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Primary and secondary effects of social background on educational attainment in Italy. Evidence from an administrative dataset

Anna Ress and Davide Azzolini***

Abstract: The existence of social-background inequality in educational transitions is a well-established fact in Italy. However, it is still unclear the extent to which these social-background differences are due to social-group variations in previous performance (“primary effects”) rather than in decision models (“secondary effects”). This topic has been largely neglected in Italy thus far, with the only exception of Contini e Scagni (2011; 2013). We update and extend their results by exploiting a unique administrative dataset based on an entire student cohort who enrolled in upper secondary education in the province of Trento in school year 2010/11. Our results confirm that secondary effects play an overwhelmingly stronger role as compared with primary effects, especially for boys. But we also add some novel results. First, beyond transitions to general schools, we also consider transitions to vocational training courses, finding that secondary effects are even stronger in this latter case. Second, we proxy social origins using not only parental education but also social class, finding that the use of the former leads to an underestimation of secondary effects. Third, we examine interactions between school grades and social origins and find that social-background differences in general school enrollment persist even among top-performing students.

Keywords: educational transitions, Italy, social-background inequality

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Introduction

After sixty years of educational expansion, in Italy children of high educated and more affluent families are still more likely than their less privileged counterparts to undertake and successfully complete more challenging and more rewarding school careers (Ballarino & Checchi, 2006; Barone, Luijkx, & Schizzerotto, 2010). While the existence of this social-background inequality in educational attainment is well documented in Italy, we still do not know much about the possible explanations for this disparity. More precisely, it is not clear to what extent the lower educational attainment of members of less privileged social groups is due to their lower school performance rather than to the existence of social variation in choices about educational careers net of prior performance. Following Boudon (1974), the effect of social origins on children's educational attainment can be broken down into *primary* and *secondary effects*. The former, also known as performance effects, indicate the intensity to which social origins affect individuals' educational transitions through acquired performance (usually measured by standardized achievement tests and school grades). Primary effects operate through family influences on children and thus via the transmission of genetic traits but also through environmental conditions and the daily interactions between parents and children, with the former transmitting to the latter sociocultural resources that are key for the cognitive and non-cognitive development since the early years. In turn, secondary effects (or, choice effects) are defined as those social differences in educational attainment that still persist even after holding previous performance equal across groups. The assumption here is that social background affects sensitivity to direct and indirect costs associated with educational investments as well as aversion to risk. As a result, members of more privileged social groups are expected to be more inclined to invest in longer periods of education versus the less privileged ones, also to prevent downward intergenerational social mobility (Erikson & Jonsson, 1996).

In this paper we assess the weight of primary and secondary effects in Italy. We focus on a crucial transition in educational careers, i.e. the passage from lower to upper secondary education. At the age of 14 years, upon completion of lower secondary education, students are faced with a choice between four main branches: general schools (*licei*), technical schools (*istituti tecnici*), vocational schools (*istituti professionali*) and

vocational training courses (*formazione professionale*). As extensively demonstrated in the literature, this choice exerts important consequences on individuals' future occupational and life outcomes; especially, general schools are *de facto* the main gateway to tertiary education (Barone, 2012).

Whereas the empirical literature on primary and secondary effects is quite rich in several European countries (Erikson & Jonsson, 1996; Jackson et al., 2007; Stocké, 2007; Kloosterman et al., 2009; Erikson & Rudolphi, 2010; Jackson, 2013), empirical evidence on this topic is scanty for the Italian case. The main reason of this shortcoming is the lack of data combining educational choices, previous performance and detailed information about students' family of origin. A pioneering study on the topic is the one of Contini and Scagni (2011; 2013). The authors analyze transitions to upper secondary education of four student cohorts during the 1990s and show that secondary effects play a very important role on educational choices in Italy. According to their estimates, secondary effects explain between 50 and 70 percent of the differences between social groups in educational transitions, while in several other European countries their weight is much smaller (Erikson, 2007; Jackson et al., 2007).

With this contribution, we aim to provide new empirical evidence on the topic and to extend Contini and Scagni's conclusions with regard to some key points. To this purpose, we use a rich school administrative database relative to an entire student cohort who experienced the transition from lower to upper secondary education in the school year 2010/11 in the province of Trento, in Northern Italy. While there are some limitations of generalizability of the results to the national level, we believe that these are largely compensated by the fact that we rely upon high-quality administrative data collected yearly on the entire population of students enrolled in the educational system, thus allowing us to investigate students' educational trajectories in a longitudinal fashion.

Overall, our analysis provides several confirmations of Contini and Scagni's results. The weight of primary effects is substantially smaller than in other European countries and secondary effects seem to play the lion's share, especially for boys. These are important confirmations, as they refer to a student cohort which is roughly 10 years younger than those examined by Contini and Scagni, demonstrating that patterns of educational inequality are persistent over time.

With this work we also provide a number of extensions to the work of Contini and Scagni. First, we examine not only the transition to general

schools but also to vocational training courses. We believe that this is an important contribution to extant literature because social-background disparities are particularly pronounced with regard to enrollment in vocational training courses (Barone, 2012) and also because these courses represent a quickly growing segment of the secondary education system (Barone, 2012; Isfol, 2012). In this view, analyzing a context such as the province of Trento - where vocational training courses have long represented a large component of the education system - could yield some important insights for the national level as well. Specifically, as we are going to see, our results indicate that secondary effects are even more pronounced when considering transition to vocational training courses instead of general schools.

Second, in addition to parental education we also consider family social class. The use of this latter indicator of social origins does not alter our conclusions. But our results, in line with other studies (Holm & Jæger, 2013), seem to suggest that secondary effects are slightly stronger if we use social class rather than parental education, especially for boys' transitions to general schools.

