 2015 assessment. For each macro-area, the gaps between Licei, Istituti tecnici and Istituti professionali are corroborated. Scores in Reading of 15-years-old students from Northern regions are higher than those of students from Southern regions. Students attending Licei from the macro-region “Centre” performs more like Northern ones enrolled in Licei and Istituti tecnici and much better than “Southern” ones (South and South & Islands). The performances of Southern students enrolled in Licei are lower or equal to those of Northern ones studying at Istituti tecnici. Therefore, is confirmed that socio-economic background combined to (and affecting also) school-track choices is a strong

4 Until the 2012 wave, PISA dataset provided a representative sample of 15-year-olds students significant at country level (useful both for cross-countries comparison and for the intertemporal analyses of a single country). In the Italian case, samples were robust also for macro-regions inquires and for single region inquires (19 regions plus Trento and Bolzano, each considered separately). In the 2015 dataset the sample has remained significant at country and macro-region levels, but no longer at regional level. Italian data from PISA 2015 wave are licensed according to the following macro-regional groupings: North-West including Valle d’Aosta, Piemonte, Lombardy, Liguria); North-East including Trento and Bolzano, Veneto, Friuli-Venezia Giulia, Emilia-Romagna); Centre (Tuscany, Umbria, Marche, Lazio); South, including Abruzzo, Molise, Campania and Puglia); South and Islands, including Basilicata, Calabria, Sicilia, Sardinia. We relied on those type of groupings for all our further statistical elaborations.
predictor of a student’s score (Agasisti and Cordero-Ferrera, 2013; Willms, 2006; Wößmann, 2007). Those dynamics seem to be exacerbated by geographical divides. As it can be inferred from Figure 10, lower scores in Reading are associated to lower social status students attending vocational upper secondary schools (Istituti professionali) in the Southern and central Italian regions, while higher scores are associated to higher social status students studying in Licei located in Northern and central regions. Once again in addition to the inequalities in Reading scores according to school-track, deeper inequalities among macro-regions come out.

**FIGURE 10.** Italy: Differences in the scores in Reading (thresholds at 95%) according to macro-regions and school-tracks

Source: our elaboration from OECD-PISA data 2015

**FIGURE 11.** Italy: Scatter plot of clusters according to scores in Reading, ESCS, school-track and macro-region

Source: our elaboration from OECD-PISA data 2015
The distribution of the average values of the ESCS\(^5\) at the regional level might be an explanation. We can notice a high variance in the average ESCS among Italian macro-regions. More specifically, the two Southern/Island macro-regions have a substantial negative average ESCS (relative to an OECD average of 0), while they have positive values for the North-East and the Centre.

| TABLE 2. Macro-area averages for ESCS in Italy |
|---|---|---|
| Macro area | Averages | Standard deviation |
| North-West | .0741 | .8819 |
| North-East | .1047 | .8538 |
| Centre | .0745 | .9344 |
| South | -.2283 | .9885 |
| South Islands | -.2780 | .9947 |
| Total | -.0434 | .9450 |

Source: our elaboration from OECD-PISA data 2015

We then run a series of multiple regression analyses in order to catch up the strength of several independent variables explaining the general explanation structure for education scores\(^6\) (Table 3). Firstly, we estimated the betas for ESCS, gender, migratory background (1\(^{st}\) and 2\(^{nd}\) generation) finding that ESCS is the most predominant explicator for educational scores for the overall Italian PISA 2015 population. We than added ESCS school average, ESCS heterogeneity in school and studying at Liceo as extra factors.

