

Equity: Policy and Practice in Ticino and in Switzerland

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Abstract

PISA 2006 results show that in Switzerland – with its more than twenty school systems – the debate cannot be reduced to integrative vs. selective policy: both can lead to quality and equity. Moreover, a school system can be equitable when compared to others, but show flaws within itself: in Canton Ticino – which has an integrative school system (except for tracking in mathematics, French and German) – the relationship between background variables and performance in mathematics is weaker than in other cantons, but there is a large performance overlap between students assigned to courses with different levels of requirements. Furthermore, we have found that in student tracking gender, socioeconomic or migrant origin can also play a role. We cannot determine how much this is due to the ambitions of families or students, school practices, or other factors. In any case, this phenomenon should be a cause for concern – since tracking can determine the school career – and be investigated and acted upon. Our policy aims at equity, integration and support of disadvantaged students (special language courses for immigrants, etc.), but this is not enough. If we want to continue with tracking while at the same time pursuing equity, we should reduce the influence of background variables in the tracking process.

Keywords: equity, competencies, tracking, PISA, secondary school

Introduction

Equity is undoubtedly one of the most important challenges in educational policy. In its thematic review on equity (Field, Kuczera and Pont, 2007), the OECD defines two dimensions of equity: fairness, which means that contextual characteristics (such as gender, socioeconomic origin, etc.) should not “influence” educational potential; and inclusion, which aims at a minimum level of education/competencies for everyone. This definition includes not only the idea that personal or social characteristics should not “interfere” with learning and learning outcomes, but also the idea of equality of opportunities with regard to school “career”. No one should be discriminated against or given special advantage in their school career based on gender, socioeconomic origin or other characteristics. The issue of equity is also important in Canton Ticino, an Italian-speaking part of Switzerland. The school law of this Canton emphasizes the importance of the integration of citizens in the social context through an effective basic and continued education, and aims at promoting gender equality, correcting socio-cultural differences and reducing obstacles that could impair students’ education. In this article we want to explore whether these goals are attained, first compared to other Cantons in Switzerland, and then within Canton Ticino itself. We will look at the impact of contextual variables – such as gender, socioeconomic origin, migrant status – on student performance in PISA 2006 mathematics in different Cantons with different school systems. We will then investigate what happens within Ticino, whose school system is essentially integrative, except for tracking in mathematics, French and German in 8th and 9th Grades. We will explore whether there is a performance overlap between students who are assigned to courses with different requirements, and we will ascertain whether contextual characteristics of the students play a role in tracking in mathematics.

Background

Switzerland is a federal state with twenty-three cantons (and three semi-cantons), which means that on many issues there is no uniform policy. Education is one of these, meaning that every canton has its own school system, and school systems can vary greatly within Switzerland. To simplify, we can say that school systems in the German-speaking cantons are essentially selective and track quite early (more or less in 6th Grade), while the French are partly selective. Canton Ticino (Italian speaking) has an integrative school system, with five years of primary school and four years of “Scuola Media” (junior high school), starting school at age six and terminating at age fifteen. The integrative Scuola Media was created in the 1970s in order to counteract

segregation and give equal learning opportunities to all. In fact, before the Scuola Media was created, after the five years of primary education there was tracking in two types of schools (one preparing students for professional education, the other preparing them for higher education), and the selection of students was partly “dependent” on their socioeconomic origin. Actually, however, the Scuola Media is not totally integrative. In fact, there is student tracking in courses with different levels of requirements (“corso attitudinale” is the course with higher requirements; “corso base” is the course with basic requirements) in mathematics and German (until 2005/06 also in French). Enrollment in one or the other course level depends on formal criteria, that is, the evaluation obtained in the subject in the previous year¹. Even if the criteria for enrollment in higher requirement courses are met, enrollment is not direct: the teacher expresses his/her advice, and the final decision is up to the family. This is important, because it can have an impact on equity. On the one hand, competencies could be “influenced” by personal and contextual characteristics, so that some students may not achieve the requirements for enrollment in the higher course. Field, Kuczera and Pont (2007, p.66) show, for example, that in countries where early tracking (and with a large number of tracks) takes place, the influence of social background on student performance is stronger. On the other hand, the teacher’s advice and the family decision could also depend on student/teacher background characteristics. In Switzerland, for example, in tracks with higher requirements there is a greater proportion of students with a higher socioeconomic origin, while in tracks with lower requirements there is a greater proportion of students with a lower socioeconomic origin (UST, 2005). These considerations are important, because the track in the Scuola Media determines the future school career of students to a great extent. Direct access to high school and preparation for university studies is in fact possible only for those students who have graduated from the Scuola Media with higher requirement courses and a certain average grade evaluation. Students who have not attended higher requirement courses and want to enroll in high school are subject to an entry examination.

