Compensatory and multiplicative advantages: Social origin, school performance, and stratified higher education enrolment in Finland

Abstract

The rules of intake, which determine how educational institutions are accessed, play a significant part in generating intergenerational educational inequalities. Different rules may allow parental advantages to compensate for students' lack of advantages (such as academic performance) or to multiply and help only those students who are in a position to use such additional advantages. In this paper, we study compensation and the multiplication of advantages in the context of the Finnish higher education system. Entrance exams and a dual model (universities and polytechnics) make this system stand out among many other Western countries and hence suitable for this study. Using high-quality Finnish register data, we study the associations between parental education and stratified higher education enrolment across the school performance distribution. Our results show that polytechnics provide access for poorly performing students from higher social origins (*compensatory advantage*). Polytechnic education also attracts well-performing students from lower social origins, which leads to a situation in which well-performing students with higher social origins have a substantially larger probability of enrolling in university compared to well-performing students with lower social origins (*multiplicative advantage*).

Introduction

Based on many previous studies concerning intergenerational educational inequalities, it is clear that social origin is associated with an individual's educational outcomes through different routes. Firstly, children with higher social origins perform better, on average, than children from lower classes (Jackson, 2013). Moreover, while aiming to avoid downward social mobility, students from more advantaged families tend to make more ambitious choices in their educational pathways, independent of previous school performance (Boudon, 1974; Breen and Goldthorpe, 1997).

In addition to average social origin differences in educational transitions over the whole range of previous school performance, the impact of social origin can vary over the performance distribution. Recent studies of compensatory advantage have shown social origin differences to be largest among the students with low school performance (Bernardi and Cebolla-Boado, 2014a; Bernardi and Cebolla-Boado, 2014b; Bernardi and Triventi, 2018). However, advantageous resources and life events may also accumulate or multiply (e.g., Erola and Kilpi-Jakonen, 2017). In addition to social origin differences among poorly performing students, we argue that certain institutional contexts may lead to a situation where inequalities are magnified particularly among the best performing students. Multiplicative advantage is used to refer to situations where social origin differences across the performance distribution are largest among the well-performing students.[1]

Our contribution in this article is to analyse the interplay of social origin and previous school performance in the transition to higher education in a dual system of higher education –

which can be found in many countries across the world – and to demonstrate that such a system together with specific rules of intake may lead to compensatory advantage and multiplicative advantage taking place within the same educational transition. Organising higher education as a dual model constitutes a paradox where social class differences may, on the one hand, be reinforced by diverting lower-class children from the higher-tier institutions, giving them less education than they would otherwise; on the other hand, they may be reduced by providing lower-threshold access to higher education, giving lower-class children more education than they would otherwise receive (Brint and Karabel, 1989). We show how stratification in higher education together with the way intake is organised is associated with diversion by social origin among well-performing students (multiplicative advantage), and compensation of poor performance among students from high social origins (compensatory advantage). We argue that stratified higher education systems, especially in a situation when intake rules differ between these two institutions, are troubling in terms of social stratification.

Our empirical focus is on social origin differences in higher education enrolment across the performance distribution in Finland. The Finnish educational system, which does not comprise tuition fees and in addition provides students with state subsidies, produces a relatively large amount of educational mobility compared to other Western countries (Pfeffer, 2008; OECD, 2018), while maintaining the role of education as an essential mechanism for intergenerational class mobility more generally (Erola, 2009). Our example should be useful for testing the patterns of compensatory and multiplicative advantages in educational attainment. Finland should provide lower-bound estimates for the importance of social origin,

whereas in countries with higher levels of intergenerational inequality and education systems involving tuition fees, these associations should appear even stronger. Yet when it comes to the specific intergenerational mechanisms involved, such as compensation and multiplication, the overall institutional context may sometimes even strengthen their importance.

Two aspects of the higher education system make the Finnish case particularly interesting. Firstly, Finnish higher education is organised as a dual model, dividing the system into more vocationally oriented polytechnics and academically oriented universities. Both types of institutions provide teaching in all the broader fields of study and are quite similar in volume, but the institutions differ in their rules of intake and selectivity. Secondly, higher education, and especially university education, is mainly accessed through intake exams—though the rules of intake are currently being reformed. This reduces the importance of earlier school performance, as one can pass the entrance exam even if one's past educational success has been poor.

