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## Delayed Educational Inequality after the COVID-19 Pandemic: Vertical Stability and Horizontal Divergence in University Enrollment in Japan



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# **Delayed Educational Inequality after the COVID-19 Pandemic: Vertical Stability and Horizontal Divergence in University Enrollment in Japan**

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## **Abstract**

The COVID-19 pandemic caused widespread school closures and economic disruption, raising concerns about widening socioeconomic inequalities in educational attainment. While prior research has documented substantial learning losses, it remains unclear whether these translated into inequalities in actual educational transitions and whether such effects emerged immediately or with delay. Using multi-cohort longitudinal data from the Japanese Longitudinal Study of Children and Parents (JLSCP), this study examines how the timing of exposure to the pandemic shaped socioeconomic inequalities in the transition to higher education. The results show that socioeconomic inequalities in overall university enrollment remained stable, and there is little evidence of widening inequality among students who faced the transition to higher education during the pandemic. However, among cohorts exposed to the pandemic during compulsory education, educational inequality in access to selective universities widened with a delay. These findings suggest that the consequences of pandemic-related disruptions did not immediately translate into inequalities in educational attainment but instead became visible later. This study highlights the importance of assessing the impact of negative societal shocks over the long term, as initial disadvantages may accumulate and lead to delayed educational inequality.

*Keywords:* COVID-19 pandemic, educational inequality, transition to higher education, selective universities, cumulative disadvantage

## 1. Introduction

In spring 2020, the spread of the novel coronavirus triggered the COVID-19 pandemic, causing unprecedented disruption worldwide and leading to widespread school closures that severely affected education systems (OECD, 2021). A large body of research has consistently shown that pandemic-related school closures had significant negative effects on children's academic achievement and mental health (Betthäuser et al., 2023; Cruz et al., 2025; Di Pietro, 2023; Hammerstein et al., 2021; König & Frey, 2022; Wisenöcker et al., 2025). Despite this emphasis on the educational crisis, it remains unclear whether these disruptions translated into persistent socioeconomic inequalities in educational attainment (Ravn, 2025; van de Werfhorst et al., 2024). To address this gap, this study examines whether and how the timing of exposure to the pandemic shaped socioeconomic inequalities in educational attainment across cohorts.

This study draws on a cross-cohort longitudinal survey of Japanese high school students conducted between 2017 and 2025, with the pre-pandemic cohort serving as a benchmark. By comparing cohorts exposed to the pandemic at different stages of their educational trajectories, it assesses whether pandemic-related inequalities emerged immediately or instead appeared later among cohorts exposed to the pandemic at earlier stages. The central question is whether pandemic-related disruptions have delayed consequences that persist beyond the immediate shock or whether educational systems facilitate recovery. Two competing perspectives from the literature on social stratification offer contrasting expectations. One perspective emphasizes the equalizing role of schooling (Downey et al., 2022), suggesting that inequalities may diminish after schools reopen. Another highlights cumulative disadvantage (DiPrete & Eirich, 2006), suggesting that initial disadvantages may persist or widen over time. Because learning is a cumulative process,

initial disadvantages may be particularly pronounced for students from disadvantaged backgrounds who face greater difficulties in recovery (Contini et al., 2025; Hammerstein et al., 2021). However, whether pandemic-related disruptions lead to recovery or persistent inequalities in educational attainment remains an open empirical question, as few studies have examined their impact on actual educational attainment (Ravn, 2025; van de Werfhorst et al., 2024).

Building on these perspectives, the timing of exposure is critical for determining whether pandemic-related disruptions generate delayed inequalities in the long term. Although earlier exposure may provide more time for recovery before the transition to university, younger students are more vulnerable to learning disruptions and more dependent on family resources, making early shocks potentially more consequential (Hammerstein et al., 2021; König & Frey, 2022). Given the cumulative nature of learning, such early disadvantages may persist and widen over time (DiPrete & Eirich, 2006), leading to more pronounced inequalities at the transition to higher education. Because existing research has primarily focused on younger students or short-term changes before and after the pandemic (Betthäuser et al., 2023; Contini et al., 2025; Maldonado & De Witte, 2022), it has paid limited attention to how variation in exposure timing translates into inequalities in educational transitions. As a result, existing research may overlook the possibility that the negative effects of the pandemic on educational attainment unfold with a delay.