Methods

To investigate the above-mentioned questions, we use the PISA 2006 cantonal additional samples and the “index of selectivity” in the “orientation cycle” (8th and 9th grade). PISA (Programme for International Student Assessment) is an OECD programme which aims at evaluating the competencies of fifteen-year-olds in three key subject areas: mathematics, science and reading. It has taken place regularly every three years since 2000. Each time the assessment is done, one subject area is focused on, although all of them are tested. The participation of various countries has increased with each assessment, and in 2009 over 60 countries participated in PISA. Switzerland has participated in PISA since 2000 with an additional sample of students in grade nine (the last year of compulsory schooling) for each language region and an additional sample for some cantons. This enables comparison within the country which is not possible with the fifteen-year-old sample, due to large differences in the cantonal school systems, regarding, for example, school entry age, duration of primary school and tracking. The grade nine sample allows us to draw conclusions about competencies at the end of compulsory schooling, when all students have gone through the same number of school years and are about to leave compulsory schooling, either to start vocational education training or to enroll in high school. In 2006 fourteen cantons² decided on an additional sample and about 20,500 students in grade nine took part in PISA. Our analyses are based on the final database, comprising 20,456 students enrolled in grade nine. Students’ performance in PISA is assessed through a two-hour paper test and is reported on a global scale (the international mean for OECD countries in 2006 equals 498) and in competence levels. The mathematics scale has six levels of competencies: level two is considered the “baseline” level of mathematics competencies (OECD, 2007). Level six is the highest competence level. Students’ performance can also be related to contextual variables. After taking the test, the students fill in a 45-minute questionnaire about socio-demographics, attitudes towards school and the PISA main domain in the cycle, information about school and out-of-school activities and so on. The socioeconomic origin is an index which is constructed based on data about parents’ education, profession and home possessions (OECD, 2007, p.333). At the international level, the index of socioeconomic background has a mean of 0 and a standard deviation of 1. For the comparisons among cantons, we carry out simple descriptive analysis:

¹ Students who finished 7th grade with an average grade of at least 4.5 (where 4 represents the passing mark and 6 the best mark) in the subject concerned (or alternatively show an average of 4.5 in all compulsory subjects) can enroll in the higher requirement course in the 8th grade. Students who have obtained a grade of at least 4.5 in the higher requirement course or a grade of at least 5 in the basic requirement course in the 8th grade can enroll in the higher requirement course in the 9th grade.

² All the French speaking Cantons and part of Cantons: Genève (GE), Neuchâtel (NE), Vaud (VD), Jura (JU), Fribourg (FR), Berne (BE-f), Valais (VS-f); some German speaking Cantons and parts of Cantons: Zurich (ZH), S. Gall (SG), Schaffhausen (SH), Aargau (AG), Thurgau (TG), Bern (BE-d), Basel Landschaft (BL), Wallis (VS-d); Ticino (TI), Italian speaking Canton.

mean performance, range, performance difference between groups of students, multilevel analysis to decompose variance in between-school variance (variance due to the fact that students are enrolled in one school rather than in another, that is, variance linked to the characteristics of the schools) and within-school variance (difference in performance linked to the individual students and their characteristics). Thereafter, we determine the amount of between-school variance due to the socioeconomic composition of the schools³, and the amount of within-school variance due to the socioeconomic origin of students. The analysis within Canton Ticino is also descriptive: mean and range of performances of students in basic and higher requirement courses; distribution in the higher and basic requirement courses according to gender, socioeconomic origin (lower and higher, each representing 50% of the sample) and migrant origin for very competent students (level five or six in PISA mathematics) or very weak in mathematics (below level two). We also use the selectivity index in the “orientation cycle” (8th and 9th grades) of the Scuola Media for the school year 2007/08. This index shows the proportion of social origin (lower, middle or higher) in the different tracks to the total population in the Scuola Media. The social origin variable is based on the students’ census data, and is constructed from the educational level and professional status of parents. Tracks are constructed based on the number of courses with higher requirements, basic requirements or “corso pratico” (practical course) ⁴. We use the data of school year 2007/08 because they are not collected every year, and the school year we chose is the closest for the PISA test.