| TABLE 3. Individual and aggregational determinant of Italian students OECD-PISA scores in Reading |
|---|---|---|---|---|
| | Mod.1 | Mod.2 | Mod.3 | Mod.4 |
| | β | β st | β | β st | β | β st | β | β st |
| Constant | 483,573 | 483,91 | 493,294 | 464,103 |
| ESCS | 31,694 | 0,345 | 9,469 | 0,103 | 8,521 | 0,093 | 7,96 | 0,087 |
| Gender=Female | 18,903 | 0,109 | 6,524 | 0,038 | 4,204 | 0,024 | 1,573 | 0,009 |
| Second generation | -15,484 | -0,031 | -17,438 | -0,034 | -10,903 | -0,022 | -18,286 | -0,036 |
| First generation | -39,145 | -0,091 | -39,901 | -0,093 | -36,607 | -0,085 | -43,047 | -0,1 |
| ESCS school average | 64,575 | 0,364 | 61,017 | 0,344 | 39,975 | 0,225 |
| ESCS heterogeneity in school | -5,285 | -0,008 | -6,109 | -0,009 | 17,28 | 0,026 |
| Liceo | 23,609 | 0,136 | 20,282 | 0,117 | 35,336 | 0,204 |
| Grade repetition | -45,454 | -0,181 | -47,668 | -0,19 |
| North-West | 24,113 | 0,117 |
| North-East | 29,845 | 0,134 |
| South | -15,256 | -0,072 |
| South-Islands | -22,235 | -0,096 |

Source: our elaboration from OECD-PISA data 2015

\(^5\) The ESCS is a standardized variable as all OECD-derived indexes. This means that it has a mean of 0 and a standard deviation of 1 across countries with weighting each country equally.

\(^6\) For reasons of estimation parsimony, we have run the OLS analyses only on Reading scores.
The outcome is that ESCS is still the most predominant explicator, but this time as ESCS school average. That means that students are likely to perform better both when studying in school with higher upper status attendance and because of their higher social status. In fact, studying at Liceo – where ESCS school average is higher – instead of at Istituto tecnico or Professionale makes the difference too.

When adding grade repetition as independent variable, even if this latter shows a strong explanatory role, the explaining weight of ESCS school average slightly decrease, but it remains the highest. Finally, we calculated the macro-region net effect: controlling for all the above mentioned variables, a wide North-South divide comes out.

We can than underline the general explanatory structure of inequalities in Reading scores among Italian 15-years-old students. Excluding the almost tautological and undisputed negative effect of grade repetition, students’ social backgrounds at school level, studying at Licei and living in Northern Italy seems to explain much of higher scores.

**FIGURE 12.** Positive and negative contribution of independent variables on Italian students OECD-PISA scores in Reading

![Diagram showing positive and negative contribution of independent variables on Italian students OECD-PISA scores in Reading]

Source: our elaboration from OECD-PISA data 2015

OLS models run for each macro-area display that the general explanatory structure remains almost unchanged, except for a very relevant exception: in Southern regions the effect of the association of studying at Liceo to higher scores is much stronger than in Northern regions, while ESCS heterogeneity in school has a different effect according to macro-region: it has a very negative
impact on scores of Northern students, a very positive ones on scores of Southern students. This latter evidence is open to several interpretations, because of the fact that higher heterogeneity tends to equalize student differences related to family background (Raitano & Vona, 2010) and therefore equalization may be downward lower scores where ESCS school average has a stronger effect – such as in Northern schools – and upward higher scores where ESCS school average has minor effect – such as in Southern schools.

**TABLE 4.** Individual and aggregational determinant of Italian students OECD-PISA scores in Reading according to macro-areas.

<table>
<thead>
<tr>
<th></th>
<th>North-West</th>
<th>North-East</th>
<th>Centre</th>
<th>South</th>
<th>South-Islands</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\beta$</td>
<td>$\beta_{st}$</td>
<td>$\beta$</td>
<td>$\beta_{st}$</td>
<td>$\beta$</td>
</tr>
<tr>
<td>Constant</td>
<td>550.3</td>
<td>547.7</td>
<td>398.8</td>
<td>411.4</td>
<td>386.3</td>
</tr>
<tr>
<td>ESCS</td>
<td>6.87</td>
<td>0.077</td>
<td>6.51</td>
<td>0.073</td>
<td>10.07</td>
</tr>
<tr>
<td>Gender=F</td>
<td>2.07</td>
<td>0.013</td>
<td>5.75</td>
<td>0.038</td>
<td>9.46</td>
</tr>
<tr>
<td>Second generation</td>
<td>-23.47</td>
<td>-0.059</td>
<td>-45.60</td>
<td>-0.129</td>
<td>-6.73</td>
</tr>
<tr>
<td>First generation</td>
<td>-56.20</td>
<td>-0.16</td>
<td>-66.02</td>
<td>-0.202</td>
<td>-36.57</td>
</tr>
<tr>
<td>School average</td>
<td>24.75</td>
<td>0.12</td>
<td>48.77</td>
<td>0.231</td>
<td>63.80</td>
</tr>
<tr>
<td>ESCS heterogeneity in school</td>
<td>-70.27</td>
<td>-0.112</td>
<td>-48.27</td>
<td>-0.072</td>
<td>85.54</td>
</tr>
<tr>
<td>Liceo</td>
<td>36.05</td>
<td>0.228</td>
<td>16.97</td>
<td>0.112</td>
<td>34.28</td>
</tr>
</tbody>
</table>

