



# The geography of social background inequalities in educational opportunities: a within-country study

Moris Triventi <sup>a</sup> and Emanuele Fedeli <sup>b</sup>

<sup>a</sup>Full Professor, University of Milan, Department of Social and Political Sciences, Via Conservatorio, 7, 20122 Milano, MI, Italy; <sup>b</sup>Postdoc Fellow, University of Milan, Department of Social and Political Sciences, Via Conservatorio, 7, 20122 Milano, MI, Italy.

**CONTACT** Moris Triventi ([moris.triventi@unimi.it](mailto:moris.triventi@unimi.it)), University of Milan, Department of Social and Political Sciences, Via Conservatorio, 7, 20122 Milano, MI, Italy

## ABSTRACT

We examine the main sources of social background inequalities in academic track enrolment whether their relative importance varies across 103 Italian provinces. We distinguish between three channels by which social inequalities in educational transitions are reproduced, the ‘primary’, ‘secondary’ and ‘tertiary’ effects (Boudon, 1974; Esser, 2016). They refer to the role of individual competencies, teachers’ assessments, and family decisions, respectively. We compiled a student population panel dataset from the INVALSI-SNV, following 1,344 million students from five cohorts (2013–2017) enrolled in the 8th grade of lower secondary school (untracked) to the 10th grade of upper secondary education (tracked). The results from the KHB method suggest that families’ choices are the prevalent source of reproduction of inequalities in academic track enrolment, followed by tertiary and then primary effects. Interestingly, we find more geographical heterogeneity in the channels by which educational inequalities are reproduced than in the total inequality by social background. Moreover, our findings align with the Incremental Reproduction regime found in cross-national studies, emphasising that an increase in secondary effects does not correspond to any notable variation in the magnitude of primary or tertiary effects.

**KEYWORDS** Inequality of educational opportunity; social background; teachers’ marks; academic performance; family decisions; geographical inequality

## Introduction

Despite major educational reforms and significant efforts to democratise access to schooling (Breen *et al.*, 2009), social inequalities in educational attainment

**ARTICLE HISTORY** Received 31 January 2024; Accepted 1 July 2025

**Edited by** Mobarak Hossain

© 2025 European Sociological Association. Published under a Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0) license.

This is an open-access article distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0) license, which permits unrestricted use, distribution, and reproduction in any medium, provided the use is non-commercial and the original work is properly cited. For a full description of the license, please visit <https://creativecommons.org/licenses/by-nc/4.0/legalcode>.

remain pervasive in economically advanced Western societies (Blossfeld, Blossfeld and Blossfeld, 2015). Social class, parental education, and family wealth are still strongly and positively associated with years of education attained and the probability of graduating from tertiary education (Shavit *et al.*, 2007). This clearly violates the basic principle of equality of educational opportunity embraced by contemporary democratic societies, according to which characteristics for which individuals bear no responsibility—such as social origin or race—should not determine their chances to succeed in the educational system, which should depend only on individual ability and effort (Roemer and Trannoy 2016).

A substantial body of research highlights cross-national differences in the inequality of educational opportunities (IEOp) among children from different social backgrounds (Shavit *et al.*, 2007; Jackson, 2013; van de Werfhorst, 2018; Blossfeld *et al.*, 2016; Triventi *et al.*, 2020). However, relatively little research has focused on how IEOp varies within countries and across regions. This lack of attention has been identified as problematic, as it may hinder a full understanding of the phenomenon (Chetty *et al.*, 2014; Betthäuser, Kaiser and Trinh, 2021).

First, while some institutional aspects vary across countries, others are shaped at the regional, provincial, or even municipal level (Burger, 2019). Differences in funding, teacher allocation, and school facilities often emerge from these decentralised structures, affecting educational opportunities. These resource disparities can either promote equal opportunities or reinforce existing social inequalities.

Second, beyond institutional and resource-driven differences, regional contexts differ in their economic structures, labour markets, and cultural attitudes towards education. These broader socioeconomic and cultural environments can independently shape educational aspirations, access, and outcomes, further contributing to regional disparities (Rodríguez-Pose and Tselios, 2010).

Third, analysing geographical variations allows researchers to identify regions with particularly high levels of educational inequality. This helps target interventions and allocate resources to the areas that need them most (Chetty, Hendren and Katz, 2016). Finally, from an analytical perspective, a within-country analysis provides a controlled environment to compare different regions within the same national framework. This can offer clearer insights into the specific causes of educational inequality, as external national factors remain constant (Carvalho 2016).

In recent years, several studies in both economics and sociology (e.g., Rodríguez-Pose and Tselios, 2010; Chetty *et al.*, 2014; Betthäuser, Kaiser and Trinh, 2021; Acciari, Polo and Violante, 2022) have begun investigating how the intergenerational transmission of socioeconomic status (SES) varies across

regions, generally finding substantial variation at this level. Notably, studies based on administrative data also reveal significant, fine-grained geographical heterogeneity in life opportunities (Chetty, Hendren and Katz, 2016; Chetty *et al.*, 2014). However, these studies typically focus on the outcomes of social mobility processes, such as occupational status, income, or educational attainment. While this provides valuable insights into geographical variations in intergenerational social mobility, it does not clarify whether the mechanisms underlying these patterns vary across contexts.

Against this background, we examine how social background inequalities in academic track enrolment in upper secondary education vary across Italian provinces in recent student cohorts. Specifically, we assess not only the geographical heterogeneity in the strength of the association between social origin and academic track choice but also whether the mechanisms driving these inequalities differ across contexts—an issue largely overlooked in the literature.

By focusing on a single country, we control for institutional characteristics that have been the focus of cross-national studies, such as the type of tracking system and the degree of standardisation in education (Allmendinger, 1989). This approach allows us to isolate within-country differences and assess whether the reproduction of educational inequalities operates uniformly across Italy or whether the influence of parental socioeconomic resources on educational opportunities is more pronounced in certain areas. Finding substantial regional variation would highlight the need to explore how local contextual factors shape social inequalities in educational transitions.

Italy is a particularly well suited case study for examining within-country variation in educational inequalities due to its pronounced regional divides in school outcomes (Bratti, Checchi and Filippin, 2007) and socioeconomic conditions (Terrasi, 1999). The country exhibits low overall educational attainment rates (OECD 2020) and high levels of educational inequality (Contini and Scagni, 2013), particularly in the transition to upper secondary education. Social origin differentials in academic track choice are wider in Italy than in most other European countries (Jackson, 2013), even when compared to similarly stratified systems, like Germany or The Netherlands (Checchi and Flabbi, 2007; Contini and Scagni, 2013). However, despite these strong background effects in track selection, Italy's socioeconomic gradient in standardised performance measures (e.g., PISA) is relatively small—closer to egalitarian countries, like Finland, than to Germany, Great Britain, or France (Contini and Triventi, 2016). These contrasting patterns make Italy an ideal setting to explore how social background influences educational trajectories across different local contexts.

Additionally, Italy provides a unique opportunity for this analysis due to the availability of high-quality, student-level administrative data. For our empirical

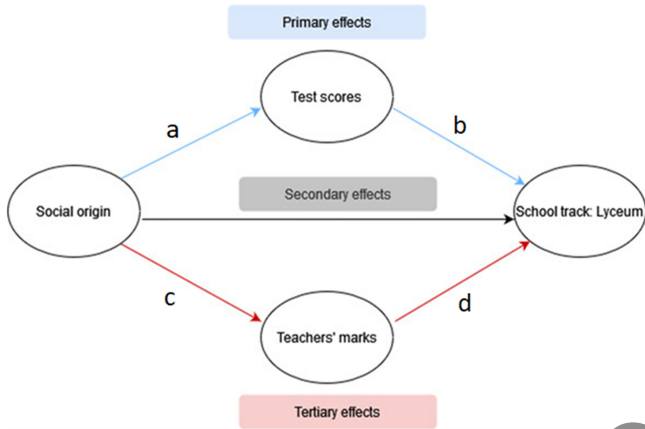
analysis, we compiled a large-scale panel dataset from the INVALSI-SNV (*Istituto nazionale per la valutazione del sistema educativo di istruzione e di formazione*), tracking 1.34 million students from five cohorts (2013–2017) as they transition from the untracked lower secondary level (8th grade) to the tracked upper secondary system (10th grade). The large sample size allows us to disaggregate the analysis across 103 provinces, which share the same national educational framework but exhibit significant variation in school quality and socioeconomic conditions. This enables us to hold institutional structures constant as we assess how regional differences shape the reproduction of educational inequalities.

We focus on enrolment in the academic track, as it is positively associated with subsequent educational success. Students attending the academically oriented track show higher performance in mathematics and reading (Horn, 2013; Maaz *et al.*, 2008; Triventi, Barone and Facchini 2021), lower risks of dropping out (Werblow, Urick and Duesbery, 2013), higher chances of entering university, better marks in higher education (Cappellari, 2004), and higher wages (Dustmann, 2004).

We rely on a theoretical framework developed in the social stratification literature (Boudon, 1974; Erikson *et al.*, 2005; Esser, 2016; Jackson, 2013), which identifies three main channels through which social inequalities in educational transitions are reproduced. First, *family school-related decisions* shape students' trajectories, as parents from different social backgrounds may make different choices even when their children have similar academic competence (secondary effects). Second, *student academic ability* directly influences educational transitions, as students with stronger prior performance are more likely to enter academic tracks (primary effects). Third, *teachers' evaluations of students' performance* can reinforce inequalities by influencing track placement beyond what is explained by students' actual ability (tertiary effects).