Results

The analyses show that in Canton Ticino, the mean performance of grade nine students is quite good (522 score points; OECD mean of fifteen-year-old students is 498 score points), but lower than in most Cantons with an additional grade nine sample. In terms of equity, however, Canton Ticino ranks well: the range of performances (Figure 1) between the weaker (5. percentile) and most competent students (95. percentile) is, as in Canton Jura, the smallest; gender differences in performance are statistically non-significant (this happens in only two other cantons); the influence of the socioeconomic and geographic origin (non-native compared to native⁵) is weak compared to most cantons.

On the other hand, the performance difference in favor of students who normally speak the test language at home compared to students who normally speak another language at home positions Ticino in the “middle of the ranking”: in seven cantons the difference in performance between these two groups of students is smaller than in Ticino. Some cantons can rank well in terms of equity and also in terms of quality. For example, in Fribourg the average performance is 557 score points and the influence of socioeconomic origin is mild. This means that in Switzerland it is possible to combine equity and quality.

³ It corresponds to the average value of the socioeconomic index of the students in the school.

⁴ The “corso pratico” is intended for students with great learning difficulties in the subject concerned, and who are consequently exempt from regular attendance. An individual program, oriented to the specific needs of the students, is offered in place of the regular course.

⁵ “Native” students are here defined as those students born in Switzerland, with at least one parent also born in Switzerland ; “non-native” students are those born in Switzerland whose parents were born abroad, and those born abroad and whose parents were also born abroad.

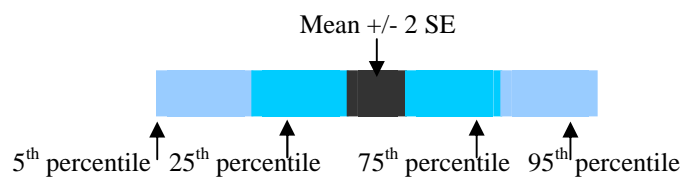
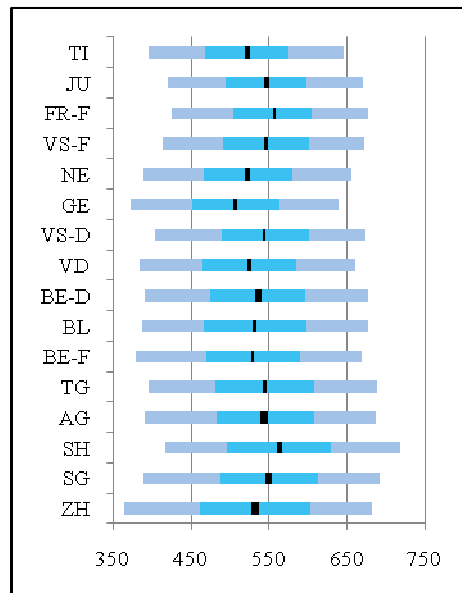


Figure 1: Students' competencies in mathematics, PISA 2006, by Canton, ranked by variation of performance (lower to higher)

In terms of equity, an important aspect is related to the variance decomposition (Figure 2): multilevel analysis shows that in fact in Ticino the between-school variance is very weak. Put simply, in terms of learning outcomes in Ticino there is no significant difference related to which school students are enrolled in. This is not surprising, and it is linked to the fact that the school system is integrative. Between-school variance is much more important in the German speaking cantons, which is partly due to the fact that in these cantons the school systems are selective. Moreover, in the German-speaking cantons a great part of the between-school variance is explained by the socioeconomic composition of the schools. This means that in these cantons the socioeconomic background of students plays a role in the tracking process: students of higher socioeconomic background are enrolled in schools with higher requirements more often than students of a lower socioeconomic background and vice versa (UST/CDPE, 2005). French cantons are partly selective, but show a mild between-school variation. This has to do with the fact that in the same school there are several tracks. In fact, between-class variation in the French cantons is higher (Nidegger, 2008).