This article is organised as follows. First, we give an overview of the substantial amount of literature on social origin differences in educational outcomes. Second, we describe the context of the study and formalise our hypotheses. Third, we describe the high-quality Finnish register data and the methods we used to test these hypotheses. We then present our results, and conclude by discussing their implications for institutional variations in patterns of intergenerational social inequality.

Social origin differences in educational attainment

Social origin differences in educational attainment can be separated into primary and secondary effects (Boudon, 1974). Primary effects refer to the social origin differences in educational *performance*. The unequal distribution of resources between families leads to social origin differences in school performance. These differences can be due, for example, to divergent home environments or genetic factors (Jackson, 2013, p. 12–13). Secondary effects refer to the social background differences in educational *choices*, conditional on educational performance. In addition to differences by social background in school performance, students from higher social origins tend to have higher educational expectations while controlling for school performance (Boudon, 2974; Jackson, 2013). Several studies have found social origin differences in educational attainment net of school performance (e.g., Erikson et al., 2005; Holm, Hjorth-Trolle, and Jaeger, 2019; Jackson et al., 2007).

These findings are in line with the thesis of relative risk aversion by Breen and Goldthorpe (1997), who argue that educational decisions are driven by the desire to reduce the risk of children obtaining a lower class position than their parents. According to this thesis, individuals weigh the costs, benefits, and probability of success of different educational pathways, while trying to avoid downward mobility (Breen and Goldthorpe, 1997). In so doing, children from higher social origins are more likely than children from lower social origins to overcome the risks related with educational failure, and they may have parental support to compensate for false steps (Bernardi, 2012). Thus, studies of compensatory advantage have shown differences in educational transitions by social origin to be largest among poorly performing students (e.g., Bernardi and Cebolla-Boado, 2014a; Bernardi and

Cebolla-Boado, 2014b; Bernardi and Triventi, 2018). More broadly, the compensatory advantage thesis argues that privileged families are more capable of compensating for their children's disadvantageous life events than disadvantaged families (Bernardi, 2012; Bernardi and Cebolla-Boado, 2014a; Bernardi and Grätz, 2015; Grätz, 2015; Tanskanen, Erola, and Kallio, 2016; Bernardi and Triventi, 2018). Children from privileged families tend not to be negatively affected by parental divorce (Grätz, 2015), parental unemployment (Lehti, Erola, and Karhula, 2019), sibship size (Tanskanen, Erola and Kallio, 2016), or even a father's early death (Prix and Erola, 2017) in terms of their educational outcomes. Studies using information on birth month and school achievement have even provided causal evidence of compensatory advantage (Bernardi and Grätz, 2015).

Overall, children from higher social origins are less dependent on prior negative outcomes and signals in their educational pathway than children from lower social origins. As students from higher social origins "place proportionally less weight on signals about academic ability compared with low-SES [socioeconomic status] students" (Holm, Hjorth-Trolle, and Jaeger, 2019, p. 456), they are more likely to downplay their bad school grades in their further educational transitions. It is worth mentioning that we refer to grades as advantages, rather than signals, since comprehensive school grade point average (GPA, our measurement of school performance) plays a vital role in the process of applying to upper secondary education. At the end of compulsory schooling, students usually apply to multiple secondary education schools, and the selection is based on compulsory school grades. Because of this, interpreting these grades only as signals would underestimate their role in shaping educational pathways.

In contrast to mechanisms of compensation where parental advantages compensate for the lack of students' own advantages (in this case, grades), advantages may also accumulate or even multiply. With compensatory processes, well-off families may aim to avoid status loss with "defensive" strategies; in addition, families may maximise advantages with "offensive" strategies, which would lead to inequalities being observed among the high achievers (Bernardi and Ballarino, 2016, p. 265). The accumulation of advantages can be seen as a temporal process where inequalities grow over time, or as a status-resource interaction (DiPrete and Eirich, 2006, p. 292) where certain advantages are especially magnified among groups that are already advantaged. This interaction, or interplay of advantages, can operate through different patterns. Additional advantages may be equally advantageous for all (*accumulation*), they can assist only those with lots of advantages already (*multiplication*), or they can assist all but boost especially those already advantaged (*multiplicative accumulation*) (Erola and Kilpi-Jakonen, 2017, p. 7). We build on this framework and refer to *multiplicative advantage* in situations where social origin differences across the performance distribution are larger among the well-performing students than among the poorly performing ones. This leads to a situation where, rather than compensating for each other—or even being merely additive (accumulation)—different advantages actually enhance or multiply each other's influence. In this case, the additional advantage of high social origin is especially helpful to those who have the highest probability of success, namely well-performing students.