Moreover, the pandemic may have affected not only whether students enroll in higher education but also where they enroll, particularly in access to selective universities. As higher education expands, competition for access to selective institutions tends to intensify (Bound et al., 2009), whereas pathways to higher education open up even for students with lower levels of academic achievement (Amano & Poole, 2005). The theory of effectively maintained inequality highlights horizontal differentiation within the same level of vertical educational attainment in the

context of expanding higher education (Lucas, 2001, 2009). Even small differences in academic achievement are likely to be magnified in high-stakes examinations, leading to qualitative differentiation in educational attainment (Ono, 2007). Given that existing pandemic research has primarily focused on widening socioeconomic disparities in academic achievement (Betthäuser et al., 2023; Di Pietro, 2023; Hammerstein et al., 2021), such disparities may be reinforced through highly competitive entrance examinations. This implies that pandemic-related inequalities are most clearly realized at selective thresholds within higher education rather than in overall enrollment, and the consequences of the pandemic may be underestimated if horizontal differentiation in where students enroll is not taken into account (Aucejo et al., 2020).

This study extends theories of cumulative disadvantage by showing that temporary social shocks can generate delayed inequalities in educational attainment. This paper examines how cohort-specific exposure to the pandemic shapes socioeconomic inequalities in educational attainment by identifying when pandemic-related inequalities emerge and in which vertical and horizontal dimensions of educational attainment they become most visible. Japan provides a particularly informative case, as university admission is strongly structured by competitive entrance examinations—often described as “examination hell” (Ono, 2007)—which make transitions to higher education highly sensitive to even small differences in academic achievement.

## **2. Theoretical Background**

### **2.1. The Twin Shocks of the Pandemic and Educational Inequality**

The negative consequences of school interruptions for children have been widely documented even before the COVID-19 pandemic. A large body of research has documented that interruptions to schooling—such as summer breaks (Alexander et al., 2007; Cooper et al., 1996; von Hippel et al.,

2018), and teacher strikes (Belot & Webbink, 2010; Jaume & Willén, 2019)—lead to learning losses and may widen educational inequalities. The COVID-19 pandemic differs from earlier disruptions in that it affected not only children but also their families on a global scale, thereby producing a “twin shock” of educational disruption and economic hardship (Azevedo et al., 2021). This combination of shocks is likely to have reinforced existing socioeconomic inequalities by simultaneously affecting both learning processes and family resources.

The first shock, school closures, likely reinforced pre-existing socioeconomic inequalities in academic achievement. Meta-analyses and systematic reviews show that the pandemic had negative effects on children’s academic achievement and mental health, with learning losses disproportionately concentrated among socioeconomically disadvantaged students (Betthäuser et al., 2023; Cruz et al., 2025; Di Pietro, 2023; Hammerstein et al., 2021; König & Frey, 2022; Wisenöcker et al., 2025). While schools attempted to maintain instruction through remote or online learning (OECD, 2021), distance learning was generally less effective than school-based instruction (Jack et al., 2023). Children from advantaged families were more likely to benefit from supportive home environments (Andrew et al., 2020; Francis & Weller, 2022), and active parental support for distance learning (Bonal & González, 2020; Domina et al., 2021), whereas those from disadvantaged backgrounds faced greater constraints due to limited cultural and economic resources (Lareau, 2015), thereby widening achievement gaps (Engzell et al., 2021; Maldonado & De Witte, 2022). These patterns suggest that school closures amplified pre-existing socioeconomic inequalities in academic achievement by shifting the locus of learning from schools to families, thereby increasing the role of family resources (Engzell et al., 2021; Jack et al., 2023).