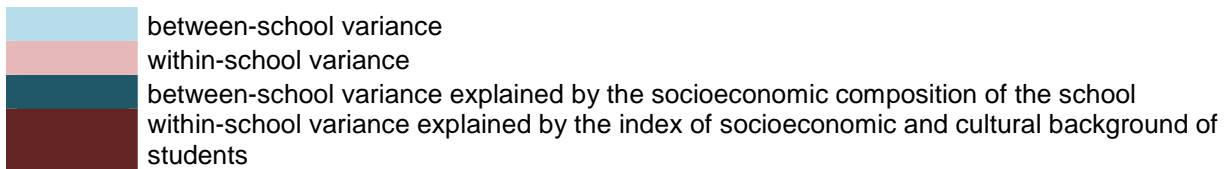
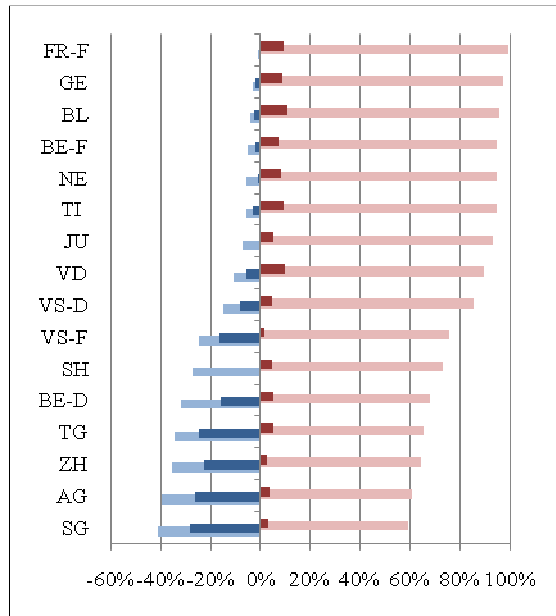


Figure 2: Between-school and within-school variance in student performance in mathematics, PISA 2006, by Canton

To enquire about the degree of equity within Ticino – assuming that competencies assessed with PISA are fundamental for adult life and that school contributes to their acquisition – we have analyzed the competencies of students according to their tracking in courses with higher or basic requirements. In Figure 3 we can see that students enrolled in the higher requirement course obtain higher average scores than students enrolled in the basic requirement course.

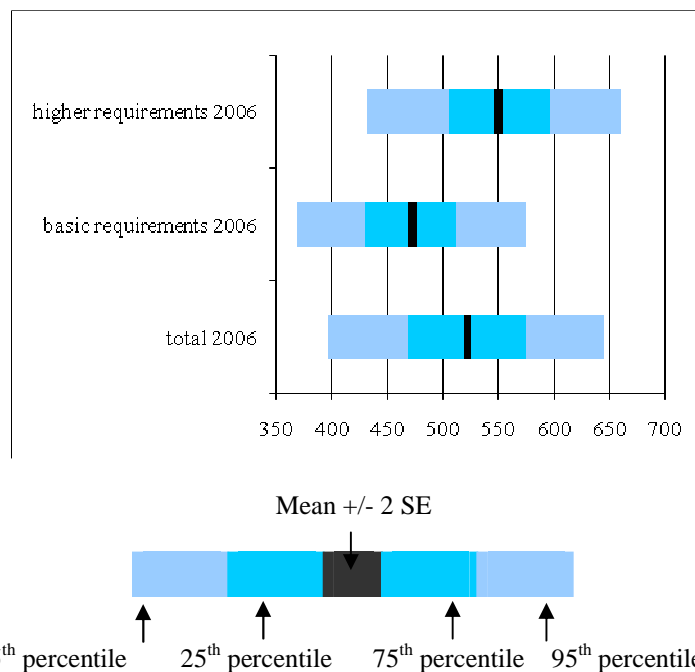


Figure 3: Students' competences in mathematics, PISA 2006, by type of course

This finding isn't surprising, but what is most interesting is the performance overlap between students of the two courses. Three quarters of the students enrolled in the basic requirement course perform at least as well as students enrolled in the higher requirement course. PISA mathematical items and the study plan of the Scuola Media coincide quite well (Origoni, 2007). Assuming that PISA gives a valid picture of students' competencies, the performance overlap reveals a problem: it indicates that students with similar competencies are enrolled in courses with different levels of requirements and thus with different chances regarding their school career, since enrollment in high school depends on the school track in the Scuola Media. Having found an overlap in competencies between students enrolled in different tracks, we decided to enquire whether variables other than real competencies play a role in the tracking process. We therefore investigated the roles played by gender and socioeconomic origin. Since we found that migrant and socioeconomic origin are related, in the sense that in Ticino students from immigrant families are of lower socioeconomic origin than students from native families⁶, we have not taken migrant origin into account. Figure 4 represents the interaction of PISA mathematical competencies (very proficient students, level five or six; low proficient students, below level two), gender, socioeconomic origin and distribution in higher requirement or basic requirement mathematics courses. A higher socioeconomic origin always represents an advantage compared to lower socioeconomic origin. In fact, students with a higher socioeconomic origin always have more chance of being enrolled in the higher requirement course, compared to students with a lower socioeconomic origin. This phenomenon is particularly strong among low proficient males. Gender, instead, seems to play a minor role, since it makes a difference only among low proficient students of higher socioeconomic origin. In this group, males have 20% more chance than females of being enrolled in the higher requirement course: in fact, 52% of males against 32% of females of higher socioeconomic origin are enrolled in the higher requirement course despite the low competencies demonstrated in PISA. This finding indicates that Ticino's school system is not completely equitable, because students with similar competencies do not have the same chances regarding their educational careers.