The Finnish institutional context, and our hypotheses

We study patterns of compensatory and multiplicative advantage in the Finnish educational system. In Finland, students usually attend comprehensive school from age 7 to 16, and to a large extent, all students have the same curriculum. The first educational branching point is after comprehensive school, when students can leave the educational system or continue on to vocational or general upper secondary school. From both of these upper secondary tracks, which take approximately three years to complete, students gain a qualification that is required when applying to tertiary education. Although the choice of upper secondary track is vital for later educational transitions, there are no formal dead-ends, meaning that continuing education is always possible after receiving a qualification (Figure 1). Only a few students leave the educational system directly after comprehensive school, and the enrolment rate in upper secondary education is very high compared to other OECD countries (OECD, 2018). In our sample, 86% of individuals graduated from upper secondary education within eight years after comprehensive school. Parental education is associated with gaining an upper secondary degree even after controlling for prior school performance (Kilpi-Jakonen, Erola, and Karhula, 2016). Students graduating from general upper secondary education continue on to tertiary education much more often, compared to individuals graduating from vocational upper secondary education (Ibid.). Thus, exiting the educational system and entering the labour market is most likely after vocational upper secondary or tertiary education.

Figure 1. The Finnish educational system (excluding kindergarten and doctoral education).

*****FIGURE 1 HERE*****

The higher education system consists of universities and polytechnics, which both provide teaching in all broad fields of studies. While nearly all university programs automatically allow accepted students to continue to master's-level studies, the polytechnic programs stop at the bachelor's degree and only rarely provide master's-level programmes. Universities focus more on academic research, whereas polytechnics are more vocationally oriented institutions (Välimaa 2019, p. 279). The establishment of vocationally oriented polytechnics in the 1990s—by upgrading post-secondary (lowest-level tertiary) vocational institutions—was aimed at increasing participation rates in higher education and providing more equal educational opportunities. In particular, the aim was to increase the numbers of vocationally oriented and highly educated people in the business sector (Välimaa, 2019, p. 279). This also raised the overall enrolment rate in higher education.

Entry into higher education is highly competitive due to government-imposed limitations on student intake. In the academic year 2011–2012, 31% of applicants were accepted to university and 37% were accepted to polytechnics; 11% were accepted to both institutions, of whom around 80% chose to go to university (Kumpulainen, 2014). These figures also indicate that despite the increase in the volume of enrolment over the previous decades, the overall intake is still substantially smaller than the demand for higher education, and particularly so for the programs provided by the universities. Indeed, the restricted intake has also lead to falling overall levels of educational attainment among the youngest cohorts, and increased competition for access to higher education (Kalenius and Karhunen, 2018).

There are entrance exams to both universities and polytechnics, but the exams themselves and preparation for them vary considerably, as materials for the exams for polytechnics are

published approximately one month before the exam, compared to universities, where materials are published usually at least half a year before the exam (though recently this has changed somewhat). In addition, for access to polytechnics, grades from upper secondary school, as well as other qualifications such as work experience, are more important in the application process than for universities (Thomsen et al., 2017). Students applying to polytechnics appreciate the working life orientation of the studies and the less selective access, whereas students applying to universities appreciate theoretical knowledge and the quality of education in their studies (Vuorinen and Valkonen, 2003).

As also pointed out by Thomsen et al. (2017), competition for access is higher for university than for polytechnics. With less selective entrance, polytechnics may provide access to higher education for poorly performing students from high social origins who aim to avoid downward mobility but are unable to access university, thus increasing their probability to enter polytechnics rather than exit education, in contrast to similarly performing students from low social origins. With our *compensatory advantage hypothesis*, we thus assume that social origin differences in access to polytechnics are larger at the lower end of the performance distribution and the differences decrease as school performance increases (see Figure 2).

For university access, entrance exams play a more significant role. Until very recently, university entrance exams required a substantial amount of preparation, which has made private preparatory courses increasingly popular, to the extent that they have come to be considered necessary especially in the most prestigious fields, such as medicine and law (Kosunen, Haltia, and Jokinen, 2015). The fees for these courses can be several thousands of

euros, the most expensive ones promising to return the fee if a student does not pass the test. These courses are especially popular among applicants from higher social origins (Kosunen et al., 2020).