Finally, our work examines the existence of interaction effects between social origins and previous performance on educational choices. Results are of some interest for they show that social inequalities are markedly reduced at high grades with regard to enrollment in vocational training courses but that the same does not happen clearly when considering transitions to general schools. This suggests that, among top-performing students, children from more disadvantaged backgrounds have much higher propensity to enroll in technical schools as compared with their peers from more affluent families or better educated parents.

The paper is organized as follows. In the next section we review the relevant literature on primary and secondary effects and the state of the art in Italy. In the following section we describe the context of the analysis as well as the data and the variables employed. In the fourth section we present and comment our findings. In the last section we conclude by drawing some substantive and policy considerations.

Primary and secondary effects: a review of the literature

The existence of social inequality in educational attainment is a well-

documented fact. Education and occupational class of parents have a significant impact on youths' schooling in many European countries (Shavit & Blossfeld, 1993; Erikson & Jonsson, 1996; Breen et al., 2009), as well as in Italy (Cobalti & Schizzerotto, 1994; Ballarino & Schadee, 2008; Barone et al., 2010; Checchi, 2010). In Italy, children born to highly educated or affluent families enjoy higher chances to enroll in general schools after completing lower secondary education, whereas children from less privileged backgrounds show higher transition rates to vocational training courses. This transition is not trivial. Although school tracks cannot be ordered hierarchically, obtaining a general school degree versus a technical or a vocational one greatly increases individuals' chances to continue studies at the tertiary level and to gain access to more rewarding and more stable occupational positions in the future (Barone, 2012).

Social-background inequality in educational attainment can be understood as a product of two separate mechanisms, called "primary effects" and "secondary effects" (Boudon, 1974). Primary effects express the association between social origins and individuals' educational choices mediated by cognitive and academic performance and originate from the fact that children of more educated and privileged families tend to achieve higher performance and competences and to do better in school than children of disadvantaged families (Erikson & Jonsson, 1996). Those differences are in part due to the transmission of genetic traits, which affect - interactively with environmental factors - children's cognitive and non-cognitive skills (APA, 1995; Cunha et al., 2006), but also to the combined action of a number of sociocultural resources (Althusser, 1970; Bourdieu & Passeron, 1970; Jackson et al., 2007; Jackson, 2013) made available to children since the early years of life.

In turn, secondary effects identify those educational attainment differences between social groups that still persist after holding previous performance equal across groups. Secondary effects are generated by socially structured differences in sensitivity and perceptions about costs and benefits of educational investments as well as in perceived risks associated with the expected probability of their children's success. According to this model, secondary effects also identify higher classes' aversion to

downward intergenerational mobility (Erikson & Jonsson, 1996; Goldthorpe, 1996)¹.

The behavioral model underlying the “primary/secondary effects” framework assumes that, first, students achieve some scholastic results and, second, that students (and their families) make their educational decisions based on prior results and on their social positioning. We should recall, however, the potential bias coming from “anticipatory decisions” (Jackson et al., 2007; Jackson, 2013). There exists a possibility that parents of higher (lower) socio-economic status invest more (less) to support their children in early school years in accordance with the aspirations that they place on their future school careers. Put differently, parents might be pushed to invest more in their children’s cognitive development in order to increase their chances to gain access to the most challenging and rewarding schools. If this hypothesis holds true there is a risk to underestimate secondary effects (Jackson et al., 2007). Fortunately, in Italy the potential bias coming from anticipatory decisions is likely to be narrow, as that the Italian education system is not a selective one and access to any upper secondary school branch is not officially conditioned on prior outcomes (Jackson, 2013).

Net of this potential bias, decomposing social-background differentials in educational attainment in primary and secondary effects is crucial to enhance the understanding on how inequalities generate and develop. As it appears from abundant research, high-class children are systematically attaining higher educational levels than their lower-class peers, even after accounting for prior performance (Jackson, 2013; Erikson & Jonsson, 1996; Erikson & Rudolphi, 2010; Jackson et al., 2007). However, in many countries primary effects seem to be the strongest driver of inequality in educational attainment. In the UK, primary effects are found to account for a large share of class differentials in educational transitions (between 50 and 75 percent) (Jackson et al., 2007). In Sweden and the Netherlands, the relative weight of primary effects is estimated around 60 percent (Kloosterman et al., 2009; Erikson & Rudolphi, 2010) whereas in Germany is around 50 percent (Stocké, 2007).

In Italy, the topic has not been sufficiently studied yet, essentially because of lack of adequate data. A notable exception is represented by the

¹ In addition, it shall not be neglected the potential role played by students’ significant others outside the family (Akerlof, 1997).

work of Contini and Scagni (2011; 2013). The authors use survey data from the National Office of Statistics (Istat), integrated with Ministry of Education and IARD data and analyze transitions to upper secondary education in the 1990s of four cohorts born between 1976 and 1985. According to these authors, secondary effects have a predominant role in accounting for social differentials in educational transitions in Italy. The impact of school performance (as measured by the lower secondary school final grade) on upper secondary education choices is estimated at about 30 percent for males and about 40 percent for females, thus much smaller than in other Central-Northern European countries (Contini & Scagni, 2011). It shall be noted that the low relative weight of primary effects does not imply that they are weak in absolute terms, but, overall, the take-away message coming from the literature is that secondary effects might be the reason for the particularly high social inequalities in educational opportunities found in Italy as compared with other European countries (Jackson & Jonsson, 2013).

As already mentioned, our goal is to provide a further empirical test and to update Contini and Scagni's results. We also aim to extend the literature with regard to three aspects: a) we ask whether and how results change if we consider transitions to vocational training courses, and not just to general schools; b) we assess what changes if we use social class and not only parental education as an indicator of social origins; c) we investigate whether social-background differentials in transition rates to both general schools and vocational training courses change at the different grades. This latter question will help better disentangle the interactions between social origins and previous performance in forming educational choices, and therefore help us understand if social-background differences persist even among top-performing students.