The second shock, economic hardship, further reinforced socioeconomic inequalities in both academic achievement and educational choices. Research on the labor-market consequences

of the pandemic consistently shows large negative effects on employment, working hours, and income, with disproportionate impacts on more vulnerable groups such as lower-educated workers and women (Abugamza et al., 2024). These economic shocks likely affected families' capacity to invest in their children's education. Socioeconomically disadvantaged families have fewer resources to maintain or increase educational investments (Lunn & Kornrich, 2018), whereas more advantaged families may increase investments in shadow education to compensate for learning disruptions (Lee et al., 2023; Matsuoka, 2026), which further reinforces disparities in academic achievement. At the same time, economic hardship may shape educational choices by making socioeconomically disadvantaged families more pessimistic about the perceived benefits, costs, and subjective probabilities of success of university enrollment (Stark et al., 2022), leading to downward revisions of educational plans and lower educational aspirations (Aucejo et al., 2020; Glick et al., 2025; Matsuoka, 2026). These mechanisms indicate that economic hardship further widened socioeconomic inequalities in both academic achievement and educational choices.

Pre-pandemic research has long distinguished between two mechanisms underlying educational inequality: primary effects, referring to socioeconomic differences in academic achievement, and secondary effects, referring to socioeconomic differences in educational choices at key educational transitions (Boudon, 1974; Breen & Goldthorpe, 1997). Although it is difficult to precisely assess how primary and secondary effects contributed to cohort differences generated by the pandemic, as this would require detailed measures of academic achievement and carefully designed data (Matsuoka, 2026; Stark et al., 2022), the twin shocks could have amplified both mechanisms, potentially widening overall educational inequality in attainment. However, little is known about whether these inequalities emerged immediately or developed over time, as few studies have examined the long-lasting impact on educational attainment.

## **2.2. The Timing and Location of Pandemic Effects in Educational Attainment**

While existing research has documented the negative consequences of the pandemic's twin shocks for children's academic achievement, mental health, and educational expectations (e.g., Betthäuser et al., 2023; Glick et al., 2025; Wisenöcker et al., 2025), evidence on educational attainment remains limited and mixed (e.g., Ravn, 2025; Repo et al., 2025; van de Werfhorst et al., 2024). Ravn (2025), using Danish register data, shows that the pandemic reduced transitions to upper secondary education, with particularly negative effects among socioeconomically disadvantaged students. By contrast, van de Werfhorst et al. (2024), analyzing track placement in Dutch secondary education, find that socioeconomic inequalities in track placement did not increase substantially during the pandemic. Similarly, Repo et al. (2025), using Danish multi-cohort data, find little change in existing socioeconomic inequalities in educational choices. This divergence is puzzling given the consistent evidence of widening inequalities in academic achievement (e.g., Betthäuser et al., 2023; Wisenöcker et al., 2025), raising the question of when and where pandemic-related inequalities in educational attainment become visible.

A key explanation for the relatively limited expansion of socioeconomic inequalities in educational attainment is the timing of exposure to the pandemic. Given the cumulative nature of learning, early disadvantages caused by the pandemic are unlikely to translate immediately into inequalities in educational attainment but instead accumulate over time (DiPrete & Eirich, 2006), and become consequential at key educational transitions where selection is based on academic performance. Several studies suggest that learning losses were more pronounced among younger students (Hammerstein et al., 2021; König & Frey, 2022), implying that these effects may not be fully visible immediately after the shock but may instead unfold gradually over time as the most

affected cohorts reach the transition to higher education. As a result, inequalities in educational attainment may remain latent in the short term (van de Werfhorst et al., 2024), and only emerge later when cohorts exposed earlier to the pandemic face high-stakes selection. However, much of the existing research examines only a relatively short period before and after the pandemic (Ravn, 2025; van de Werfhorst et al., 2024) and rarely adopts a multi-cohort design (Repo et al., 2025), thereby limiting our ability to detect such delayed and transition-specific inequalities.

A further limitation of existing research is that it focuses primarily on track placement within secondary education rather than transitions to higher education, thereby overlooking where pandemic-related inequalities are most likely to become visible. Inequalities are likely to emerge most clearly at educational transitions that involve high-stakes selection based on academic performance, particularly in access to selective universities, given the substantial learning losses and the difficulty of recovery (Betthäuser et al., 2023; Di Pietro, 2023; Hammerstein et al., 2021). van de Werfhorst et al. (2024) suggest that socioeconomic inequalities in track placement did not increase as much as inequalities in academic achievement, partly due to policy interventions mitigating the consequences of the pandemic. In terms of recovery from the pandemic, policy interventions such as financial support may have partially offset the effects of economic hardship on educational choices, whereas they are likely to be less effective in compensating for long-lasting learning losses. While pandemic-related inequalities are likely to become more pronounced at later transitions where selection intensifies, it remains unclear to what extent the pandemic has produced lasting consequences for the transition to higher education.