Although this framework does not capture the full complexity of the factors, processes, and interactions that generate educational inequalities, it serves as a useful analytical tool for decomposing social disparities according to the roles of key actors—families, students, and schools. Additionally, it offers empirical insights into the potential effectiveness of different policy interventions aimed at mitigating socioeconomic disparities in educational attainment (Jackson, 2013).

The article is structured as follows. In the next section, we present the theoretical framework. We then describe the Italian educational system, followed by formulating research hypotheses about the expected patterns. Next, we outline the analytical strategy, including data, variables, and methods, and then present the empirical findings—first focusing on descriptive patterns across provinces, then decomposing total inequality into the three main channels, and finally



**Figure 1.** Conceptual scheme for analysing the channels through which social inequalities in school track enrolment are reproduced.

relating geographical variation in IEOp to contextual indicators at the provincial level. The final section concludes by highlighting the potential and limitations of this line of research and suggesting avenues for future work in this area.

### Theoretical framework

Social background plays a crucial role in influencing the allocation of students to different educational tracks, and these disparities result from a complex interplay of factors. In this theoretical exploration, we delineate three primary channels through which social inequalities in educational transitions are perpetuated. These channels—commonly referred to as ‘primary’, ‘secondary’, and ‘tertiary’ effects (see Figure 1)—have been extensively discussed in the social stratification literature (Boudon, 1974; Esser, 2016; Jackson, 2013).

According to Boudon (1974), *primary effects* refer to those socioeconomic background differences in educational transitions attributable to differences in students’ academic ability. Children with stronger academic performance are more likely to pursue educational paths that are more demanding and better aligned with their talents and interests. Since children from higher socioeconomic backgrounds, on average, develop higher cognitive abilities and perform better in the early school years (Bradbury *et al.*, 2015; Passaretta and Skopek, 2021), they also tend to have better opportunities to enter and succeed in academically oriented and demanding school tracks.

In Boudon’s framework, *secondary effects* refer instead to the direct influence of social background on the likelihood of making a given educational transition,

independent of prior academic performance. These effects are generally understood to reflect families' considerations regarding the expected costs, chances of success, and benefits associated with different educational options (Breen and Goldthorpe, 1997).

More recently, Esser (2016) extended this analytical model by introducing the concept of *tertiary effects*, which explicitly account for the role of teachers in shaping students' (and their parents') educational decisions beyond the influence of student ability. Unlike Boudon, Esser and others (Blossfeld, Blossfeld and Blossfeld, 2015) emphasise the need to distinguish between 'objective' indicators of students' academic competence—typically measured through standardised tests—and teachers' subjective assessments, expressed through grades and recommendations. The concept of tertiary effects draws attention to the potential for teachers' biases in evaluating the academic potential of students from different social backgrounds, a factor that can significantly influence track placement decisions.

In our theoretical framework, we incorporate insights from both the original and expanded models to provide a comprehensive account of the main channels through which social background inequalities are produced and reproduced in education. In the conceptual scheme depicted in Figure 1, the notion of primary effects of social origin refers to the (indirect) component of the total effect of social origin on educational choice that operates through students' academic ability ( $a \times b$ ),<sup>1</sup> which is typically assessed using standardised tests in key general subjects, such as language and mathematics.

The sociological literature on primary effects extensively examines the mechanisms linking social background to academic performance, with cultural capital theory (Bourdieu, 1977; Bourdieu and Passeron 1990) providing a key explanatory framework (van de Werfhorst and Hofstede, 2007; Jæger and Breen, 2016). However, research also highlights that primary effects emerge from a complex interplay between educational institutions and families' cultural, economic, and social resources. A broader perspective considers multiple factors shaping differences in academic competencies across social groups, including (a) genetic endowments; (b) in-utero and early childhood health and nutrition; (c) family structure, particularly sibship size; (d) the home environment and parental investment in cognitive stimulation; (e) teachers' and schools' expectations; and (f) student socioemotional competencies and psychological traits (Jackson, 2013).

<sup>1</sup> Indirect effects in path analysis are identified as the product of two paths, meaning that the effect of one variable on another is mediated through a third variable. The strength of the indirect effect is calculated by multiplying the coefficients of the two connecting paths (Hayes 2017).



We use the concept of ‘tertiary effects’ to refer to the role of teachers in influencing students’ (and their parents’) educational decisions regarding enrolment in the academic track, over and above the role of student ability. In Figure 1, this is captured by the  $c \times d$  product. Teachers may influence such decisions by assigning grades and making track recommendations that are not aligned with students’ actual competencies due to evaluation biases (Malouff and Thorsteinsson, 2016), students’ socioemotional skills and behaviour, or teachers’ stereotypes (Auwarter and Aruguete, 2008; Sprietsma, 2013). Some evidence suggests that teachers attribute higher marks and provide more favourable track recommendations to upper-class children compared to equally able but socioeconomically disadvantaged peers (Batruch *et al.*, 2023). Given the visibility and salience of teachers’ marks and recommendations, these are likely to shape parents’ perceptions of their child’s academic proficiency and potential, affecting their school-related decisions.

The remaining share of socioeconomic background differences in students’ academic track enrolment makes up the ‘secondary effects’. In Boudon’s (1974) original formulation, secondary effects of social background refer to the residual origin effects on educational choices (i.e. the direct part of the origin effect) not attributable to student performance differences. In our scheme, which incorporates tertiary effects, they represent heterogeneous educational decisions across families with children of equal academic ability and identical teacher evaluations and recommendations (Blossfeld, Blossfeld and Blossfeld, 2015; Esser, 2016), captured by the  $e$  path in Figure 1.

Secondary effects refer to differences in educational choices between families of different social backgrounds, even among students with similar academic performance. These choices are shaped by families’ expectations regarding the benefits, costs, and risks associated with alternative educational paths (Breen and Goldthorpe, 1997; Erikson and Jonsson, 1996). Rational action theory explains these differences as the result of bounded rationality and class-specific risk aversion. Higher-SES families, who possess the necessary resources, are compelled to invest in their children’s education to avoid the risk of downward mobility. In contrast, students from lower-SES backgrounds need to invest relatively little in education to reach the social position of their parents, which reduces the incentives for pursuing longer or more ambitious educational trajectories (Breen and Goldthorpe, 1997). Moreover, given their limited exposure to higher education, such families may perceive academic tracks as riskier—in terms of both financial investment and the likelihood of success—leading them to favour technical or vocational pathways that offer more immediate entry into the labour market (Breen and Yaish, 2006).

While rational action theory offers a compelling explanation for social background differences in track choices, it is not exhaustive. Educational decisions are also shaped by cultural capital, habitus, and perceptions of the dominant peer and school environment (Bourdieu and Passeron, 1990). The extent to which these mechanisms operate uniformly across a country or vary by local context remains underexplored. We adopt a within-country perspective to assess whether—and how—regional differences in social, economic, and institutional environments influence the relative weight of these mechanisms.

Although the relationship between teachers' grades and standardised test scores is not central to the decomposition of social background inequalities in educational outcomes, it is relevant for understanding the interconnections between the factors in our model. While discrepancies between these measures exist—as suggested by the concept of 'tertiary effects'—they are generally positively correlated (Brookhart, 1994). This positive association is because both measures capture students' academic competence, albeit through different approaches (Borghans *et al.*, 2016). Standardised tests assess knowledge and skills in a controlled environment, while teachers' grades reflect a broader evaluation that includes classroom participation, effort, and behaviour. Despite these differences, students with higher academic competence tend to perform well on both, as cognitive ability, mastery of subject matter, and study habits contribute to success in both settings (Guskey, 2006). Empirical research supports this pattern, consistently finding a significant positive correlation between standardised test scores and teachers' grades (Wiberg, 2019).

### A glance at the Italian education system

Italy provides a compelling case for studying social inequality in school tracking, particularly in relation to regional differences. The country exhibits high levels of social background influence on track choice despite having an inclusive system in which no formal ability requirements regulate access to different upper secondary school tracks (Contini and Triventi, 2016). This creates an institutional setting where inequalities emerge through not direct institutional barriers but family-driven selection mechanisms and contextual differences in educational quality.

Although the Italian education system is formally centralised, regional disparities are substantial, with strong heterogeneity in standardised test scores across schools and regions (Abbiati, Argentin and Gerosa, 2017; Agasisti and Cordero-Ferrera, 2013), generally favouring the north. Moreover, grading standards vary significantly across provinces, with evidence suggesting that teachers in the south tend to be more lenient (Triventi and Argentin, 2015). In addition, teacher biases against lower-background students have been documented



in grading (Triventi, 2023) and track recommendations (Argentin, Barbieri and Barone, 2017). These variations make Italy an ideal context for analysing within-country inequalities in school tracking, as different local environments may amplify or mitigate the role of social background.

Despite the highly stratified nature of the Italian upper secondary school system, track access is largely determined by family decisions rather than formal institutional barriers. The academic track (*licei*) provides the most direct pathway to higher education, while technical and vocational tracks offer lower academic expectations and weaker labour market prospects (Triventi, Barone and Facchini, 2021). These differences contribute to long-term social stratification, even though students have the right to enrol in any track. While tuition fees do not vary significantly across public schools, the long-term returns of different tracks in terms of university access and labour market outcomes are substantial (Barone *et al.*, 2018; Ballarino, Barone and Panichella, 2016).