Thus, certain institutional features, such as highly selective intake through entrance exams for which time- and money-consuming preparation courses are nearly necessary, may lead to situations where differences according to parental education are large, especially among well-performing students. At the same time, polytechnics may be considered as a less risky option, especially by well-performing children from lower social origins who wish to enter higher education but do not have sufficient knowledge of what it takes to succeed at university, thus increasing their probability to enter a polytechnic rather than a university, in contrast to similarly performing students from high social origins. With our *multiplicative advantage hypothesis,* we assume that social origin differences in access to university are smaller at the lower end of the performance distribution and the differences increase as school performance increases (Figure 2). It is worth noting that university enrolment is unlikely among all social origin groups at the lower end of the performance distribution which partly explains why larger differences emerge at the higher end of the performance distribution.

Figure 2. Compensatory and multiplicative advantage. For simplicity, all associations are displayed as linear, even if we allow for nonlinearities in our empirical models.

*****FIGURE 2 HERE*****

Data

To test these hypotheses, we use register data obtained from Statistics Finland, which consists of a 5% population sample of individuals who finished their comprehensive school during the years 2000–2004 and were under the age of 25. The sample is stratified according to registered language, and includes an over-sampling of students registered as speaking a language other than Finnish, for which we adjust using sampling probability weights in all analyses, in addition to controlling for students' registered language in the regression models. The data is structured as an individual-level panel, but we analyse individuals only at one time point, for which we use accumulated data for the eight years following comprehensive school completion. Consequently, all our variables are time-invariant. The data contains information about registration in different types of educational institutions and qualifications gained in those eight years, parental education, as well as basic demographic information, such as gender and registered language.

The outcome of interest is a categorical variable with a value of 0 for no higher education enrolment, 1 for polytechnics enrolment, and 2 for university enrolment during the eight years after finishing comprehensive school. We only analyse students who completed upper secondary education during these eight years, as a qualification from upper secondary school is required for accessing tertiary education. We are interested in enrolment in higher education, not in its completion. Those few individuals (N=904, a weighted 4% of the total sample) who enrolled in both a university and a polytechnic, are treated as enrolling in university. After excluding individuals without an upper secondary degree (N=3,655, weighted 14%), and individuals with missing value in school performance (N=326, weighted

2%), the result is an analytical sample of 19,224 observations (83% of the initial sample). Supplementary analyses including individuals without an upper secondary degree can be found in the online appendix.

Explanatory variables include students' school performance and social origin. Our measure of school performance is based on the average of teacher-given grades at the end of comprehensive school, and is thus a continuous measure. Access to upper secondary education is mostly based on this GPA, but in accessing higher education, this GPA is no longer relevant. However, the end of comprehensive school is the last time when grades are measured with the same scale and from the same curricula, so it is also the last point when students' grades are comparable. The scaling ranges from 4 to 10, but for anonymisation reasons the GPA in our data runs from 6 to 9.5 (bottom and top coding of 4.0–6.0 and 9.5–10.0, respectively). In the regression analyses, we use GPA as centred to its weighted mean of the analytical sample (7.91) to make interpretation of results more straightforward. In these models, comprehensive school GPA is included as a linear and a square term to capture nonlinearity; further polynomials were not found to be significant for any social origin groups.

We measure social origin by maximum parental education. We measure the highest attained education level of either parent at the time the student finished comprehensive school. The variable is divided into four categories: university degree, lowest-level tertiary education, secondary education, and basic education or less. In the last category, there are also parents whose education level is unknown.

In all our regression models, we control for the type of upper secondary education obtained (as a dummy variable), gender (as a dummy variable) and registered language (Finnish, Swedish, or other). Descriptive statistics of our dependent, explanatory, and control variables are shown below (Table 1).

TABLE 1 HERE

Analytical strategy and methods

To examine how the enrolment in higher education is associated with parental education and previous school performance, we start by displaying descriptive analyses by each of the combined associations: shares of parental education over the GPA distribution, shares of enrolment over the GPA distribution, and enrolment in higher education by parental education.