### **3. Hypotheses**

This study examines whether pandemic-related inequalities in educational attainment emerge immediately or instead unfold over time. Although policy interventions such as financial support may have mitigated the immediate impact on educational attainment (van de Werfhorst et al., 2024), the twin shocks of school closures and economic hardship may have exacerbated socioeconomic inequalities in academic achievement and increased disparities in educational choices by worsening the future outlook of disadvantaged students (Matsuoka, 2026; Stark et al., 2022). While the equalizing role of schooling suggests that educational inequalities may diminish after schools reopen (Downey et al., 2022), theories of cumulative disadvantage predict that initial disadvantages persist and may widen over time (DiPrete & Eirich, 2006).

Given that a growing body of research indicates that younger students experienced larger learning losses during the pandemic, particularly among those from disadvantaged socioeconomic backgrounds (Hammerstein et al., 2021; König & Frey, 2022), these early disadvantages may persist, resulting in delayed inequalities at the transition to higher education, as the most affected cohorts reach this transition later. These arguments lead to the following hypotheses.

**Hypothesis 1 (Immediate effect):**

Socioeconomic inequalities in educational attainment are greater among cohorts that faced the transition to higher education during the pandemic than among pre-pandemic cohorts.

**Hypothesis 2 (Delayed effect):**

Socioeconomic inequalities in educational attainment are greater among cohorts exposed to the pandemic at earlier stages of their educational trajectories than among pre-pandemic cohorts.

This study tests these hypotheses by operationalizing socioeconomic status using both parental education and household income. The first shock, school closures, may strengthen the role of parental education by increasing the importance of cultural resources within the family (Domina et al., 2021), whereas the second shock, economic hardship, may amplify the role of household income by constraining economic resources (Matsuoka, 2026). Because economic resources may be more sensitive to government financial support implemented during the pandemic than cultural resources, focusing on a single dimension of socioeconomic status may underestimate the extent of pandemic-related educational inequality.

Moreover, this paper focuses not only on vertical educational inequality in whether students enroll in higher education but also on horizontal educational inequality in where they enroll. In recent years, pathways to higher education have expanded even for students with lower levels of academic achievement (Amano & Poole, 2005), whereas admission to selective universities typically requires highly competitive entrance examinations (Ono, 2007). Because initial learning losses may translate into persistent inequalities in academic performance (Hammerstein et al., 2021; König & Frey, 2022), pandemic-related disruptions may be more pronounced in inequalities in access to selective universities, where qualitative differences in educational attainment are most consequential for later life chances (Lucas, 2001, 2009).

#### **4. Japanese Context**

The Japanese educational system comprises nine years of compulsory education followed by three years of high school. After high school, students can enroll in higher education, including four-year university programs leading to a bachelor's degree. The vast majority of students proceed to

high school after completing compulsory education; in 2025, the enrollment rate reached 98.6% and the graduation rate was around 99% (Ministry of Education, Culture, Sports, Science and Technology, 2025a). Although high school education has effectively become universal, the university enrollment rate remains substantially lower, at 58.6%, and access to university outside the standard high school-to-university transition is limited (Ministry of Education, Culture, Sports, Science and Technology, 2025a). As a result, the main axis of educational inequality in Japan has shifted to the transition from high school to university (Ishida, 2007). Prior to the COVID-19 pandemic, educational inequality remained relatively stable over time (Fujihara & Ishida, 2016), partly due to high university tuition and insufficient scholarship programs (Nakazawa, 2016).