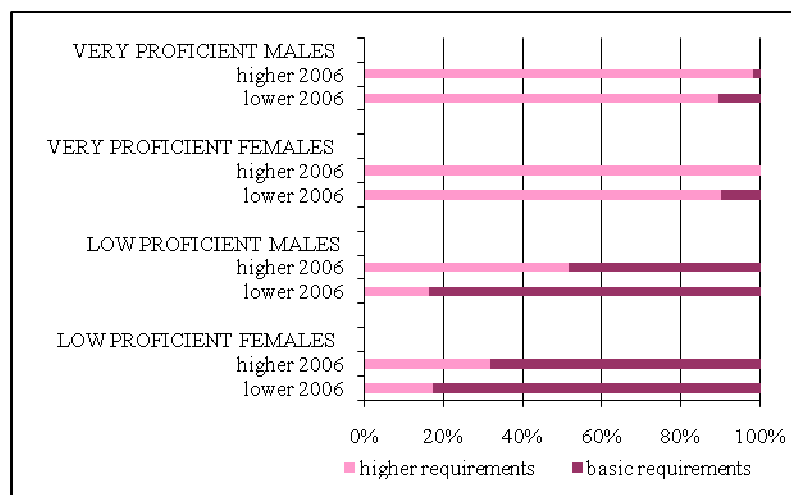


Figure 4: Interaction of PISA competencies, gender, socioeconomic origin and requirement level of the mathematics course, PISA 2006, Ticino

The selectivity index⁷ for the orientation cycle (8th and 9th grade) in school year 2007/08⁸, included in the monitoring of Ticino's educational system, confirms this finding: Figure 5 shows that students of higher social origin are overrepresented in the most demanding school track (two higher requirement courses) and quite underrepresented in the least demanding tracks (one higher requirement course, two basic requirement

⁶ The value of the index of the socioeconomic origin for students whose parents were born in Switzerland (0.45) and for students with only one parent born in Switzerland (0.42) are higher than for the students whose parents were born abroad (-.32).

⁷ When the index for a given social status in a given school track has a value of 0, the percentage of students of the given social status in the given track equals the percentage of students of that social status in the Scuola Media on the whole. When the index has a positive value, the students of the corresponding social status are overrepresented in the given track; when the value of the index is negative, students of the corresponding social status are underrepresented in the given track.

⁸ Starting from school year 2007/08 – following the 3rd Reform of the Scuola Media – only mathematics and German are subject to tracking, whereas French becomes optional in grade 9.

courses and one practical course⁹). On the other hand, students of lower social origin are overrepresented in the least demanding tracks and underrepresented in the most demanding track.

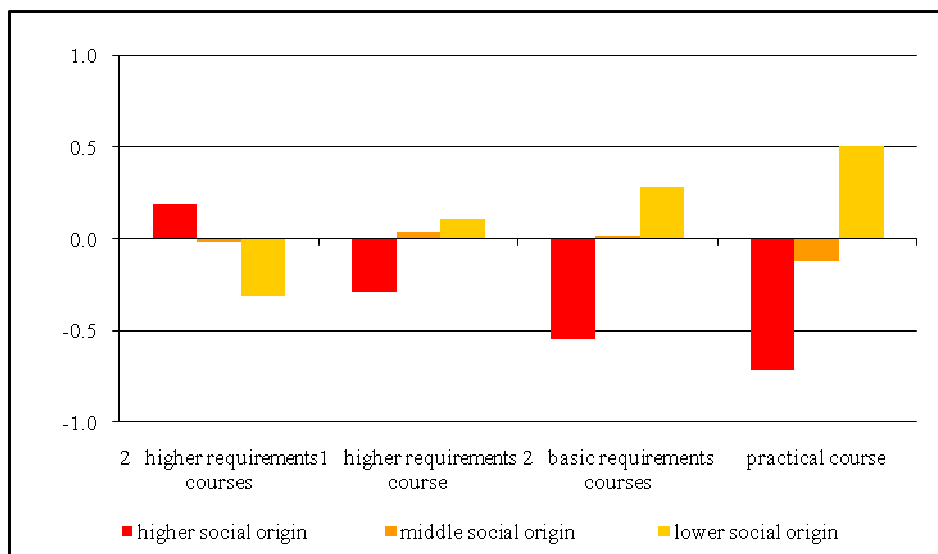


Figure 5: Selectivity index in the orientation cycle (8th and 9th grade) of the Scuola media in Ticino, by social origin, school year 2007/08