Research design

The context of the analysis

We use school administrative data from the *Anagrafe Unica degli Studenti della Provincia Autonoma di Trento (AUS-PAT)*. The data cover an entire school cohort which successfully completed lower secondary school in school year 2009/2010 and transitioned to upper secondary education the following year in the province of Trento. The data comprise 5.751

students leaving from 90 lower secondary schools and enrolled in 52 upper secondary schools or vocational training centers.

Before proceeding to a detailed description of the data, some considerations are in order with regard to the internal and external validity of our analysis. The limited scope of this study implies some weakness in terms of generalizability of the results to the national level. The province of Trento differs from the rest of the country, especially from the Southern regions, with regard to the overall economic structure and relatively high living standards. Moreover, the province of Trento enjoys higher degree of autonomy with regard to several policy domains, included education. This is also reflected in higher average student outcomes: dropout rates and grade retentions are lower than the national average (Amistadi et al., 2010; Ministero dell'Istruzione, 2011a; 2011b) and students' performance as measured by standardized tests is well above the national average whereas it is more similar to other Northern-Italian regions like Lombardia and Veneto (Gentile, 2009; Martini & Rubino, 2011).

Nonetheless there are some key features of the education system which are common both in the province of Trento and in the rest of the country. First, the organizational structure of the education system is the same as it comprises four main branches: general schools (*licei*), technical schools (*istituti tecnici*), vocational schools (*istituti professionali*) and vocational training courses (*formazione professionale*). Also, upper secondary school participation rates are similar to the national average (Opes, 2009). The remarkable difference lies in the higher share of students enrolled in *formazione professionale* in the province of Trento as compared with many other areas of the country (Cpvse, 2010). This is an aspect of greater distinction but, at the same time, it is also one of the strengths of our case study, for participation to vocational training courses has been continuously expanding at the national level in the past years (Isfol, 2012). Hence, this case study allows us to provide some results which might be of some interest for the national level in the upcoming years. Second, and most important to the purpose of our work, practically no differences exist in the magnitude of social inequality in education between the province of Trento and Italy, as also found in Gentile (2009), Martini and Rubino (2011) and Opes (2009; 2011). Table 1 shows that social-background differences in the province of Trento are comparable to those found in the rest of the country, both considering standardized tests, lower secondary education final grade and upper secondary school participation.

Table 1. Social-background differentials in educational outcomes in the province of Trento and in Italy

	Scores on standardized achievement tests Primary school - Fifth Grade*		Lower secondary education final exam grade**	Participation in upper secondary education***	
	Math	Italian	Excellent	General school	Not enrolled
<i>Parental education</i>					
“Tertiary education” vs “Lower secondary education”					
Trentino	+0.77	+1.04	+25.7	+53.7	-18.9
Italy	+0.63	+0.81	+28.9	+55.0	-17.3
“Salariat” vs “Working class”					
Trentino	+0.50	+0.59	+7.8	+37.2	-7.9
Italy	+0.46	+0.57	+13.7	+38.8	-11.3

*Group differences on mean Rasch-scaled scores. For both domains means and standard deviations were set at .067 and 1.04, respectively. Source: Own elaborations on Invalsi-SNV 2009/2010.

** Percentage-point differences between groups in the probability of obtaining “excellent” on the final exam (school year 1995/96). Source: Own elaborations on Istat - I Percorsi di studio e di lavoro dei diplomati 2004. Data refer to the region Trentino-Alto Adige.

*** Group differences in the probability of general school enrollment and not being enrolled in any school among 15-19 year olds who have successfully completed lower secondary school. Source: Own elaborations on Istat - Indagine Continua sulle Forze di Lavoro 2005-2011. Data refer to the region Trentino-Alto Adige.

Data and variables

The AUS-PAT presents several advantages in terms of quality of the data. First, the database comprise the whole student population enrolled in the education system. The census nature of the data allows us to overcome well-known problems of educational surveys regarding sampling errors. Second, data are longitudinal, for each student is followed on a yearly basis throughout her entire school career within the province of Trento. This allows us to rely on real-time information and not on retrospectively collected information. Third, the AUS-PAT is an administrative data source based on official data, collected and controlled systematically by school offices. This implies that measurement errors are strongly limited. Key information such as grades and school enrollments are not reported by the respondents, but are registered yearly by school offices. In addition, students’ demographic information is obtained directly from the tax codes

(*codici fiscali*) of both the students and their parents, this greatly reducing issues of *misreporting*. The data coverage reaches 100 percent of the students who have successfully completed lower secondary education in the school year 2009/10 and who enrolled in upper secondary school in the following year².

Our dependent variable identifies the type of school each student is enrolled at in school year 2010/11, one year after completion of lower secondary education. We classify schools as following: general schools, technical schools, vocational schools and vocational training courses. However, in most of our analyses we focus only on general schools and vocational training courses, as it is on these two branches that social inequalities are more prominent.

Regarding the independent variables employed in the analyses, our data made us possible to track down prior performance information for all students who enrolled in upper secondary education. We measured performance with the grade obtained on the final exam of lower secondary education in school year 2009/10³. Grades are expressed in a numerical form, ranging from six to ten, but in our analyses, to account for its non-normal distribution, we treat this information as categorical⁴. To measure family social background we use information collected by school offices through students' registration forms. We code parental education, using the dominance criterion, thus assigning to the family the highest level reached by any of the two parents, or by the only adult living with the student. Our variable has four categories: tertiary degree, upper secondary education diploma, vocational qualification and lower secondary education certificate or lower. Parental education is distributed as follows: tertiary education (14.8 percent), upper secondary education (41.1 percent), vocational

² We do not consider students who did not make the transition from lower to upper secondary education because not admitted (about 3 percent of students, according to Ministero dell'Istruzione, 2011a), nor the very few cases who enrolled in a school outside the province. We also do not consider students who completed lower secondary education outside the province because we have no information on the lower secondary school's final grade.

³ We could not use INVALSI test scores of the students due to the large number of missing values.