In the next step, we use multinomial logistic regression, as our outcome of interest has three values: not continuing at all, polytechnics enrolment, or university enrolment. All the results from the multinomial logistic regression models are presented as marginal effects. Because we estimate marginal effects, we predict each outcome at a time, with the other options treated as the reference group (e.g., university enrolment versus no enrolment in higher education and polytechnics enrolment). The first results (Table 2) are presented as average marginal effects (AME). The major advantages of AME, especially for logistic models, are that it is possible to compare effect sizes across models and groups, since coefficients of AME are not affected by unobserved heterogeneity, and that results can be interpreted as predicted probabilities (Mood, 2010).

Another crucial advantage of having estimates as predicted probabilities is that the results of interactions can be interpreted more correctly (Mize, 2019). In the last step, we include an interaction term for GPA and parental education. As AME provides only a single estimate of the marginal effect (Williams, 2012), we instead calculate predictive margins over each parental education group at fixed values of GPA. We plot the estimates in figures because visualising predicted probabilities with interactions of one nominal and one continuous independent variable is important, and almost necessary, for interpreting the results (Mize 2019, p. 106). Holding GPA at fixed values allows us to focus on our primary object of interest: whether differences in higher education enrolment across the GPA distribution differ according to parental education.

In addition to the figures displaying the overall predicted probabilities for different parental education categories across the performance distribution that are presented in the main text, the online appendix presents the predicted difference—or the marginal effect—of parental education categories at fixed values of GPA using university educated parents as the reference category. These figures thus present the predicted differences and associated confidence intervals from a different point of view.

Results

Descriptive analyses

In Figure 3, the shares of parental education are plotted across the distribution of comprehensive school GPA. GPA is associated with parental education: students from highly educated families are overrepresented at the higher end of the GPA distribution, whereas

students from less-educated families tend to have lower average grades. Individuals with parental lowest-level tertiary education are the most evenly distributed across the GPA distribution.

Figure 3. Shares of parental education over comprehensive school GPA (N=19,224).

*****FIGURE 3 HERE*****

Comprehensive school GPA is also associated with enrolment in higher education (Figure 4). Most students who perform above average in comprehensive school continue to tertiary education, and the very well-performing ones most often go on to university. The lower the GPA, the smaller the share of students enrolling in higher education. There are no individuals in our sample accessing university with a GPA of 6.1 or below, and only very few with a GPA below 7. Students who enrol in higher education with school performance around the mean (7.91) enrol in polytechnics to a greater extent than in universities.

Figure 4. Shares of enrolment in higher education in eight years after comprehensive school over the comprehensive school GPA (N=19,224).

*****FIGURE 4 HERE*****

In addition to previous school performance, enrolment in higher education is also associated with parental education (Figure 5). The higher the parental education, the larger the share of students entering higher education. The most substantial difference between parental education groups is in university enrolment: 8% of students from families with basic education (or less) enrolled in university whereas 49% of students from families with a university degree did the same. The higher the parental educational group, the smaller the

proportion of students not enrolling in higher education. Of students with parental lowest-level tertiary education, 39% enrolled in polytechnics, whereas among students whose parents have a university degree, only 31% did the same. Students with a parental university degree are the only group among whom university enrolment is more common than accessing polytechnics.

Figure 5. Enrolment in higher education in eight years after comprehensive school by highest parental level of education (N=19,224), in %.

*****FIGURE 5 HERE*****

Multivariate regression analyses

Average marginal effects from multinomial logistic regression models are presented in Table 2. We conducted our models in three steps. For the first model (AMEs presented as 1a, 1b, and 1c) we included only parental education and control variables (gender and registered language) to estimate the gross association between social origin and enrolment. To calculate secondary effects, i.e., the association between social origin and educational outcomes net of school performance, we added comprehensive school GPA to the model (2a, 2b, and 2c). In the last model (3a, 3b, and 3c), we additionally controlled for upper secondary school track (general versus vocational), as it is highly correlated with parental education and comprehensive school GPA, and is crucial for later educational transitions. By adding this control, we adjust our models to differences emerging from tracking choices made at age 16, which is not the subject of this study.