In addition to financial barriers, socioeconomic inequalities in the transition from high school to university are also shaped by differences in academic ability. The Japanese high school system is strongly stratified through academic tracking (Kariya, 2011), such that students' subsequent educational pathways are largely structured by the type and selectivity of high school they attend (Fujihara, 2024). Educational expansion has opened up pathways to higher education even for students with lower academic achievement, which is partly due to the diversification of admission routes and the decline in overall selectivity in recent decades (Amano & Poole, 2005). However, entry into selective universities still requires passing highly competitive entrance examinations (Ono, 2007) and these institutions offer substantial returns in the labor market (Toyonaga, 2025), increasing the importance of qualitative differences in educational attainment.

In this context, the COVID-19 pandemic reached Japan in early 2020. In March 2020, the Japanese government requested nationwide school closures, leading to widespread suspension of in-person instruction. In addition to this first shock, the economic downturn associated with the pandemic generated a second shock in the form of economic hardship, affecting many households,

particularly those with lower income and lower levels of parental education (Kikuchi et al., 2021). Although schools gradually reopened after May 2020, instructional time was often reduced, and remote or online learning was implemented (Ministry of Education, Culture, Sports, Science and Technology, 2020), which had substantial negative effects on children's learning (Asakawa et al., 2025). While the most severe disruptions were concentrated in the 2020 academic year, a growing body of evidence indicates that these disruptions were associated with learning loss and widening socioeconomic disparities in academic achievement during compulsory education (National Institute for Educational Policy Research, 2024). This is particularly important because widening educational inequalities during compulsory education plays a decisive role in track placement in academically tracked upper secondary systems (Fujihara, 2024).

National assessment data indicate that average test scores among students in compulsory education remained relatively stable between 2016 and 2021 but declined substantially by 2024, with larger declines observed among socioeconomically disadvantaged students (National Institute for Educational Policy Research, 2024). OECD (2023) similarly reports that achievement gaps in Japan widened between 2018 and 2022, as higher socioeconomic groups improved while lower socioeconomic groups remained stable (OECD, 2023:167). To mitigate the consequences of the pandemic, the Japanese government implemented policy measures, including support for online instruction (Ministry of Education, Culture, Sports, Science and Technology, 2020) and the introduction of a need-based financial aid program that provided substantial tuition reductions and grants to students from low-income households (Ministry of Education, Culture, Sports, Science and Technology, 2025b). Although this ongoing financial aid program may have mitigated the impact of economic hardship, it remains unclear whether widening achievement gaps during compulsory education translate into socioeconomic inequalities in educational attainment.

## **5. Methods**

### **5.1. Data**

This study uses data from the graduation survey of the Japanese Longitudinal Study of Children and Parents (JLSCP), which was administered annually between March 2017 and March 2025. The JLSCP is a large-scale multi-cohort longitudinal study conducted from 2015 (wave 1) to 2025 (wave 10) by the Institute of Social Science at the University of Tokyo and the Benesse Educational Research and Development Institute. The Benesse Educational Research and Development Institute is one of Japan's leading educational research organizations and maintains a large-scale survey panel covering more than half of children nationwide. This survey panel is widely used as a major sampling frame for assessing educational conditions in Japan (Benesse Educational Research and Development Institute, 2026), and has provided multiple survey datasets that have been widely used in Japanese academia (Social Science Japan Data Archive, 2024).

The JLSCP used this survey panel to sample children and their parents across 12 grade levels in 2015, ranging from first grade of compulsory education to third year of high school. The sampling employed a stratified design that reproduced the population composition by residential block, gender, and grade based on the School Basic Survey (Ministry of Education, Culture, Sports, Science and Technology, 2025a). In total, responses were obtained from 16,761 parent-child pairs (response rate: 77.7%), covering cohorts born between 1997 and 2008, with approximately 1,300 pairs in each grade. Participants were subsequently followed annually until they reached the third year of high school. As the academic year in Japan begins in April, a graduation survey was conducted each March from 2017 for students in their final year of high school (Grade 12). This

enables analysis of changes in inequalities in educational attainment at the transition from high school to higher education across cohorts spanning both the pre-pandemic and pandemic periods.