⁴ It should be noted that this grading system was introduced in school year 2007/08 and therefore lower secondary school final grade was classified differently (Sufficient, Good, Very good, Excellent) at the time when Contini and Scagni (2011; 2013) carried out their investigations.

qualification (22.7 percent), lower secondary education certificate or lower (21.4 percent). We apply the dominance criterion also to classify students into the EGP social class scheme (Erikson et al., 1979) adapted to four categories, as in Opes (2011). Social class is distributed as follows: the salariat (large entrepreneurs, professionals and managers), 12.4 percent, intermediate employees (38.1 percent), small employers and self-employed (15.9 percent), working classes (lower technical and routine occupations) (33.6 percent)⁵.

As described in the following sections, we analyze the data by the means of decomposition techniques and multinomial logistic regressions and present results in the form of predicted probabilities. All analyses are carried out separately by gender in light of the strong differences in performance and in educational choices of boys and girls (Sartori, 2009; Contini & Scagni, 2011). Finally, models also include a dummy for students' area of residence (urban vs rural area) which allows for possible disturbance related to geographically differentiated sets of available school options.

Results

Lower secondary school grade and transitions to upper secondary education

Descriptive analyses reported in Tables 2 and 3 show that there exist large differences between social groups, both in grades and in educational choices. Children of low-educated parents have higher probability of choosing vocational training courses (one out of three females and almost one out of two males), whereas only a small minority (5.5 to 7.4 percent of

⁵ Information on these two variables was not transmitted from school offices for 25% of the students: however, this information is very accurate, as supplied directly by the parents at the time of registration of the student. To ensure that the presence of these missing data does not bias our estimates we carried out several robustness checks: a) we verified that the two variables' distributions do not depart significantly from estimates obtained from other sources (e.g., Italian Labour Force Survey); b) we also checked that the estimates of our parameters of interest obtained using multinomial logistic regression models do not change significantly if we include missing as a separate category or if we exclude them from the analysis; c) finally, Tables 2 and 3 show that the cases for which we do not have information on family origins are distributed quite similarly to the entire population with regard to grades and school choices.

girls and boys, respectively) makes the same choice among children of high-educated parents (Table 2).

Table 2. School choices of students after lower secondary school, by parental education, social class and gender (% , school year 2010/11)

	Academic school	Technical school	Vocational school	Vocational training	Academic school	Technical school	Vocational school	Vocational training
	Males (N = 2.994)				Females (N= 2.757)			
<i>Parental education</i>								
Tertiary education	59.8	28.6	4.2	7.4	78.3	9.2	7.0	5.5
Upper secondary education	28.2	50.1	3.7	18.0	60.7	22.8	6.4	10.1
Vocational qualification	14.4	45.8	5.7	34.1	41.5	31.2	7.9	19.4
Lower secondary education	9.3	42.1	2.9	45.7	36.3	22.8	6.9	34.0
Missing cases	26.9	36.8	5.4	31.0	49.5	19.4	9.0	22.1
<i>Occupational class</i>								
Salariat	49.8	34.3	4.4	11.6	67.2	18.4	6.3	8.2
Intermediate employees	30.2	49.8	4.5	15.5	60.9	21.6	7.7	9.9
Small employers and self-employed	22.2	42.7	4.3	30.8	44.8	30.4	6.2	18.6
Working class	11.6	42.3	3.6	42.5	39.5	23.6	6.8	30.1
Missing cases	29.9	36.2	5.1	28.8	53.0	18.5	8.8	19.7
Total	26.4	41.9	4.4	27.3	52.3	21.9	7.5	18.3

Source: Own elaborations on AUS-PAT.

Similarly, more than 40 percent of male students and about 30 percent of girls who belong to the working class enroll in vocational training course, while among higher classes this only happens in 11.6 percent of boys and in 8.2 percent of the girls. Transition rates to general schools

reach almost 60 percent among boys and 80 percent of girls among those who have high-educated parents, while less than 10 percent of the boys and slightly more than one-third of the girls enroll to general schools if their parents are low educated. Equally large differences are detected when comparing children of the highest and the lowest classes. Smaller differences are found with respect to the choice of technical schools, while vocational schools clearly represent a marginal segment. Table 3 shows that lower secondary final grade is highly dependent on both parental education and social class and for both girls and boys.

Table 3. Lower secondary school final grade distributions by parental education, social class and gender (% , school year 2009/10)

	6	7	8	9	10	6	7	8	9	10
	Males (N = 2.994)					Females (N= 2.757)				
<i>Parental education</i>										
Tertiary education	19.0	24.7	21.1	19.6	15.5	7.7	16.2	23.2	27.9	25.0
Upper secondary education	30.9	24.7	22.7	15.1	6.6	18.0	21.6	23.5	22.8	14.0
Vocational qualification	46.4	30.7	12.9	7.8	2.1	22.3	31.4	23.4	15.3	7.6
Lower secondary education	59.0	22.4	12.9	3.8	1.8	41.4	27.8	17.0	8.3	5.5
Missing cases	42.8	23.3	18.8	10.9	4.3	28.9	27.9	17.9	17.4	7.9
<i>Occupational class</i>										
Salariat	24.7	26.7	22.7	15.1	10.8	12.9	18.8	25.8	24.6	18.0
Intermediate employees	29.6	24.1	22.3	15.4	8.7	15.2	23.4	22.5	22.9	16.0
Small employers and self employed	42.4	27.7	16.1	10.1	3.7	24.8	26.1	20.9	17.0	11.1
Working class	53.6	26.3	12.2	6.3	1.7	36.3	27.0	20.0	11.6	5.1
Missing cases	40.9	22.9	19.5	11.9	4.9	26.9	28.1	18.4	17.8	8.8
Total	39.7	24.9	18.4	11.5	5.5	24.4	25.4	20.9	18.3	11.0

Source: Own elaborations on AUS-PAT.