Although families play a central role in school track choice, academic achievement and teacher evaluations remain influential. Schools with excess applications may use prior performance as a selection criterion, and teachers provide recommendations that, while not binding, influence family decisions (Barone, Argentin and Barbieri, 2017). Given the teacher biases and regional disparities in grading, students from lower-SES backgrounds may face additional obstacles in being encouraged or considered for the academic track. This interplay between family decisions, teacher influence, and regional disparities makes Italy an insightful case for understanding how social inequalities in education are reproduced in a system that is formally open but functionally stratified.

## Literature review and research hypotheses

Building on the theoretical framework presented earlier, the description of the Italian education system, and empirical research in the field, this section develops hypotheses on

- 1) geographical variations in the total effect of social background on academic track placement (total IEOP);
- 2) the overall relative importance of primary, secondary, and tertiary effects in Italy;
- 3) their geographical variation; and
- 4) the relationship between primary, secondary, and tertiary effects and total inequality.

1) *Geographical variations in social inequalities in academic track placement.* A key contribution of this study is its within-country approach, which moves beyond broad geographical distinctions—such as the well-documented

north–south divide in Italy—to examine the extent to which regional and local contexts shape educational inequalities. While many studies have highlighted macro-regional disparities in education (e.g. Ballarino, Panichella and Triventi, 2014), there has been limited exploration of whether and how social background inequalities in school tracking vary at a more granular level across provinces. Given the substantial heterogeneity in socioeconomic conditions, school quality, and educational practices even within macro-regions (Fiasconaro, Triventi and Fedeli, 2024), a regional approach allows us to assess whether educational inequalities follow a continuous geographical gradient or local contextual factors generate distinct patterns of inequality across different areas of the country.

The effect of family SES on academic track placement may vary across provinces due to a number of contextual factors that can moderate social inequalities in educational transitions, including societal modernisation and cultural norms, income inequality and economic stratification, labour market opportunities and incentive structures, and school quality and educational resources.

Q2 According to modernisation theory, educational inequalities tend to be stronger in less modernised areas, where ascription and particularism prevail over achievement and universalism as principles regulating the social stratification system (Treiman, 1970). In more economically developed regions, meritocratic principles are likely to be more institutionalised, and the relative influence of family background in school transitions may be weaker (Treiman, 1975; Marks, 2013). This suggests that in highly modernised provinces, social background may have a less pronounced effect on academic track placement, as students from different social classes have greater access to opportunities based on merit rather than inherited advantage (Ballarino, Panichella and Triventi, 2014).

High levels of economic inequality can reinforce educational disparities by limiting low-SES students' access to resources that facilitate enrolment in the academic track, such as private tutoring, extracurricular activities, and cultural capital accumulation (Erikson and Jonsson 1996). In regions with greater income polarisation, high-SES families may have stronger incentives to secure educational advantages for their children, leading to greater social selectivity in track choice. Conversely, in more economically equal provinces, where families have similar levels of economic resources, the impact of social background on educational transitions may be weaker. Recent research highlights that spatial disparities in economic structures shape inequality in early career outcomes, reinforcing the idea that economic conditions may play a key role in moderating social background effects in education (Morris, 2023).

Labour market conditions also influence educational choices, particularly through perceived returns to education. In provinces with higher unemployment rates, students and families may view higher educational attainment as

a necessary investment to secure stable employment. This may reduce social inequalities in academic track enrolment, as even lower-SES families recognise the importance of a strong educational background for labour market success. Conversely, in provinces with abundant medium-skilled job opportunities, vocational and technical tracks may appear more attractive to lower-SES students, reinforcing the social reproduction of educational inequalities (Breen and Goldthorpe, 1997). In these contexts, the academic track may remain a privileged route primarily taken by high-SES students, as lower-SES families may view it as too risky or unnecessary for social mobility.

Furthermore, access to high-quality educational resources—such as well-funded schools, updated curricula, experienced teachers, and modern teaching technologies—can mitigate social inequalities in educational transitions (Hanushek, 2020). Stronger educational infrastructures may provide better support for students from disadvantaged backgrounds, reducing disparities in track choice. However, regional inequalities in school quality remain substantial in Italy, with provinces in the south generally exhibiting lower levels of school funding, teacher quality, and academic performance (Bratti, Checchi and Filippin, 2007; Agasisti and Cordero-Ferrera, 2013). In such contexts, low-SES students may be further disadvantaged, as they are more likely to attend under-resourced schools that limit their academic preparation and aspiration for the academic track.

All of these considerations lead us to expect *significant heterogeneity across Italian provinces in social background inequalities in academic track enrolment* (Hypothesis 1).

2) *Relative importance of primary, secondary, and tertiary effects.* From a theoretical perspective, it has been suggested that the prevailing system of student allocation and key actors involved in this process can significantly affect educational outcomes (Jackson, 2013). In this respect, Italy follows a formal ‘open-choice’ model, where sorting by high school tracks is not restricted by students’ prior academic performance, and teachers’ recommendations are either absent or non-binding (Barone, Argentin and Barbieri, 2017; Contini and Triventi, 2016). Unlike education systems where track assignment is based on institutional assessments (e.g. test scores, academic performance, or teacher recommendations), upper secondary enrolment in Italy has traditionally been a family-driven decision. However, in recent years, teachers’ recommendations in lower secondary schools and selective admission procedures in upper secondary schools have gained increasing importance.

In open-choice systems, the direct impact of social background—beyond previous academic performance—is expected to be more pronounced than in systems employing ability-based sorting (Blossfeld *et al.*, 2016). This is because, in

open-choice systems, academically underperforming students from privileged backgrounds have the opportunity to enrol in more desirable educational tracks (Bernardi and Triventi, 2020). On the other hand, low-SES parents may opt for vocational secondary schooling for their academically proficient children due to class-specific risk-aversion tendencies, even when higher tracks are accessible (Jackson and Jonsson, 2013).

Studies in Italy that decompose social background inequality in academic track enrolment into primary and secondary effects consistently find that the latter accounts for about 55–65% of the gaps between students from socio-economically advantaged and disadvantaged groups (Azzolini and Ress, 2014; Contini and Scagni, 2013; Contini and Triventi, 2016).<sup>2</sup> However, studies did not include both teachers' evaluations and standardised test scores, overlooking the distinction between primary and tertiary effects. In a recent study, Triventi (2023) shows significant positive direct effects of social origin on teachers' marks, even for students with the same subject-specific competence. Moreover, given the higher visibility and salience of marks compared to test scores (Fedeli and Triventi, 2023; Holm, Hjorth-Trolle and Jäger, 2019; Jackson, 2013), we expect that social inequalities driven by teachers' marks will have a greater impact than those based on standardised test scores in driving overall social gaps in entering the academic track.

These considerations lead us to hypothesise that *across Italian provinces, secondary effects will be the predominant source accounting for the total association between social background and academic track placement, followed by tertiary and then primary effects* (Hypothesis 2).

3) *Geographical variation.* While we expect a general order of importance among secondary, tertiary, and primary effects in shaping social inequalities in academic track placement, their relative weight may vary across provinces, depending on local economic, institutional, and educational conditions. For instance, in provinces with higher unemployment rates and weaker labour markets, secondary effects may be less pronounced, as even lower-SES families recognise the importance of higher education to secure stable employment, leading

<sup>2</sup> Contini and Scagni (2013), using the ISTAT Survey of High School Graduates for cohorts born in the 1980s and accounting for sample selection, found that secondary effects accounted for more than 5% of the total differentials. Ress and Azzolini (2014) conducted a similar analysis using a unique longitudinal data archive from the province of Trento, reporting estimates of a similar magnitude. Contini and Triventi (2016) leveraged data from the national learning assessment of 10th graders (INVALSI, 2013–14), which includes information on final marks in lower secondary education (prior to tracking). The authors decomposed total social background inequalities into primary and secondary effects using the KHB method. Secondary effects accounted for 70% of the social gap in allocation between lyceums and technical schools and 60% when comparing the technical and vocational tracks.

to a stronger role for academic ability (primary effects) in track placement. Conversely, in regions with greater school segregation and unequal access to quality education, tertiary effects may become more prominent as disparities in teacher assessments and school resources reinforce social inequalities beyond individual performance. Moreover, in provinces where academic lyceums are more selective, family background may play a heightened role, as high-SES students leverage cultural and social capital to navigate competitive admissions processes, even when their academic performance is weaker.

This leads us to expect that not only the overall association between social background and academic track enrolment but also *the relative importance of primary, secondary, and tertiary effects will vary significantly across provinces* (Hypothesis 3).

4) *Relationship between primary, secondary, and tertiary effects.* The third aspect considered in this study refers to the absolute size of primary, secondary, and tertiary effects across Italian provinces and how they combine to produce overall social inequalities in academic track enrolment. In this way, we aim to better understand the different pathways through which IEOp is created. In the same spirit, but addressing this issue in a cross-national comparison, Jackson and Jonsson (2013) proposed three main types of educational inequality regimes in which primary and secondary effects operate to produce IEOp: Uniform Reproduction, Compensatory Reproduction, and Incremental Reproduction.

In the Uniform Reproduction regime, primary and secondary effects are perfectly positively associated, meaning that when secondary effects increase, primary effects do as well, and at the same rate. Consequently, overall educational inequalities increase rapidly because secondary and primary effects are equally significant. Under this regime, students from advantaged backgrounds achieve educational success through their performance and choices in ways that mirror their social background. In contrast, in the Compensatory Reproduction regime, secondary and primary effects are perfectly negatively correlated, meaning that as secondary effects increase, primary effects decrease. This leads to a situation where educational inequalities remain relatively constant as secondary effects change. In this context, parents allocate resources to enhance their children's performance and influence their educational choices. Social class tends to maintain its influence regardless of policy interventions.