TABLE 2 HERE*

Our results show that parental education is associated with higher education enrolment after controlling for gender and registered language (Model 1). The higher the parental education, the lower the estimated probability of not enrolling in higher education (M1a). Estimating university enrolment by parental education (M1c), students whose parents have a university degree enrol in university with a probability of 41 percentage points greater than students from families with a basic education or less, keeping other covariates constant. However, a parental university degree is associated with only an eight-percentage-point increase in the probability of enrolling in polytechnics compared to parental basic education, controlling for gender and registered language (M1b). Previous studies from Finland have shown that there is a strong link between high social origin and access to university (Nori, 2011), but not to polytechnics (Kivinen, Hedman, and Kaipainen, 2012). The net estimates for parental lowest-level tertiary and secondary education compared to parental basic education are statistically significant and positive for both types of higher education enrolment. Whereas for parental university education, there are large differences in these estimates between polytechnics enrolment (eight percentage points) and university enrolment (41 percentage points), the AME of the parents' lowest-level tertiary education in enrolment is 16 percentage points for both institutions.

By adding comprehensive school GPA to the models, we can see that the associations between parental education and higher education enrolment are partly explained by a student's school performance, as parental education coefficients are strongly reduced (Model 2). However, almost all the estimates remain statistically significant, signifying that there are associations between parental education and enrolment that cannot be explained by school

performance. The inclusion of GPA fully explains the difference between parental basic education and a university degree regarding enrolment in polytechnics (M2b), as well as the difference between parental basic and secondary education regarding enrolment in university (M2c). The net estimate of GPA is statistically significant and positive for enrolment in polytechnics and university, though the estimate is larger for the latter.

In the last model (Model 3), we additionally control for upper secondary school qualification. Those graduating from general upper secondary school have a much higher probability of higher education enrolment, as found in previous studies (Kilpi-Jakonen, Erola, and Karhula, 2016). After controlling for upper secondary school degree, the net estimate of GPA becomes negative for enrolment in polytechnics. However, as mentioned in the Methods section, AMEs provide only one average estimate of the marginal effect, which shows neither potential non-linearities nor interactions (even when these are included in the models themselves). To focus on our main contribution—whether there are differences in enrolment probabilities across the GPA distribution by parental education—we next add an interaction term between GPA and parental education, and calculate adjusted predictions for fixed values of GPA.

Same pattern but different levels: No enrolment in higher education

As shown in Figure 6, the higher the parental education, the higher the predicted probability to enrol in higher education across the GPA distribution (for tests of statistically significant differences between the marginal effect of a parental university degree versus others at the same fixed values of GPA, see the online appendix). At the lower end of the GPA distribution (at the minimum value of GPA), the difference in predicted probability between

the lowest (basic) and highest (university) parental education group is 23 percentage points, and at the higher end of the GPA distribution (at the maximum value of GPA), the difference in predicted probability between parental basic and university education is 14 percentage points. However, even if the levels of predicted probabilities differ substantially between parental education groups, the trend seems to be the same for all: the chance of no enrolment in higher education decreases as GPA increases.

Figure 6. No enrolment in higher education, according to comprehensive school GPA and the highest parental level of education (N=19,224). The model controls for gender, upper secondary qualification type, and registered language. The estimates have a 95% confidence interval.

*****FIGURE 6 HERE*****

Compensatory advantage: Enrolment in polytechnics

Students with comprehensive school GPAs around or below the mean, and who have highly educated parents (lowest-level tertiary or university degree) are much more likely to enrol in polytechnics compared to students with the same grades but no parental tertiary education degree (Figure 7). Students who performed above the mean and have a parental university degree are less likely to enrol in polytechnics compared to other parental education groups. There are almost no differences between parental lowest-level tertiary and university education groups below the mean, but substantial differences above the mean. These results suggest that polytechnics provide access to higher education especially for poorly performing students from highly educated families, as indicated in the compensatory advantage hypothesis. Polytechnics also provide access to higher education for well-performing students from less-educated families.

Figure 7. Enrolment in polytechnic according to comprehensive school GPA and the highest parental level of education (N=19,224). The model controls for gender, upper secondary qualification type, and registered language. The estimates have a 95% confidence interval.

*****FIGURE 7 HERE*****

Multiplicative advantage: Enrolment in university

The trend is very different when we compare these results to university enrolment (Figure 8). Predicting the probability of university enrolment, the differences by parental education groups are most substantial for the students performing above the mean. Differences between a parental university degree and the lower levels of parental education arise immediately with rather poor school results, and are substantial across the whole GPA distribution (for the tests of statistically significant differences between the marginal effect of parental university degree versus others at the same fixed values of GPA, see the online appendix). The difference between the two highest levels of parental education remains relatively constant across the performance distribution, but the difference in comparison with the lower levels of parental education begins to increase around the mean of the GPA distribution, and continues to grow before levelling off near the top of the performance distribution. Nevertheless, we should note that this is the case for absolute (percentage point) differences between the parental education groups, whereas relative differences between groups are almost constant across the performance distribution (results not shown). Overall, this pattern provides support for the multiplicative advantage hypothesis.