Children of high-educated parents have much higher likelihood of obtaining the highest grades (15 percent among boys and 25 percent among girls) than those with low-educated parents (2 percent among boys and 5.5

among girls). Roughly similar differences are detected when using social class instead of parental education as an indicator of social origins.

Decomposing the effects of social background on educational transitions: the contribution of primary and secondary effects

In the previous section we have shown that social background is associated with highly pronounced differences in educational choices and in lower secondary school final grade. Now we try to assess the extent to which the former are explained by the latter. Put it differently, we try to break down social differentials in educational transitions in a component due to past performance (primary effects) and a component due to choices (secondary effects).

To pursue this goal we apply the technique of non-linear decomposition developed by Fairlie (2003). This technique is based on binomial logistic regression models, and therefore it is in line with the approach followed with most of the studies conducted on this topic (see section 2). However, in contrast with these studies, which present results in terms of odds ratios, we follow Morgan (2012) and base our decompositions on predicted probabilities, as they are more easily interpretable. To estimate Fairlie's model, we classify our dependent variable so that it takes the value 1 for those who enrolled to general schools and 0 for all other choices, and we do the same for vocational training courses.

Then, we compare each social group, identified by either parental education or social class, with the relative most advantaged group. For example, we compare transitions of children of parents holding only a lower secondary education certificate with their peers with tertiary-educated parents; similarly, we compare children of self-employed to children of the high class, and so forth. In addition, we estimate separate models for males and females to account for gender variation in educational choices, and control in all models for the area of residence (urban vs. rural area) to allow for possible geographical constraints to school choices. Additional models (not shown) also included schools fixed effects in order to allow for variability in grading across schools as well as student immigrant status: neither of these additional models retrieved different estimates from those presented below.

In formal terms, we estimate the following equation:

$$\bar{Y}^{\text{High}} - \bar{Y}^{\text{Low}} = \left[\sum_{i=1}^{N^{\text{High}}} \frac{F(X_i^{\text{High}}; \beta^{\text{High}})}{N^{\text{High}}} - \sum_{i=1}^{N^{\text{Low}}} \frac{F(X_i^{\text{Low}}; \beta^{\text{High}})}{N^{\text{Low}}} \right] + \left[\sum_{i=1}^{N^{\text{Low}}} \frac{F(X_i^{\text{Low}}; \beta^{\text{High}})}{N^{\text{Low}}} - \sum_{i=1}^{N^{\text{Low}}} \frac{F(X_i^{\text{Low}}; \beta^{\text{Low}})}{N^{\text{Low}}} \right]$$

(1)

where Y^{High} and Y^{Low} identify general school (or vocational training courses) enrollment of children of parents with high and low social background, respectively. N^{High} and N^{Low} represent the size of the two groups; X^{High} and X^{Low} are grades obtained on the final exam of lower secondary education; β^{High} and β^{Low} are vectors of coefficient estimates (grades) obtained with a logistic regression estimated on the two groups. Therefore, the difference in enrollment rates to general schools (or vocational training courses) between social groups ($Y^{\text{High}} - Y^{\text{Low}}$) is given by a component explained by previous grades (primary effects) and a second component which is unexplained by grades and thus identifies secondary effects⁶.

The first term on the right side of the equation (primary effects) compares transition rates of the two groups (High and Low) fixing the β coefficients, i.e. applying to both groups the β coefficients of the reference group (High). The second term (secondary effects) compares transitions of the two groups leaving the coefficients free to vary but fixing grades, that is, using the grade distribution of the most socially disadvantaged group (Low).

We replicated the analysis estimating equation (1) but inverting the groups, i.e., using Low as the reference group, and thus fixing the coefficients using β^{Low} on the left term and X^{High} in the right term. No substantial differences were found between the two methods. However, in line with most literature, in Table 4 we present and comment primary and secondary effects obtained by averaging the estimates of the two decomposition methods.

⁶ It shall be acknowledged that our estimates of secondary effects may also include the effect of unobserved factors which might affect educational transitions and not be related to social background (Morgan, 2012). One of these factors could be students' spatial distribution and consequent different access to educational alternatives. To reduce this possible source of bias, all models control for area of residence (urban vs. rural).

In Table 4 results of these decompositions are displayed. For each comparison the estimates of the total differences between the groups as well as the absolute and relative contributions of primary and secondary effects are reported. For example, the difference in general school enrollment between sons of tertiary and upper-secondary educated parents amounts to 30 percentage points. It is a very large difference: a chance for a boy to enroll to a general school shifts from 30 percent if his parents have a diploma, up to 60 percent if at least one of the parents owns a university degree. Prior performance accounts for 27 percent of this difference, whereas the remaining 73 percent is due to secondary effects. In other words, if sons of medium-educated parents had the same grade distribution of sons of high-educated parents, the gap between the two groups in the probability of general school enrollment would be reduced by slightly more than one fourth. If we look at the other comparisons reported in Table 4 (tertiary education vs vocational qualification and tertiary education vs. lower secondary school certificate), differences between social groups in the transition to general schools are, as expected, even larger. At the same time, also the absolute and relative weight of primary effects increase, confirming the importance of social background on individuals' cognitive development and scholastic performance.

If we turn our attention to girls, social-background differences are visibly smaller. This is mainly due to the lower absolute weight of secondary effects and not to the smaller weight of the primary effects - the latter appear almost identical across the two genres, as also demonstrated in Contini and Scagni (2011). In particular, secondary effects account for less than 50% of the educational disadvantage of girls from lower social backgrounds. Thus, family social background seems to play a bigger role if the child is male. We might think of two different interpretations of this result. First, female educational attainment might have grown less and less dependent from social origins because of the steady expansion of female school participation occurred in the past two decades (Sartori, 2009). According to this explanation, families, regardless of their socioeconomic status, would find it more profitable to push their daughters toward a greater investment in education in order to compensate for the disadvantage they are expected to face in the labor market (Schizzerotto & Barone, 2006).