Finally, in the Incremental Reproduction regime, secondary effects increase in magnitude while primary effects remain constant. This suggests that the impact of social background on performance is somewhat limited, while the influence on the choices students make, given their performance, is not constrained. Research is limited assessing the empirical plausibility of the various scenarios. However, Jackson and Jonsson (2013), in summarising empirical findings from

several national studies and birth cohorts, suggest that the Incremental Reproduction regime best describes the relationship between primary and secondary effects in the studied countries, where the magnitude of primary effects varies less than that of secondary effects.

Following this, we hypothesise that *across Italian provinces, we might detect a pattern resembling the Incremental Reproduction regime, with both (absolute) primary and tertiary effects not varying systematically with secondary effects* (Hypothesis 4).

## Analytical strategy

### Data

To investigate geographical variations in the reproduction of social inequalities in educational decisions, we use data from INVALSI-SNV, which provide information on competencies and educational pathways across key school grades for the entire student population. We use data from five cohorts of students enrolled in the third year of middle school (8th grade, 2013–2017), tracking their high school enrolment and final exam grades.

Since there is no dropout rate in middle school within the Italian system, the dataset includes nearly the entire student population over these five years, with minimal missing data (less than 5% nationally and up to 14% in a few provinces). These missing cases are primarily due to technical issues and missing demographic information, which we believe do not affect our analyses. As a result, we rely on listwise deletion of missing values.

Additionally, Valle d'Aosta and Bolzano are excluded due to their status as special autonomous regions and unique linguistic communities, though analyses for the years they are included confirm the consistency of our findings.

By leveraging the large size of the INVALSI dataset, we can disaggregate the analysis by province, gaining a more detailed perspective on territorial heterogeneity in educational inequality. The individuals included in the analysis across provinces range from a minimum of 1,250 (in Aosta province) to a maximum of 92,869 (in Milan province). Key variable information comes from administrative registers of the schools, standardised tests conducted in selected school grades, and ad hoc questionnaires administered to the entire student population.

### Variables

The outcome used in the analysis is track enrolment in the 10th grade represented as a dummy variable distinguishing students enrolled in the classical and scientific lyceums from those enrolled in all other tracks. This classification is



used for several reasons. First, it succinctly captures the most significant divide in later educational and occupational opportunities. It goes beyond the formal classification of curricula and excludes general curricula that are typically considered academic oriented but have lower academic standards than those in the more traditional lyceums.<sup>3</sup>

The main independent variable is an index of economic sociocultural status (ESCS) constructed by INVALSI based on the approach developed in the OECD-PISA survey. The index is derived from a principal component analysis that summarises information on parental education, occupational level, and the number of books at home. For the analysis, it has been standardised to have a mean of zero and standard deviation of one. Higher values on this variable indicate a family background richer in socioeconomic and cultural resources.

We recognise that this choice limits our ability to elaborate detailed hypotheses about the role of specific categories or classes in educational decisions or highlight the heterogeneous effects of different dimensions of social background (Bukodi and Goldthorpe, 2013). However, given that we aim to provide an overall assessment of socioeconomic advantages related to family of origin across many contexts, we chose to rely on an overall composite measure instead of examining specific dimensions of social background (Kolenikov and Angeles, 2009). This approach avoids an excessive number of parameters and makes the interpretation of results more manageable. However, focusing on individual measures of social origin, such as parental years of education, leads to similar findings.

The two mediators refer to student academic competencies as expressed by their performance in national standardised tests and teachers' evaluations as captured by marks. More specifically, student competencies are measured by averaging scores in the INVALSI standardised tests in language and mathematics in 8th grade. Teachers' assessments are measured using the grade achieved in the 8th-grade final exam, assigned by a committee of teachers from the student's classroom over the previous three years. Therefore, both variables are measured at the end of lower secondary education, just before the transition to upper secondary education.

<sup>3</sup> This variable does not strictly capture educational choice immediately following the end of lower secondary education, as such information is not available in the data. Instead, it reflects enrolment in the second year of upper secondary education. This means it takes into account any track changes that may occur between the first and second year. Although this limits our ability to directly relate the results to family decisions made at the lower-to-upper secondary transition, it nonetheless captures a relevant outcome—namely, the track in which students are likely to complete their diplomas. While official statistics on this aspect are lacking, research suggests that track changes in Italy are relatively limited and mostly involve shifts within the same broader track (Contini and Triventi 2016). This reduces the likelihood of substantially different results had we focused on enrolment in the first year instead.

We use control variables for basic sociodemographic characteristics, such as gender, migration background (natives, first- and second-generation migrants), and dummy variables indicating the academic cohorts. These are included because they may correlate with both our ESCS measure and academic track placement. We did not include other variables in the main analyses because they are not part of the theoretical framework we rely on and might distort the estimation of the total primary, secondary, and tertiary components, as suggested in the literature.

## Methods

The analyses are guided by our interest in two theoretical estimands. The first concerns the total association between social background and the probability of enrolment in the academic track in 10th grade (Total IEOp). We use binomial logistic regressions with clustered standard errors as the estimation method. The basic model includes the ESCS index as the focal independent variable and the sociodemographic characteristics as control variables. The total association is measured by computing the average marginal effect of ESCS on the probability of enrolling in the lyceum in the 10th grade.

Given the large sample size, we capture geographical heterogeneity by applying a non-parametric approach and estimating province-specific regression models. This allows the coefficients for both ESCS and the control variables to vary across provinces, thereby increasing model flexibility and reducing potential bias due to misspecification (Heisig and Schaeffer, 2019).

The second estimands of interest concern the size of the three channels through which social background inequalities in educational transitions are reproduced—the primary, secondary, and tertiary components. The goal is to decompose the association between social origin and academic track enrolment into the portion mediated by student academic competencies, portion mediated by teachers' marks, and residual 'direct effect' of social background not explained by the two mediators.

In nonlinear regression models, decomposing the total effect of a variable into direct and indirect components is not as straightforward as in linear models due to a rescaling effect: coefficients and error variance cannot be separately identified (Allison, 1999; Mood, 2010). To address this issue, we apply the KHB method (Karlson, Holm and Breen, 2012; Kohler, Karlson and Holm, 2011), which is widely used for comparing a full model with a reduced model. In the reduced model, the mediators are replaced by the residuals obtained from regressing the mediators on the key independent variable. This approach isolates

the effect of the mediators on the dependent variable while controlling for the independent variable, thereby distinguishing the change in the coefficient due to confounding (which is substantively relevant) from the change due to rescaling (Kohler, Karlson and Holm, 2011).

As described, we estimate 103 KHB regressions—one for each Italian province. Each KHB regression is fitted twice to decompose two distinct measures of total IEOP: the log-odds ratios (Erikson *et al.*, 2005; Jackson, 2021) and the average marginal effects (AMEs) on the probability scale (as proposed by Morgan, 2012), both computed in relation to a one standard deviation increase in the ESCS index. The first measure has the advantage of being relatively insensitive to the marginal distribution of the outcome. It allows comparability with many studies, while the second accounts for changes in the outcome distribution as a substantive part of the phenomenon under investigation and provides a more intuitive interpretation (Mood, 2010; Morgan, 2012).

As a robustness check, we also computed the recently introduced marginal odds ratios, which retain the desirable property of being unaffected by the outcome's marginal distribution while allowing comparability across models (Karlson and Jann, 2023). Figure A1 in the Online Appendix shows that the correlation across provinces between these measures is very high, ranging between 0.88 and 0.99, suggesting that our findings do not depend on the specific measure used.

When considering the primary, secondary, and tertiary components, we supplement the analysis of log-odds ratios and AMEs with the assessment of their relative importance, expressed as a percentage of total IEOP.<sup>4</sup> We anticipate that, in this case as well, the two measures will yield very similar results.

One limitation of the KHB method is that it assumes no relationship between the mediators included in the models, treating their contributions as purely additive. However, as discussed in the theoretical framework, it is reasonable to assume a positive relationship between test scores and grades. To assess whether accounting for this additional link affects the results, we estimated a series of structural equation models (SEMs), from which we calculated indirect effects (Bollen, 1989). Figures A3 and A4 show the correlations between the estimates of primary and tertiary effects obtained from the KHB and SEM methods. These correlations are very high across provinces, ranging from 0.93 to 0.99, indicating that our main findings are robust across estimation methods, even when relaxing the assumption of no relationship between grades and test scores.

<sup>4</sup> Since the relative estimates of primary, secondary, and tertiary effects are nearly identical whether computed using total IEOP measured in log-odds ratios or AMEs, we report only one set of estimates.

## Empirical findings

### *Variables description and geographical distribution*

We begin by describing the main characteristics of our focal variables. Figure A4 in the Online Appendix shows that, on average, 58% of students in the examined cohorts are enrolled in traditional lyceums in Italy. This share ranges from a high of 75% in the province of Rome to a low of 41% in the province of Sondrio.

Average student academic performance measured by test scores varies significantly across Italian regions, confirming previous findings on the Italian case. In particular, students perform better on average in provinces such as Lecco and Sondrio in the north, while performance is much lower in southern provinces, such as Caltanissetta and Napoli.