Figure 8. Enrolment in university according to comprehensive school GPA and the highest parental level of education (N=19,224). The model controls for gender, upper secondary qualification type and registered language. The estimates have a 95% confidence interval.

*****FIGURE 8 HERE*****

Robustness checks

We conducted several robustness checks to test our results, and in all cases the conclusions were the same. More specifically, we ran the interaction models separately by gender, by the upper secondary track students graduated from, for students who entered university via polytechnics to capture a pathway used mostly by students from lower social origins (Kilpi-Jakonen, Erola, and Karhula, 2016), and for all who finished comprehensive education (rather than just those who finished upper secondary education). These last results are also included in the online appendix. We also ran the models separately using the mother's education and the father's education.

Discussion

Social origin differences in higher education enrolment in Finland vary across the performance distribution and higher education destination. Students from more educated families enter higher education more often compared to students from less educated families. Moreover, this is not just because of better school performance or because of different educational choices made at age 16. In addition, parental education and prior school performance interact to produce different probabilities of entry depending on the type of higher education that students enter.

Among students performing below the mean, those with parental tertiary-level education are more likely to access polytechnics than those without parental tertiary-level education. Thus, polytechnics seem to provide a passage for higher social origin families to obtain higher education for their poorly performing children. These results support our first hypothesis,

compensatory advantage. However, among students performing above the mean, those with a parental university degree were less likely to enrol in polytechnics compared to those without a parental university degree. This indicates that polytechnics may also operate as an important channel for well-performing students from less privileged families to obtain a higher education degree, as they might see polytechnics as a less risky choice. Well-performing students with no parental tertiary-level education are more likely to enrol in polytechnics compared to other parental education groups, and well-performing students with a parental university degree are more likely to enrol in university compared to other parental education groups.

For university enrolment, differences by parental education groups seem most substantial among these well-performing students. Thus, our second hypothesis, *multiplicative advantage*, also gained support. These differences in the choice of the higher education type among well-performing students might derive from relative risk aversion (Breen and Goldthorpe, 1997). Well-performing students are more likely to continue to higher education than poorly performing students, but those from lower social origins might believe that a polytechnics degree will provide enough education to avoid downward mobility, with a shorter degree length and a less-selective intake compared to university, whereas students from higher social origins have stronger incentives to pursue university education to avoid downward mobility. Thus, the dual model may increase the chances of students from lower social origins obtaining a higher education degree, as well as tempt students from lower social backgrounds away from higher-threshold institutions, as argued in the diversion thesis

by Brint and Karabel (1989) and Rouse (1995). The diversion seems to occur especially among the well-performing students.

The Finnish institutional context, with its dual model of higher education, means that mechanisms of both compensatory and multiplicative advantage are in operation. Multiplicative advantage seems to occur in highly selective institutions, whereas compensatory advantage seems to work in lower-threshold institutions. We argue that these differences in the forms of intergenerational transmission of advantages are at least partly due to the rules of intake. Intake to university by entrance exams, and the use of private preparatory courses, which are especially popular among high-SES university applicants (Kosunen et al., 2020), may be one explanation why differences by parental education groups were so large among well-performing students.

It has been argued that social origin differences in educational outcomes could possibly be reduced by limiting parents' freedom of choice (Dollman, 2016) or regulating access through ability assessments (Contini and Scagni, 2011, p. 224). However, additional ability assessments (i.e., intake exams) may even reinforce social origin differences if time- and money-consuming preparation for those mainly attracts (or is possible for) children from privileged families. As Raftery and Hout (1993, p. 60, emphasis in the original) put it: "There is no *necessary* connection between meritocracy and equality among social classes." The Finnish context will also provide an interesting empirical test in the future, as the higher education intake process is currently being transformed into one that places a greater emphasis on prior school performance, and with fewer places being allocated through intake exams.

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Endnotes

[1] Similar processes have also been referred to as boosting effects (Bernardi and Ballarino, 2016). We see multiplicative advantage as being a more accurate description here: we do not have a theoretical presupposition that one advantage boosts (or moderates) the other, but rather that they interact in such a way that the differences in both are increased.