Source: our elaboration from OECD-PISA data 2015

**FIGURE 13.** Positive and negative contribution of individual and school level variables on Italian students OECD-PISA scores in Reading according to macro-area.

Source: our elaboration from OECD-PISA data 2015
The graph illustrated in Figure 13 sums up the different effects of individual ESCS, ESCS school average and school-track according to macro-area. One explanation may be that in southern regions the dynamics of school’s social composition mirrors a polarization which is shaped especially on school-track choices cleavages – higher social status students in Licei on the one hand and lower social status students in technical and vocational schools on the other. Whereas in northern regions parents and students are eventually more sensitive to a hierarchical stratification of schools with different gradients of social status, regardless of the distinctions between school-tracks, these latter distinctions running more on the basis of students attitudes rather than family social expectations.

Furthermore, a significant portion of the differences between North and South is attributable to students from disadvantaged families.

6. CONCLUSIONS

We can now conclude with few provisional remarks. In Italy family backgrounds still explain a great amount of school tracks choices in upper secondary schools. Licei keeps on preserving a selective effect on students’ prospects via socio-economic and cultural capitals, even if this effect seems to start being stronger via students’ scores rather than rates of enrolment, as it has been up to the recent years. However, the Italian 2010’s reform of the upper secondary school system, aiming at de-marginalize technical and professional school tracks, does not seem to have reached the goal. Mechanisms of variance between schools via ‘track choice’ appear to be relevant, operating as a powerful signal of social segregation.

Overall, once again tested, the Italian education system still has strong traits of inequity and marked inequalities. In discussing of the empirical outcomes, we have willingly omitted the Italian positioning in the international rankings which is low. If we instead consider equity, still we find that inner-country geographical divides, social and intergenerational disparities, effects of the migration background – and therefore the lack of inclusiveness (Giancola and Salmieri, 2018) – as well as context effects are strong and evident. We found out that a clear causal chain linking family background to school-track choice; subsequently the distribution of students among upper secondary school-tracks generates its effects in terms of schools’ social composition. This latter then, (together with other individual and contextual variables), strongly affects students’ cognitive results, especially in southern regions. Finally, at the last step of the inequality chain, taken all together, school-track choice, school social composition, family background (and expectations) as well as school grades affect the propensity to undertake a university study career.

The analysis of PISA 2015 data shows a clear explanatory model: rather than the individual factors, it is the complex chain of family background, school-choice as well as average school social status which plays a determinant role in
explaining learning outcomes. Furthermore, this explanatory pattern keeps being valid when splitting up for Italian macro-areas (North-West, North-East, Centre, South and South-Islands). Two important exceptions stand out: 1) the effect of school-choice which is stronger in South and South-Islands and 2) the effect of the average social status of schools which is stronger in Centre and North-East.

If it is factual that Southern regions perform below the national average with a wide gap compared to Northern regions, it is also evident that factors beyond the reach of school effectiveness and educational policies are strongly and significantly associated to learning gaps. It would be naive (but it happens - see mass media, political actors, public opinion) to forget that alongside national trends showing wide geographical divides, the production and reproduction of educational inequalities are associated to extra-school factors neutralizing part of school’s efforts towards greater equality and better learning outcomes. Before suggesting broader recipe-solutions via educational policies or inferring that families in some national contexts cares about their children’ educational outcomes less than others, we probably should expand our views about the interrelations among research, policy, and practice to keep in view education as a thoroughly moral and political practice that requires continuous democratic contestation and deliberation (Biesta, 2007).

REFERENCES