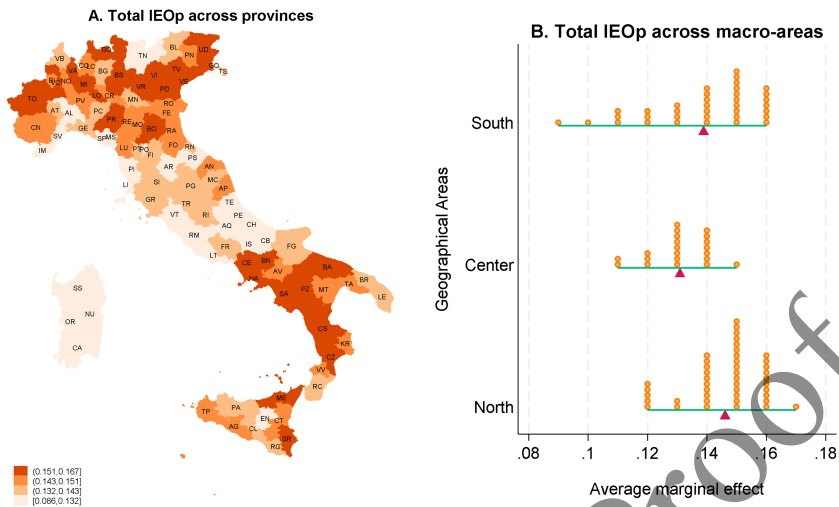
In contrast, the geographical distribution of teachers' marks follows an inverted pattern: average grades are higher in southern provinces than in central and northern areas, although some differentiation is also observed within macro-areas. This pattern aligns with the findings of Argentin and Triventi (2015), who documented high variability in grading standards in lower secondary education across Italian provinces.

Finally, Table A1 in the Appendix reports various characteristics of the ESCS variable, which measures social background across provinces. While the average ESCS varies as expected with geographical differences in economic development, the overall range of the variable is relatively consistent across contexts, spanning approximately four standard deviations.

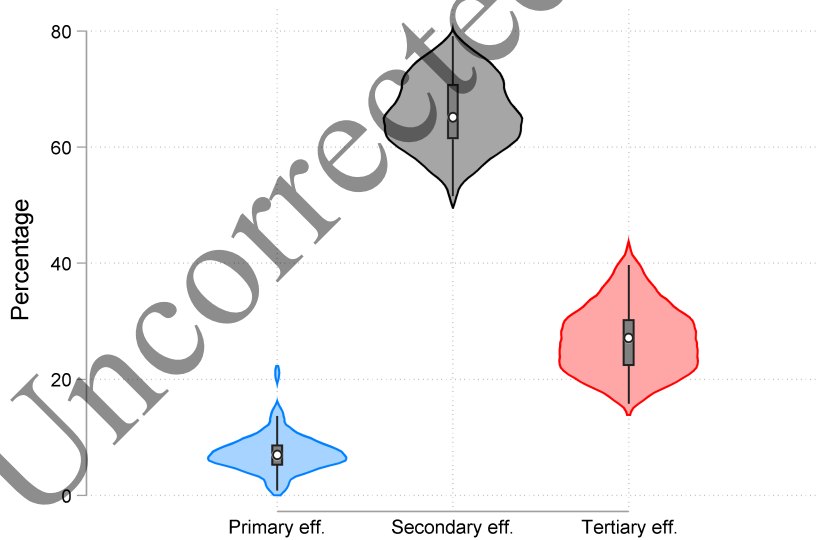
### *The association between social background and academic track enrolment*

Figure 2 displays two graphs showing the geographical variation in the association between social background and the probability of enrolling in the academic track. Overall, a one standard deviation difference on the ESCS index is associated with a difference of approximately 14 percentage points (p.p.) in enrolment in traditional lyceums in Italy. These figures do not vary significantly across macro-geographical areas: total IEOP ranges between 13 p.p. in the centre to just under 15 p.p. in the north.

However, Figure 3 shows substantial variation within macro-areas across provinces. This variation is more pronounced in the south, where IEOP ranges from 9 to 16 p.p., than in the north, where the range is slightly narrower (12–17 p.p.). To assess the significance of these geographical variations (see, for instance, Breen and In, 2024), we conducted pairwise statistical tests comparing each provincial estimate to the national estimate, used as the reference point,



**Figure 2.** Average partial effect of ESCS on the probability of enrolling in the academic track across provinces: Distribution of provincial estimates within macro-areas (dot plot, Panel A) and geographical variation at the province level (choropleth map, Panel B).



**Figure 3.** Violin plot: distribution of primary, secondary, and tertiary effects across provinces.

using the test proposed by Paternoster *et al.* (1998). As shown in Figures A5 and A6, all provincial estimates are significantly higher or lower than the national reference.

Taken together, these results suggest that, although statistically significant, the magnitude of the differences is smaller than expected based on our first hypothesis. Furthermore, in contrast to studies focused on older cohorts—which found larger inequalities in track enrolment in southern regions—the geographical pattern appears more complex. The influence of social origin is more pronounced in northern and southern provinces than in many provinces in the centre and Sardinia.

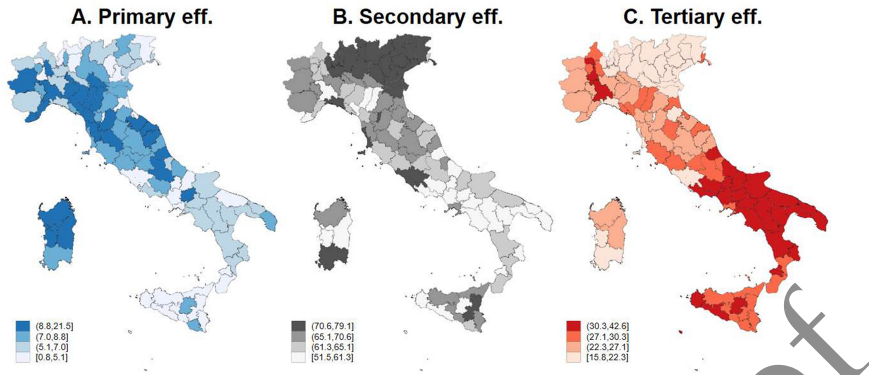
### *Primary, secondary, and tertiary effects of social background*

We now assess the extent to which inequalities in the probability of enrolment in the academic track are accounted for by student academic competencies and teachers' evaluations or by socially stratified decisions beyond these factors. Figure 3 shows the distribution of the estimated contribution of the three channels. The violin plot displays various elements of the distribution of primary, secondary, and tertiary effects across provinces, including the median (circles), interquartile range (box plot), and shape of the kernel distribution. Two main findings stand out. First, a clear distinction in the contribution of the three components: on average, secondary effects—which capture the residual, unexplained part of social background inequalities in academic track enrolment—are by far the most dominant, with a median of around 66%. Tertiary effects display a median contribution of around 26%, whereas primary effects account for less than 7% of the ESCS gap. The second finding concerns the dispersion of the estimates across provinces: the same ordering among the three components holds, with heterogeneity being largest for secondary effects, followed by tertiary, and then primary effects.

In Figure 4, we map the distribution of primary, secondary, and tertiary effects of social origin on the probability of enrolling in the academic track across Italian provinces, expressed as percentages of the total IEOp. This represents the first fine-grained geographical mapping of how educational inequalities are reproduced within the same (non-federal) country. The figures reveal a fairly clear pattern: while secondary effects are dominant in all provinces, their contribution varies considerably, ranging from 52% to a maximum of around 80%. The strongest contribution of secondary effects is found in northern-eastern provinces, while the lowest is observed in southern areas.

Tertiary effects—that is, the contribution of socially stratified teachers' evaluations beyond student competencies (as measured by standardised tests)—also display a distinct geographical pattern: their contribution is higher in southern regions and in Sicily (30–43%) and much lower in the northeast (16–22%). Finally, while primary effects are generally less relevant, their contribution is





**Figure 4.** Choropleth maps showing the relative contribution (in %) of primary, secondary, and tertiary effects to the total inequality in academic track enrolment by social origin across Italian provinces.

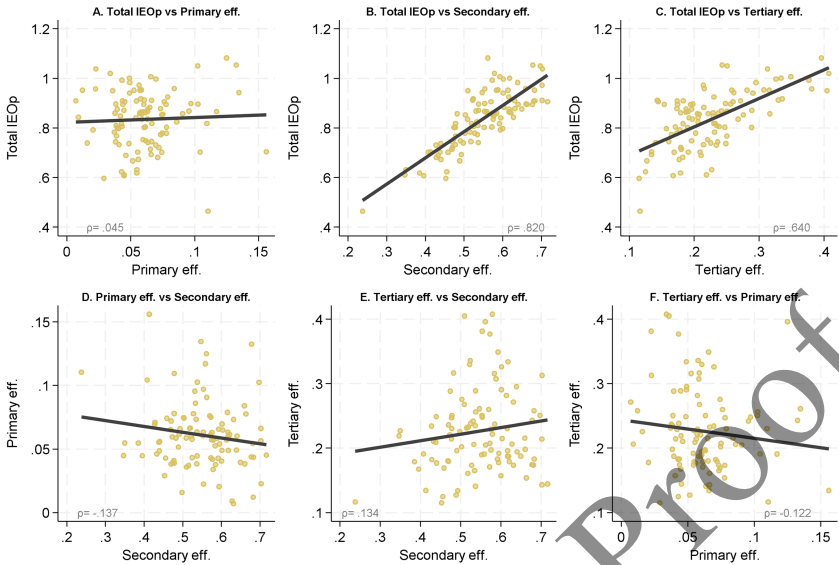
not evenly distributed across Italy. In the centre and Sardinia, student academic competencies (beyond teachers' evaluations) account for 10–22% of total IEOP, whereas in several southern provinces, their contribution does not exceed 5%.

Although we have focused on the three components measured in relative terms—as percentages of the total association between ESCS and enrolment in traditional lyceums—considering their absolute magnitude does not substantially alter the results, as the total association varies only slightly across geographical areas.