Discussion

Switzerland represents a particular case, since it is a federal state in which every canton has its own school system, each with its own peculiarities. In this article we have enquired about the degree of equity in Ticino's school system, both compared to the school system of other Swiss cantons, and within itself. Equity is an important issue, not only at an international level but also at a local level. In Ticino, equity is aimed at in the School Law. In Ticino the school system is integrative up to the end of compulsory schooling (9th grade), but tracking takes place for a few subjects (mathematics and German and, until 2006/07, also French) in 8th and 9th grade.

To enquire as to the degree of equity in Ticino, we have used PISA 2006 data, in particular the results in mathematics of 9th grade (the last year of compulsory schooling) students in the additional cantonal samples. Moreover, we have used the selectivity index for grade eight and nine, which indicates whether a social class is over- or underrepresented in a given school track.

Compared to other cantons, Ticino seems somehow more equitable: there is less variation in student performance, and background variables have a weaker impact on student performance. When we take a closer look, however, we see that the picture is not so rosy. Mathematics is subject to tracking, but students enrolled in courses with higher or basic requirements perform similarly. Moreover, students with similar mathematical proficiency are enrolled in the higher or basic requirement courses not only according to the PISA competencies: other factors, such as gender and socioeconomic origin interfere in the tracking process. This is a problem, since tracking determines, to a certain degree, the future school career. For example, access to high school, and thus to further education, is subject to having successfully followed higher requirement courses in mathematics and German. We have to acknowledge that it is highly difficult, with the information available, to ascertain the precise reasons for the fact that gender and socioeconomic origin play a role in the tracking process. On the one hand, we can suppose it is related to school/teacher attitude in the evaluation of students; on the other hand, it could be related to a different level of "ambition" of families (or students); or there could easily be other reasons leading to this result. To learn more about this we should investigate further and more deeply, for example with class and teacher observation, interviews, questionnaires and so on. Even so, it would be very difficult to test this hypothesis, since the described "mechanisms" can be partly unconscious. Another hypothesis states that PISA mathematical competencies

⁹ The practical course is intended for those students who have great learning difficulties in the concerned subject, to the extent that they are exempt from regular attendance and don't receive a grade in the subject.

are not as important as other competencies – which are perhaps more closely related to the curricular content – when it comes down to tracking (Pedrazzini-Pesce, 2003). Further investigation of the 2003 mathematical items has demonstrated that about 80% of the PISA items are covered in the Ticino curriculum (Origoni, 2007), so this hypothesis can be discarded. The PISA index of socioeconomic origin is somehow problematic: on the one hand, it is also based on students' answers to questions about their parents' jobs and education, but we realize that students often don't really know this information and/or give it inaccurately. On the other hand, these answers are recoded into ISCO codes (International Standard Classification of Occupation) of the International Labor Organization. Although coders are instructed and follow a standardized procedure, the process can be subject to errors. We therefore think that the socioeconomic index in PISA is not fully reliable. In any case, the selectivity index confirms the PISA finding that within our school systems something does not work quite as well as it should: regardless of the competence level, students from a higher social origin have more probability of being enrolled in the most demanding track, whereas students from a lower social origin have more chance of being enrolled in the least demanding tracks.

Conclusion

Even though PISA data can't tell us "all the truth", we can conclude that Ticino's school system is not totally equitable. While the PISA index of socioeconomic origin is not fully satisfactory and we can wonder if PISA competencies represent "real" competencies, we see that PISA content is well covered in our schools. We can reasonably conclude that students with a similar level of literacy in mathematics are tracked differently, and that gender, and especially socioeconomic origin, don't play a neutral role. Whatever the reasons behind it, students with equal competencies do not have the same opportunities when it comes to their educational career. We cannot say precisely how much this is due to the family/students' ambitions, to school practices, or to other factors. Nonetheless, this phenomenon should raise concern – since tracking can determine the school career – and be investigated and acted upon. If we want to continue with tracking, while at the same time pursuing equity, we should reduce the influence of background variables in the tracking process.

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