An alternative explanation has to do with the strong horizontal gender segregation in the education system, which leads girls to opt for more

“feminized” fields of studies (Barone, 2010). Especially in a sociocultural context where traditional gender roles still prevail, the presence of these highly feminized schools may partially mitigate the influence of social origin on girls’ educational choices. In additional analyses (not shown), we have an empirical confirmation of this horizontal segregation. Within the general branch, only one-third of the girls are enrolled in scientific paths, while two out of three girls opt for classic, linguistic or socio-humanistic curricula. In turn, three out of four males prefer scientific curricula (which ensure higher likelihood to access more rewarding fields of studies at tertiary level).

Table 4. Primary and secondary effects of parental education and social class on the transitions to general schools and vocational training courses, by gender (school year 2010/11)

	General schools				Vocational Training Courses			
	Male		Female		Male		Female	
	Abs.	Rel.	Abs.	Rel.	Abs.	Rel.	Abs.	Rel.
<i>Parental education</i>								
Tertiary education (ref.)	0.600		0.780		0.074		0.055	
Tertiary education vs. Upper secondary education								
Total difference	0.301		0.175		-0.099		-0.045	
Primary effects	0.081	27.0%	0.083	47.4%	-0.010	10.3%	0.009	-21.5%
Secondary effects	0.220	73.0%	0.092	52.6%	-0.089	89.7%	-0.054	121.5%
Tertiary education vs. Vocational qualification								
Total difference	0.434		0.355		-0.266		-0.133	
Primary effects	0.159	36.6%	0.150	42.3%	-0.032	12.2%	0.022	-16.5%
Secondary effects	0.275	63.4%	0.205	57.7%	-0.234	87.8%	-0.155	116.5%
Tertiary education vs Lower secondary education								
Total difference	0.495		0.419		-0.361		-0.278	
Primary effects	0.198	39.9%	0.222	53.0%	-0.097	26.8%	-0.039	14.0%
Secondary effects	0.297	60.1%	0.197	47.0%	-0.264	73.2%	-0.239	86.0%

Primary and secondary effects of parental education and social class on the transitions to general schools and vocational training courses, by gender (school year 2010/11) (continued)

	General schools				Vocational Training Courses			
	Male		Female		Male		Female	
	Abs.	Rel.	Abs.	Rel.	Abs.	Rel.	Abs.	Rel.
<i>Social class</i>								
Salarial (ref.)	0.498		0.609		0.116		0.082	
Salarial vs Intermediate employees								
Total difference	0.191		0.065		-0.038		-0.017	
Primary effects	0.020	10.4%	0.025	37.7%	-0.006	16.3%	-0.005	27.8%
Secondary effects	0.171	89.6%	0.041	62.3%	-0.032	83.7%	-0.012	72.2%
Salarial vs Small employers and self-employed								
Total difference	0.246		0.212		-0.166		-0.101	
Primary effects	0.093	37.7%	0.079	37.5%	-0.036	21.9%	-0.026	25.9%
Secondary effects	0.153	62.3%	0.132	62.5%	-0.130	78.1%	-0.075	74.1%
Salarial vs Working class								
Total difference	0.365		0.273		-0.300		-0.220	
Primary effects	0.130	35.6%	0.175	64.1%	-0.077	25.7%	-0.054	24.5%
Secondary effects	0.235	64.4%	0.098	35.9%	-0.223	74.3%	-0.166	75.5%

Source: Own elaborations on AUS-PAT.

Note: Estimates are net of area of residence (urban vs. rural)

Overall, our results confirm those obtained by Contini and Scagni (2011; 2013), to the extent that we find that prior performance systematically explains less than half of the social-background differences in transition to general schools when using education of the parents as a proxy for social origins. If we use a different indicator of social origins, such as social class, conclusions do not change greatly but secondary effects appear to be even more pronounced, especially for boys. This result is not surprising for two reasons. First, it is likely that the cultural level of the parents - which is better captured by their education - has a greater impact on children's school performance (primary effects) as compared to that of economic resources. Second, it is also reasonable to expect that social class better captures the set of constraints and opportunities within which families form their educational decisions (secondary effects). Regardless of the indicator employed, we confirm that in Italy primary effects play a relatively small contribution. The right side of Table 4 shows

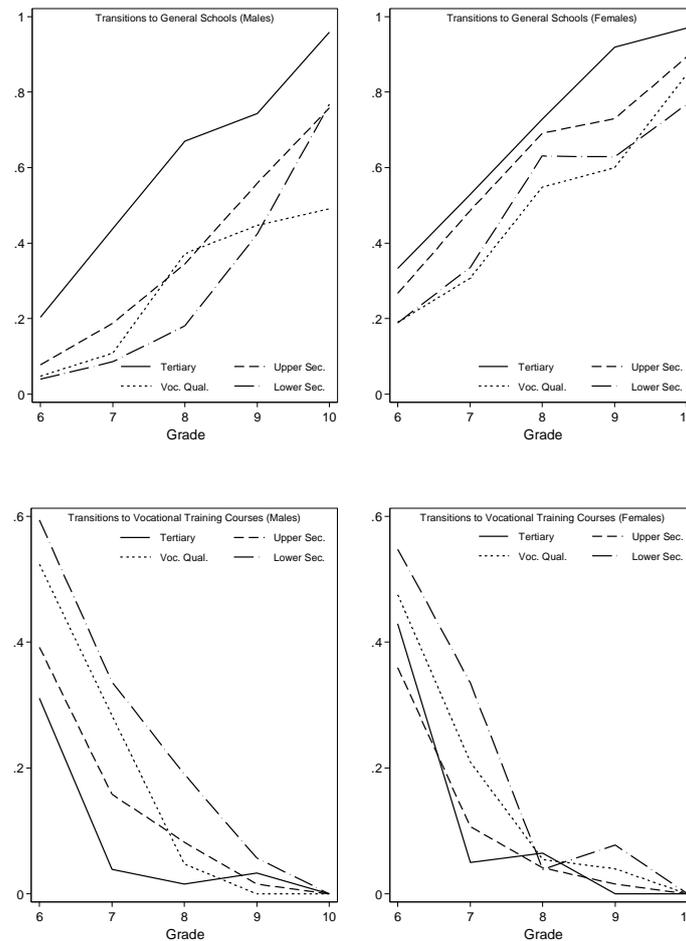
that this conclusion applies even more so for transitions to vocational training courses. With regard to enrollment to vocational training courses, differences between social groups seem to be even less due to variation in previous grades and even more so to families' choices. While primary effects explain between 27.0 and 39.9 percent of the differences in boys' transitions to general schools, these vary between 10 and 26.8 percent for transitions to vocational training courses.