Similar to earlier, we tested whether the provincial estimates of primary, secondary, and tertiary effects differ significantly from the national average using the Paternoster test. The results, presented in Figures A5–A6 and Table A3 in the Online Appendix, show that the share of provincial AME estimates significantly different from the national average (at the 95% confidence level) is 100% for secondary effects, 68% for tertiary effects, and 64% for primary effects. We can therefore conclude that substantial and statistically significant territorial variation exists in the channels through which social inequalities in educational opportunities are reproduced.

### ***Reciprocal relationships between total IEOP and the primary, secondary, and tertiary effects***

After examining the geographical distribution of total IEOP and relative size of primary, secondary, and tertiary effects separately, we now focus on their absolute values to assess whether—and to what extent—they are reciprocally related. This analysis follows the approach of Jackson and Jonsson (2013), who investigated the correlation between primary and secondary effects across



**Figure 5.** Scatterplot depicting the reciprocal relationships between primary, secondary, and tertiary effects and total IEOp (in log-odds ratios) in academic track enrolment.

countries. We aim to identify which educational inequality regime is at play within Italy.

In Figure 5, we present six scatterplots displaying the key pairwise relationships between primary, secondary, and tertiary effects and total IEOp (measured in log-odds ratios) in academic track enrolment.

The main result is that there is a strong linear correlation between secondary effects and total IEOp (0.820), a moderately strong correlation between total IEOp and tertiary effects (0.640), and an almost null correlation between total IEOp and primary effects (0.04). This suggests that total IEOp is largely influenced by family decisions regarding enrolment in the academic track among students with similar grades and academic competencies. In contrast, the contribution of heterogeneous ability between high- and low-SES children is more limited. The reciprocal correlations between primary, secondary, and tertiary effects (panels D, E, and F) are all modest in size, ranging from  $-0.137$  to  $0.134$ . In particular, as shown in panel D of Figure 5, we observe a pattern that largely mirrors the one that Jackson and Jonsson (2013) detected at the international level. Thus, even within provinces in Italy, the inequality regime resembles the Incremental Reproduction regime. As we move from provinces with smaller to larger secondary effects, we do not observe systematic variations in the size of primary effects. This implies that the influence of social background on

performance is somewhat restricted, while its impact on students' decisions, given their performance, remains unconstrained.

## Discussion and conclusions

We explored geographical variations in social background inequalities in academic track placement within the Italian education system, focusing on the relative importance of primary, secondary, and tertiary effects. By employing a comprehensive framework that considers student competencies, teacher evaluations, and family decisions, we sought to identify the channels through which social background inequalities are reproduced and their geographical variations. Our findings offer new insights into the mechanisms of educational stratification and highlight the importance of considering regional heterogeneity when examining how educational inequalities persist across generations.

A key contribution of our study is its within-country perspective, which allowed us to move beyond a simple north–south divide and examine province-level variations in educational inequalities. Italy presents a particularly relevant case for this analysis due to its high levels of social inequality in educational attainment, pronounced territorial divides in socioeconomic resources, and its formally open-choice model in upper secondary education. While track placement is not officially regulated by institutionalised selection mechanisms, academic performance and teacher evaluations still influence track choice—particularly in provinces where school selectivity is more pronounced.

Regarding our first hypothesis on significant geographical variation in the total effect of social background, our findings provide only partial support. Although absolute social inequalities in academic track enrolment are present across the country, the differences are modest in size. Moreover, a clear north–south gradient is not evident, as inequalities are largest in several northern and southern provinces and smaller in central Italy. This underscores the need for a more nuanced understanding of regional influences on educational inequalities than research has suggested. One possible explanation for the partial support of Hypothesis 1 is that vocational education offers a short-term labour market premium in more economically developed areas (Barone *et al.*, 2018). In these regions, vocational tracks may be more attractive even to students from high-SES backgrounds, leading to a less pronounced concentration of social inequalities in academic track placement in the south than initially expected. Furthermore, the lower levels of educational inequality observed in central Italy may be linked to greater economic stability, a more balanced labour market, and a less stratified school system, all of which reduce the influence of family

background on educational choices. Nonetheless, future studies should examine these speculative explanations in greater detail.

Regarding the relative importance of primary, secondary, and tertiary effects (Hypothesis 2), our results support the hypothesis that secondary effects dominate the association between social background and academic track placement. Despite Italy's formal 'open-choice' model, the fact that families play a significant role in track assignment, combined with large socioeconomic disparities, contributes to the persistence of social background-related inequalities in enrolment in lyceums. This highlights the importance of better understanding the interplay between parental choices and institutional arrangements in reproducing educational disparities. The significance of secondary effects as a key mechanism is further reinforced by comparison with findings from studies on social mobility in Italy. Among our various measures, secondary effects show the strongest correlation (between 0.5 and 0.6) with the cross-provincial estimates of intergenerational income mobility reported by Acciari, Polo and Violante (2022) (see Figure A2 in Online Appendix).

We also find that the relative importance of primary, secondary, and tertiary effects varies significantly across provinces, supporting Hypothesis 3. While secondary effects remain the dominant mechanism nationwide, we can speculate that primary effects might become more relevant in provinces with weaker labour markets, where families recognise the need for strong academic credentials to secure employment. Secondary effects may be more pronounced in highly stratified provinces, where high-SES families can draw on cultural capital, social networks, and financial resources to navigate school choice processes. Finally, based on our theoretical considerations and empirical results, we suggest that tertiary effects might be stronger in regions with high school segregation and selective lyceums, where teachers' assessments and grading practices contribute to reinforcing social background inequalities. Directly testing these explanations is beyond the scope of this study, partly due to data limitations, but future research could investigate the explanatory relevance of these contextual characteristics in moderating IEOP.

Our fourth and final hypothesis concerned the relationship between primary, secondary, and tertiary effects. Our findings align with the Incremental Reproduction regime, indicating that increases in secondary effects do not correspond to notable variations in the magnitude of primary (or tertiary) effects. This suggests that the impact of social background on academic performance is somewhat bounded, whereas its influence on students' decisions, given their performance, is less constrained. These findings provide empirical support for the pattern also identified in the international comparison by Jackson and Jonsson

(2013), offering further insights into the mechanisms shaping social background inequalities in educational transitions across Italian provinces.

This study has some limitations that are worth noting. First, the findings are based on data from the Italian education system, and caution should be exercised when generalising to other national contexts. Different educational structures and sociocultural factors may shape the patterns of social background inequalities differently. Comparative studies across diverse educational systems could offer valuable insights into the transferability of our findings and help identify specific contextual factors influencing IEOp.

Second, our analysis focused on academic track enrolment in the 10th grade, which poses challenges in studying initial educational choices directly. Instead, we examined a combination of the initial track decision and students' persistence in that track between the first and second years. We argue that this does not substantially affect our main findings, as the influence of student ability on this outcome is likely more pronounced than on the initial choice. Nevertheless, we note that the contribution of ability in our context is relatively modest and would likely be even smaller if only the initial choice were considered.

Third, to identify the three channels, we imposed strong assumptions of additivity among the components. However, it is plausible that some of these components interact with each other. For instance, secondary and primary effects may interact, as the literature on compensatory advantage suggests: social background inequalities might be more pronounced among low-achieving students (Bernardi, 2014; Bernardi and Triventi, 2020). While research has found evidence of a compensatory advantage pattern in Italy, it appears to be less pronounced when considering the likelihood of enrolling in a lyceum (Contini and Triventi, 2016).

Finally, we did not examine in depth the specific mechanisms driving the geographical variation in primary, secondary, and tertiary effects across regions and provinces. Our aim was primarily to 'establish the phenomenon' (Goldthorpe, 2016)—that is, to document the existence of significant variation in the channels through which social background inequalities in educational transitions are reproduced. We consider this a necessary first step in laying the groundwork for future research, which should investigate the drivers of such geographical heterogeneity. We speculate that variation in secondary effects may be linked to regional differences in economic development and labour market structures, which shape parents' and students' perceptions of the returns on educational investment. In areas with stronger labour markets, vocational pathways may be more attractive, potentially altering the influence of social background on educational decisions. For tertiary effects, regional variation in how educational policies are

implemented may affect the extent to which teachers' evaluations reinforce or mitigate educational inequalities.

In conclusion, this study advances our understanding of social background inequalities in educational opportunities within a formally centralised but geographically heterogeneous school system with flexibility and a limited institutional role in assigning students to schools and tracks. These organisational and institutional features appear to contribute to the dominance of secondary effects and the influence of contextual factors in reproducing educational inequalities across generations. Further research in this direction can deepen our understanding of the complex interplay between societal structures, family decisions, and educational outcomes, thereby informing policy interventions aimed at reducing social background-related disparities in academic opportunities.

Acknowledgements

The authors would like to thank participants to the ISA-Rc28 2021 Meeting in London, SISEC 2022 National Conference in Brescia, INVALSI 2022 Conference in Rome, ECSR Network Workshop at UNED in Madrid (April, 2024) and to our seminar at DiSIA at the University of Florence (3 October 2022) for useful feedback and comments. The usual disclaimers apply.

Author contributions

Moris Triventi and Emanuele Fedeli jointly contributed to the conceptualisation, methodology, formal analysis, investigation, original drafting, review and editing, and visualisation of the article. Triventi additionally led on supervision, project administration, resources, and funding acquisition. Fedeli was responsible for data curation, software implementation, and validation.

| Contribution Role          | Moris Triventi | Emanuele Fedeli |
|----------------------------|----------------|-----------------|
| Conceptualisation          | X              | X               |
| Methodology                | X              | X               |
| Software                   |                | X               |
| Validation                 |                | X               |
| Formal Analysis            | X              | X               |
| Investigation              | X              | X               |
| Resources                  | X              |                 |
| Data Curation              |                | X               |
| Writing – Original Draft   | X              | X               |
| Writing – Review & Editing | X              | X               |
| Visualisation              | X              | X               |
| Supervision                | X              |                 |
| Project Administration     | X              |                 |
| Funding Acquisition        | X              |                 |



## AI use disclosure

During the preparation of this work, the authors used ChatGPT to proofread some sections of the work. After using this tool/service, the authors and a professional English copyeditor reviewed and edited the content as needed. The authors take full responsibility for the content of the publication.

## Data availability and replication package

The data underlying this article were provided by INVALSI under licence or by permission. Data will be shared upon request to the corresponding author with the permission of INVALSI. INVALSI is the National Institute for the Evaluation of the Education System, a research institute with legal status under European public law. The authors have signed an agreement to access these administrative data.

- First, access to the data is relatively straightforward, requiring only signing an agreement: <https://serviziostatistico.invalsi.it/en>
- Second, the authors are committed to assisting with data access in case of any issues. The site where data access can be requested is in English: <https://serviziostatistico.invalsi.it/en/catalogo-dati>
- The replication package is available here: <https://osf.io/6zae8/>

## Declaration of interest statement

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Ethical statement

This study is based on the secondary analysis of anonymised data collected by INVALSI, the Italian National Institute for the Evaluation of the Education System. Access to the data was granted through a formal agreement with the institute, in full compliance with relevant privacy legislation, including the General Data Protection Regulation, and the ethical and data protection regulations of the University of Milan. The data were fully anonymised prior to being made available to the researchers. No personal or sensitive information that could identify individuals was accessible at any stage of the research process. All procedures for data handling, storage, and analysis were designed and implemented to ensure the protection of personal information and preserve the anonymity of all participants.

Q5

## Funding

Moris Triventi and Emanuele Fedeli acknowledge funding by the Compagnia di San Paolo Foundation (Italy), through the international cooperation project INEQUAL-ITREES, grant number A130902. Moris Triventi also acknowledges funding from the ERC Consolidator Grant 2022 EDUPOL (grant agreement No. 101086663).

## Supplements

Supplemental data for this article can be accessed online at <https://doi.org/10.1162/euso.a.35>.

## References

- Abbiati, G., Argentin, G. and Gerosa, T. (2017) 'Different teachers for different students? Evidence on teacher-student matching and its consequences in the Italian case', *Politica Economica*, 33, pp. 13–58. Available at: <https://doi.org/10.1429/86375>
- Acciari, P., Polo, A. and Violante, G. L. (2022) And yet it moves: Intergenerational mobility in Italy. *American Economic Journal: Applied Economics*, 14(3), pp. 118–163.
- Agasisti, T. and Cordero-Ferrera, J. M. (2013) 'Educational disparities across regions: A multilevel analysis for Italy and Spain', *Journal of Policy Modeling*, 35(6), pp. 1079–1102. Available at: <https://doi.org/10.1016/j.jpolmod.2013.07.002>
- Allison, P. D. (1999) 'Comparing logit and probit coefficients across groups', *Sociological Methods & Research*, 28(2), pp. 186–208. Available at: <https://doi.org/10.1177/0049124199028002003>
- Allmendinger, J. (1989) 'Educational systems and labor market outcomes', *European Sociological Review*, 5(3), pp. 231–50. Available at: <https://doi.org/10.1093/oxfordjournals.esr.a036524>
- Argentin, G., Barbieri, G. and Barone, C. (2017) 'Origini sociali, consiglio orientativo e iscrizione al liceo: un'analisi basata sui dati dell'Anagrafe Studenti', *Social Policies*, 4(1), pp. 53–74.
- Auwarter, A. E. and Aruguete, M. S. (2008) 'Effects of student gender and socioeconomic status on teacher perceptions', *Journal of Educational Research*, 101(4), pp. 243–46.
- Azzolini, D. and Ressa, A. (2014) 'Primary and secondary effects of social background on educational attainment in Italy: Evidence from an administrative dataset', *Italian Journal of Sociology of Education*, 6(02/2014), pp. 53–80. Available at: <https://doi.org/10.14658/pupj-ijse-2014-1-3>.
- Ballarino, G., Barone, C. and Panichella, N. (2016) 'Origini sociali e occupazione in Italia', *Rassegna Italiana di Sociologia*, 1, pp. 103–34. Available at: <https://doi.org/10.1423/82904>
- Barone, C., Argentin, G. and Barbieri, G. (2017) 'Origini sociali, consiglio orientativo e iscrizione al liceo: Un'analisi basata sui dati dell'Anagrafe Studenti', *Italian Journal of Social Policy*, 2017(1), p. 53. Available at: <https://doi.org/10.7389/86412>.
- Barone, C., Assirelli, G., Abbiati, G., Argentin, G. and De Luca, D. (2018) 'Social origins, relative risk aversion and track choice: A field experiment on the role of information biases', *Acta Sociologica*, 61(4), pp. 441–459.
- Barone, C., Triventi, M. and Facchini, M. (2021) Social origins, tracking and occupational attainment in Italy. *Longitudinal and Life Course Studies*, 12(3), pp. 441–462.
- Batrach, A., Geven, G., Kessenich, E. and van de Werfhorst, H. G. (2023) 'Are tracking recommendations biased? A review of teachers' role in the creation of inequalities in tracking decisions', *Teaching and Teacher Education*, 123, pp. 103985. Available at: <https://doi.org/10.1016/j.tate.2022.103985>
- Bernardi, F. (2014) 'Compensatory advantage as a mechanism of educational inequality: A regression discontinuity based on month of birth', *Sociology of Education*, 87(2), pp. 74–88. Available at: <https://doi.org/10.1177/0038040714524258>
- Bernardi, F. and Triventi, M. (2020) 'Compensatory advantage in educational transitions: Trivial or substantial? A simulated scenario analysis', *Acta Sociologica*, 63(1), pp. 40–62. Available at: <https://doi.org/10.1177/0001699318780950>

- Bethhäuser, B. A., Kaiser, C. and Trinh, N. A. (2021) 'Regional variation in inequality of educational opportunity across Europe', *Socius*, 7. Available at: <https://doi.org/10.1177/23780231211019890>
- Blossfeld, H.-P., Buchholz, S., Skopek, J. and Triventi, M. (Eds.) (2016) *Models of secondary education and social inequality*. Cheltenham, UK; Northampton, MA: Edward Elgar Publishing.
- Blossfeld, P. N., Blossfeld, G. J. and Blossfeld, H.-P. (2015) 'Educational expansion and inequalities in educational opportunity: Long-term changes for East and West Germany', *European Sociological Review*, 31(2), pp. 144–60. Available at: <https://doi.org/10.1093/esr/jcv017>
- Bollen, K. A. (1989) *Structural equations with latent variables*. Oxford, England: John Wiley and Sons.
- Borghans, L., Golsteyn, B. H., Heckman, J. J. and Humphries, J. E. (2016) 'What grades and achievement tests measure', *Proceedings of the National Academy of Sciences*, 113(47), pp. 13354–13359.
- Boudon, R. (1974) *Education, opportunity, and social inequality: Changing prospects in Western society*. New York, New York: Wiley-Interscience.
- Bourdieu, P. (1977) 'The economics of linguistic exchanges', *Social Science Information*, 16(6), pp. 645–68. Available at: <https://doi.org/10.1177/053901847701600601>.
- Bourdieu, P. and Passeron, J.-C. (1990) *Reproduction in Education, Society and Culture*. 2nd Edn. Thousand Oaks, CA, U.S.: Sage Publications, Inc.
- Bradbury, B., Corak, M., Waldfogel, J. and Washbrook, E. (2015) *Too many children left behind: The US achievement gap in comparative perspective*.
- Bratti, M., Checchi, D. and Filippin, A. (2007) 'Geographical differences in Italian students' mathematical competencies: Evidence from Pisa 2003', *Giornale Degli Economisti e Annali Di Economia*, 66(120)(3), pp. 299–333.
- Breen, R. and Goldthorpe, J. (1997) 'Explaining educational differentials: Towards a formal rational action theory', *Rationality and Society*, 9(3), pp. 275–305. Available at: <https://doi.org/10.1177/104346397009003002>
- Breen, R. and Yaish, M. (2006) *Testing the Breen-Goldthorpe Model of Educational Decision Making*. Stanford University Press.
- Breen, R., Luijckx, R., Müller, W. and Pollak, R. (2009) 'Nonpersistent inequality in educational attainment: Evidence from eight European countries', *American Journal of Sociology*, 114(5), pp. 1475–1521. Available at: <https://doi.org/10.1086/595951>
- Brookhart, S. M. (1994) 'Teachers' grading: Practice and theory', *Applied Measurement in Education*, 7(4), pp. 279–301.
- Bukodi, B. and Goldthorpe, J. H. (2013) 'Decomposing "social origins": The Effects of parents' class, status, and education on the educational attainment of their children', *European Sociological Review* 29(5), pp. 1024–39. Available at: <https://doi.org/10.1093/esr/jcs079>
- Burger, K. (2019) 'The socio-spatial dimension of educational inequality: A comparative European analysis', *Studies in Educational Evaluation*, 62, pp. 171–186.
- Carvalho, E. (2016) Single-country studies as comparison. In *Issues and Methods in Comparative Politics* (pp. 106–116). Routledge.
- Cappellari, L. (2004) 'The dynamics and inequality of Italian men's earnings: Long-term changes or transitory fluctuations?', *Journal of Human Resources*, XXXIX(2), pp. 475–99. Available at: <https://doi.org/10.3368/jhr.XXXIX.2.475>
- Checchi, D. and Flabbi, L. (2007) 'Intergenerational mobility and schooling decisions in Germany and Italy: The impact of secondary school tracks'.