For girls, primary effects are even negative in some cases, indicating that if girls from lower social strata had the same grade distribution as girls from higher classes, they would face even higher risk to enroll in vocational training courses. This result may be due to the very small variability in grades among those students who opt for vocational training courses but, as we shall see in the next section, it could also be a consequence of the fact that social-background differences on this transition are rather unstable across grades, especially among girls.

Interaction effects between social background and school performance

After estimating primary and secondary effects on upper secondary school transitions, in this section we ask if social background and school grades interact in determining transition rates to general schools and to vocational training courses. Figures 1 and 2 show these interaction effects, estimated separately for males and females. Predicted probabilities have been obtained from multinomial logistic regression models that include interactions between lower secondary education grade and the two socioeconomic variables of interest, parental education and social class, controlling for the geographic area of residence. For all social groups, and for both girls and boys, it is evident that the higher the grades, the higher the likelihood to enroll in general school and the lower the risk to enroll in vocational training courses. However, there are some variations worth to be discussing more closely. First, Figures 1 and 2 make apparent that social disparities in general school enrollment do not disappear even among top-performing students. This is particularly evident when looking at parental education (Figure 1).

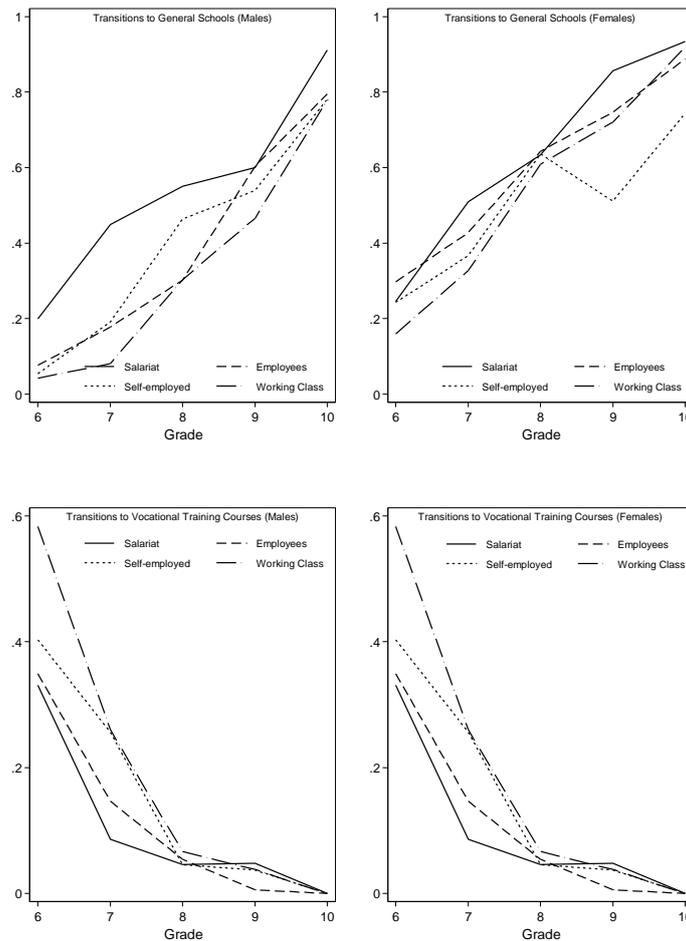
Figure 1. Interaction effects between parental education and lower secondary school final grade on the transition to general schools and vocational training courses, by gender (school year 2010/11)



Source: Own elaborations on AUS-PAT.

Note: Predicted probability from multinomial logistic models which control for area of residence (urban, rural). Complete models are available on request.

Figure 2. Interaction effects between social class and lower secondary school final grade on the transition to general schools and vocational training courses, by gender (school year 2010/11)



Source: Own elaborations on AUS-PAT.

Note: Predicted probability from multinomial logistic models which control for area of residence (urban, rural). Complete models are available on request.

Among low-performing students (grade “six”), sons of tertiary-educated parents show a probability of 20 percent to enroll in a general school,

compared to less than 10 percent of the children of parents who have only achieved a vocational qualification or have not continued their studies beyond lower secondary education.

These differences are rather stable even among better-performing students. Children of high-educated parents who achieve the highest grade (10) have more than 95 percent chances to enroll in a general school, whereas equally high-performing students whose parents have attained lower educational levels hardly reach 75 percent chance of getting into a general school and this percentage shrinks even below 50 percent for children whose parents hold a professional qualification. Unexpectedly, the “disadvantage” of this latter group even increases if prior performance increases, indicating that at high grades these students might opt for a technical education. Beyond the overall higher propensity for girls to opt for a general school, trends are similar for both sexes. If we look at social class, differences between groups tend to cancel out at high grades, with the only exception of girls belonging to small entrepreneurs’ families, who show low propensity to general school enrollment even at top grades.

Figures 1 and 2 also show that high grades completely eliminate the risk of vocational training course enrollment for all groups, thus washing away social differences on this transition. For example, the probability of choosing vocational training courses for boys and girls who got six on the lower secondary school final exam is just over 30 and 40 percent, if their parents are tertiary-educated, but for both the risk is drastically reduced, already at grade seven. However, it shall also be underscored that the “buffer” effect of grades against the risk of vocational training course enrollment operates visibly more slowly for those students whose parents are less educated, especially among boys. Patterns do not differ substantially when using social class instead of parental education. Moreover, it is noticeable that transition probabilities lines for girls of different family educational levels overlap revealing a non-linearity of the association between grades and transitions to vocational training courses across groups. This might be an explanation for the negative secondary effects found in the previous section (Table 4).