- Chetty, R., Hendren, N., Kline, P. and Saez, E. (2014) 'Where is the land of opportunity? The geography of intergenerational mobility in the United States', *Quarterly Journal of Economics*, 129(4), pp. 1553–1623.
- Chetty, R., Hendren, N., and Katz, L. F. (2016) The effects of exposure to better neighborhoods on children: New evidence from the Moving to Opportunity experiment. *American Economic Review*, 106(4), pp. 855–902.
- Contini, D. and Scagni, A. (2013) *Social-origin inequalities in educational careers in Italy: Performance or decision effects?* Stanford University Press.
- Contini, D. and Triventi, M. (2016) 'Between formal openness and stratification in secondary education: Implications for social inequalities in Italy', in H. P. Blossfeld, S. Buchholz, J. Skopek and M. Triventi (Eds.) *Models of secondary education and social inequality: An international comparison*. Cheltenham, UK: Edward Elgar, pp. 305–322. [preprint]
- Dustmann, C. (2004) 'Parental background, secondary school track choice, and wages', *Oxford Economic Papers*, 56(2), pp. 209–30.
- Erikson, R. and Jonsson, J. O. (1996) *Can education be equalized?: The Swedish case in comparative perspective*. Boulder, Colo.: Westview Press.
- Erikson, R., Goldthorpe, J., Jackson, M., Yaish, M. and Cox, D. (2005) 'On class differentials in educational attainment', *Proceedings of the National Academy of Sciences of the United States of America*, 102, pp. 9730–33. Available at: <https://doi.org/10.1073/pnas.0502433102>
- Esser, H. (2016) 'Sorting and (much) more: Prior ability, school effects and the impact of ability tracking on educational inequalities in achievement', in A. Hadjar and C. Gross (eds.) *Education Systems and Inequalities: International Comparisons*. Policy Press.
- Goldthorpe, J. H. (2016) *Sociology as a population science*. Cambridge University Press.
- Guskey, T. R. (2006) 'Making high school grades meaningful', *Phi Delta Kappan*, 87(9), pp. 670–675.
- Heisig, J. P. and Schaeffer, M. (2019) 'Why you should always include a random slope for the lower-level variable involved in a cross-level interaction', *European Sociological Review*, 35(2), pp. 258–79. Available at: <https://doi.org/10.1093/esr/jcy053>
- Holm, A., Hjorth-Trolle, A. and Jäger, M. M. (2019) 'Signals, educational decision-making, and inequality', *European Sociological Review*, 35(4), pp. 447–60. Available at: <https://doi.org/10.1093/esr/jcz010>
- Horn, D. (2013) 'Diverging performances: The detrimental effects of early educational selection on equality of opportunity in Hungary', *Research in Social Stratification and Mobility*, 32, pp. 25–43. Available at: <https://doi.org/10.1016/j.rssm.2013.01.002>
- Huber, J. D., Kernell, G. and Leoni, E. L. (2005) 'Institutional context, cognitive resources and party attachments across democracies', *Political Analysis*, 13(4), pp. 365–86.
- Jackson, M. (2013) *Determined to Succeed? Performance Versus Choice in Educational Attainment*. Stanford, California: Stanford University Press.
- Jackson, M. (2021) 'Expansion, enrollment, and inequality of educational opportunity', *Sociological Methods and Research*, 50(3), pp. 1215–42. Available at: <https://doi.org/10.1177/0049124119852376>
- Jackson, M. and Jonsson, J. O. (2013) 'Why does inequality of educational opportunity vary across countries?: Primary and secondary effects in comparative context', in M. Jackson (ed.) *Determined to Succeed?: Performance versus Choice in Educational Attainment*. Stanford University Press.
- Karlsen, K. B., Holm, A. and Breen, R. (2012) 'Comparing regression coefficients between same-sample nested models using logit and probit: A new method', *Sociological Methodology*, 42(1), pp. 286–313. Available at: <https://doi.org/10.1177/0081175012444861>

- Kohler, U., Karlson, K. B. and Holm, A. (2011) ‘“Comparing” coefficients of nested nonlinear probability models’, *Stata Journal*, 11(3), pp. 420–38. Available at: <https://doi.org/10.1177/1536867X1101100306>
- Kolenikov, S. and Angeles, G. (2009) ‘Socioeconomic status measurement with discrete proxy variables: Is principal component analysis a reliable answer?’, *Review of Income and Wealth*, 55(1), pp. 128–65. Available at: <https://doi.org/10.1111/j.1475-4991.2008.00309.x>
- Maaz, K., Trautwein, U., Lüdtke, O. and Baumert, J. (2008) ‘Educational transitions and differential learning environments: How explicit between-school tracking contributes to social inequality in educational outcomes’, *Child Development Perspectives*, 2(2), pp. 99–106. Available at: <https://doi.org/10.1111/j.1750-8606.2008.00048.x>
- Malouff, J. M. and Thorsteinsson, E. B. (2016) ‘Bias in grading: A meta-analysis of experimental research findings’, *Australian Journal of Education*, 60(3), pp. 245–56. Available at: <https://doi.org/10.1177/0004944116664618>
- Mood, C. (2010) ‘Logistic regression: Why we cannot do what we think we can do, and what we can do about it’, *European Sociological Review*, 26(1), pp. 67–82. Available at: <https://doi.org/10.1093/esr/jcp006>
- Morgan, S. L. (2012) ‘Models of college entry in the United States and the challenges of estimating primary and secondary effects’, *Sociological Methods and Research*, 41(1), pp. 17–56. Available at: <https://doi.org/10.1177/0049124112440797>
- Passaretta, G. and Skopek, J. (2021) ‘Does schooling decrease socioeconomic inequality in early achievement? A differential exposure approach’, *American Sociological Review*, 86(6), pp. 1017–42. Available at: <https://doi.org/10.1177/00031224211049188>
- Paternoster, R., Brame, R., Mazerolle, P. and Piquero, A. (1998) ‘Using the correct statistical test for the equality of regression coefficients’, *Criminology*, 36(4), pp. 859–866.
- Rodríguez-Pose, A. and Tselios, V. (2010) ‘The determinants of regional educational inequality in Western Europe’, in *Innovation, growth and competitiveness: Dynamic regions in the knowledge-based world economy* (pp. 135–163). Berlin, Heidelberg: Springer.
- Roemer, J. E. and Trannoy, A. (2016) ‘Equality of opportunity: Theory and measurement’, *Journal of Economic Literature*, 54(4), pp. 1288–1332.
- Shavit, Y., Arum, R., Gamoran, A. and Menachem, G. (2007) *Stratification in higher education: A comparative study*. Stanford University Press.
- Spietsma, M. (2013) ‘Discrimination in grading: Experimental evidence from primary school teachers’, *Empirical Economics*, 45(1), pp. 523–38. Available at: <https://doi.org/10.1007/s00181-012-0609-x>
- Stadelmann-Steffen, I. (2012) ‘Education policy and educational inequality—Evidence from the Swiss laboratory’, *European Sociological Review*, 28(3), pp. 379–393.
- Terrasi, M. (1999) ‘Convergence and divergence across Italian regions’, *Annals of Regional Science*, 33(4), pp. 491–510. Available at: <https://doi.org/10.1007/s001680050117>
- Treiman, D. J. (1970) ‘Industrialization and social stratification’, *Sociological Inquiry*, 40(2), pp. 207–34. Available at: <https://doi.org/10.1111/j.1475-682X.1970.tb01009.x>
- Triventi, M. (2023) ‘Teachers’ grading and students’ social background. Evidence from 26 million assessments’, Rome.
- Triventi, M. and Argentin, G. (2015) ‘The North-South divide in school grading standards: New Evidence from national assessments of the Italian Student population’, *Italian Journal of Sociology of Education*, 7(2), pp. 157–85.
- Triventi, M., Skopek, J., Kulic, N., Buchholz, S. and Blossfeld, H.-P. (2020) ‘Advantage “finds its way”: How privileged families exploit opportunities in different systems of secondary education’, *Sociology*, 54(2), pp. 237–57. Available at: <https://doi.org/10.1177/0038038519874984>

- Triventi, M., Barone, C. and Facchini, M. (2021) 'Upper secondary tracks and student competencies: A selection or a causal effect? Evidence from the Italian case', *Research in Social Stratification and Mobility*, 76, pp. 100626. Available at: <https://doi.org/10.1016/j.rssm.2021.100626>
- Van de Werfhorst, H. G. (2018) 'Early tracking and socioeconomic inequality in academic achievement: Studying reforms in nine countries', *Research in Social Stratification and Mobility*, 58, pp. 22–32. Available at: <https://doi.org/10.1016/j.rssm.2018.09.002>
- Werblow, J., Urick, A. and Duesbery, L. (2013) 'On the wrong track: How tracking is associated with dropping out of high school', *Equity and Excellence in Education*, 46(2), pp. 270–84. Available at: <https://doi.org/10.1080/10665684.2013.779168>
- Wiberg, M. (2019) The relationship between TIMSS mathematics achievements, grades, and national test scores. *Education Inquiry*, 10(4), pp. 328–343.

Uncorrected Proof