To sum up, results presented in this section show that children of low-educated parents have fewer chances to enroll in general schools also when they obtain very high grades. Thus, we provide a further confirmation of the thesis predicting higher propensity of higher classes to invest more in children’s schooling (Gambetta, 1990). In the rational choice perspective, it

is possible that the less privileged social groups, also with excellent performance, shun vocational training but do not raise their aspirations up to general schools, presumably considering, in line with the theory of risk aversion (Breen & Goldthorpe, 1997), technical schools as providing a more concrete link to the labor market.

Conclusions

Transition from lower to upper secondary education is a key passage in educational careers in Italy for individuals' future occupational outcomes and life chances are significantly influenced by the type of education acquired. School choice can be partially explained by students' and families' background characteristics. Children from disadvantaged social backgrounds display on average lower transition rates to general schools and higher propensity to enroll in shorter and vocationally oriented ones. With this work we aimed to assess the extent to which social-background differences on this transition are due to past performance (primary effects) rather than to different choices of individuals and families (secondary effects). Despite the limited scope of this study (it refers only to students living in the province of Trento), one of its main strengths is that it exploits - for the first time for research purposes - a unique administrative and longitudinal dataset containing very high-quality student and school information derived from different official sources (e.g., school offices and individual tax codes).

Our findings add to the results obtained by Contini and Scagni (2011; 2013) confirming that in Italy secondary effects are overwhelmingly predominant over primary effects, contrary to what happens in several other European countries (Jackson & Jonsson, 2013). Secondary effects account for 60-90 percent of social-background differences among males and 40-60 percent among girls when considering transition to general schools. Secondary effects are even larger if we look at enrollment to vocational training courses, where secondary effects reach 70-90 percent among males and even exceed 100 percent, in some cases, among girls.

Our findings point out the existence of noticeable gender differences in educational choices. Girls display particularly high propensity to general school enrollment and their likelihood to access this school branch is clearly less dependent on their social background, net of prior performance,

as compared with males. Put differently, secondary effects on general school transitions are smaller for girls than for boys. Possibly these differences have to do with the increased school participation of girls and with the presence of highly feminized schools (especially general schools with human and social sciences curricula) that attract girls partly independently from their social background.

The investigation of interaction effects between social origins and school performance provided further evidence on the relatively small role played by prior performance on subsequent school decisions. Among top-performing students, children from disadvantaged social backgrounds do reduce their gap in vocational training courses enrollment but they still display a much lower likelihood to access general schools as compared to their more privileged age-mates. A possible explanation is that youths with lower social backgrounds consider technical education as a preferable alternative to general schools, presumably because it is perceived as a more concrete and less costly option or because it opens access to jobs that are more similar to those of the parents. Such a predominance of secondary effects leaves room for both a pessimistic and a (slightly more) optimistic interpretation. On the one hand, empirical evidence makes apparent the existence of a discrepancy between performance and educational decisions which leaves ample space for ascriptive attributes such as family social origins to exert their influence on individuals' educational chances over and beyond their actual skills. This might be the reason why social-background inequality in educational attainment in Italy is found to be among the highest across European countries (Jackson & Jonsson, 2013).

On a different level, our results can also be interpreted in a more optimistic way, for it is often argued that secondary effects would be more malleable by policy measures than primary effects are (Jackson, 2007; 2013). Put it differently, it would be easier to intervene on the determinants of secondary effects rather than on the complex set of mechanisms that determine child cognitive and non-cognitive development. Hence, we conclude by listing some of the policy interventions that are identified in the literature as potentially effective in reducing social inequality, provided that their actual effectiveness, as well as their cost-effectiveness, should be appropriately tested before any large-scale implementation (Martini & Sisti, 2009). First, financial support aimed at reducing the burden of indirect costs faced by lower social classes could be successful considering the different cost sensitivity of social groups. Second, guidance programs

aimed at reducing the information gaps between social groups could reduce altered perceptions of the real difficulties of each school option and the associated risks of failure as well as biased beliefs regarding further educational prospects and occupational returns (Barone, 2012). Third, a reinforcement of schools' recommendations at the end of lower secondary school might be useful to strengthen the link between student competences and subsequent choices. Finally, beyond these policy interventions one should also recall the abundant comparative literature pointing out the negative impact of highly differentiated education systems on equality of educational opportunities (Brunello & Checchi, 2007). On this latter aspect, an attempt to loosen curricula differences between different school branches in the first two years of upper secondary education has been recently carried out in the province of Trento: in particular, some changes in the curricula have been introduced in order to ensure that all students, regardless of the type of school they attend, will receive similar teaching contents with regards to some key subjects like Italian and foreign language, or mathematics. The rationale of this reform is to facilitate switches from a school to another and hence hypothetically reduce consequences of "wrong" choices. Whether this reform will be capable of reducing the weight of social origins on educational attainment should be object of further research in upcoming years.

The *Introduction* is attributable to both authors, while paragraphs *Primary and secondary effects: a review of the literature* – *Research design* – *The context of the analysis* – *Data and variables* have been written by Anna Ressa and paragraphs *Results* – *Lower secondary school grade and transitions to upper secondary education* – *Decomposing the effects of social background on educational transitions: the contribution of primary and secondary effects* – *Interactions effects between social background and school performance* – *Conclusions* by Davide Azzolini. Data were collected as part of a research project at the Department of Sociology and Social Research of the University of Trento supported by Fondazione CaRiTRO. The authors thank Carlo Barone and Dalit Contini for their valuable suggestions and comments on earlier versions of the work.

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