Figure 1 illustrates the survey flow of the JLSCP sample. As the graduation survey was not conducted in March 2016, the analytic sample covers cohorts born between 1998 and 2006, totaling 7,366 participants across nine graduation surveys conducted between March 2017 and March 2025. Given that grade retention is rare in Japan, these cohorts correspond to students who were in the second year of high school in 2015 and transitioned to higher education in March 2017, and to those in the third grade of compulsory education in 2015 who transitioned to higher education in March 2025. Although younger cohorts required a longer follow-up period to reach the graduation survey and were therefore more susceptible to attrition (see Appendix A), this multi-cohort design allows examination of both the immediate and long-lasting impact of the pandemic, using pre-pandemic cohorts as a benchmark. In addition, because both children and their parents were surveyed, the data provide accurate information on parental education and household income through parental questionnaires, as well as detailed information on educational attainment.

[Figure 1 about here]

## **5.2. Variables**

One of the main dependent variables is whether students enrolled in a four-year university after graduating from high school. This variable is coded as a dummy equal to 1 for enrollment in a four-year university. The second main dependent variable captures whether students enrolled in a selective university. Because the Japanese higher education system is hierarchically structured according to rankings based on intense academic competition (Ono, 2007), national and public

universities as well as prestigious private universities are classified as selective universities, following conventional groupings of college selectivity in Japan (Toyonaga, 2022). This definition is consistent with prior research on educational inequality that focuses on qualitative differences in educational attainment in the Japanese context (Uchikoshi et al., 2025).

The key independent variable is the timing of exposure to the pandemic. Cohorts are classified into four groups based on the timing of exposure: C1 (pre-pandemic), C2 (transition), C3 (high school), and C4 (compulsory education). Because the COVID-19 pandemic began in Japan in early March 2020, cohorts graduating between March 2017 and March 2019 serve as the benchmark group (C1: pre-pandemic). The cohort graduating in March 2020 experienced the pandemic briefly at the time of transition to higher education, whereas the cohort graduating in March 2021 was exposed to the pandemic during their final year of high school (C2: transition). Cohorts graduating in March 2022 and 2023 experienced the pandemic during high school (C3: high school), whereas those graduating in March 2024 and 2025 experienced it during compulsory education (C4: compulsory education). This classification facilitates interpretation of the results, but the findings remain unchanged when separate cohort dummies are included (see Appendix B).

Other key independent variables are parental education and household income. Parental education was measured as the highest level of education completed by the father and mother, classified into middle school (ISCED 2), high school (ISCED 3), junior college or vocational training college (ISCED 4 or 5), university (ISCED 6), and graduate school (ISCED 7 or 8). The higher educational attainment of the two parents was used and converted into years of education, assigning values of 9, 12, 14, 16, and 18, respectively. Household income was measured using parents' reports of annual household income for the previous year in 10 income intervals. This variable was recoded into a continuous measure by assigning the midpoint of each category and

then transformed using the natural logarithm.<sup>1</sup> The models also control for children’s gender and the inverse Mills ratio, which was obtained from a probit model predicting participation in the graduation survey (see Appendix A). After excluding observations with missing values on these variables, 5,892 cases remained for the analysis. Table 1 presents descriptive statistics for the variables used in the analysis.

[Table 1 about here]

### 5.3. Analytical Approach

I estimate linear probability models to analyze four-year university enrollment and selective university enrollment. Model 1 examines the association between the timing of exposure to the pandemic and educational attainment, whereas Model 2 adds interactions between pandemic exposure and parental education and household income. For selective university enrollment, the analysis is restricted to students who enrolled in a four-year university, thereby conditioning on university enrollment and examining horizontal differentiation among university entrants, as the focus is on horizontal inequality net of vertical differences in university enrollment.<sup>2</sup>

The models are specified as follows:

Model 1:

$$Y_i = \beta_0 + \beta_1 \cdot Cohort_i + \beta_2 \cdot Parental\ education_i + \beta_3 \cdot Household\ income_i + X'_i \gamma + \varepsilon_i$$

Model 2:

$$Y_i = \beta_0 + \beta_1 \cdot Cohort_i + \beta_2 \cdot Parental\ education_i + \beta_3 \cdot Household\ income_i \\ + \beta_4 \cdot (Cohort_i \times Parental\ education_i) + \beta_5 \cdot (Cohort_i \times Household\ income_i) \\ + X'_i \gamma + \varepsilon_i$$

$Y_i$  represents educational attainment, measured either as enrollment in a four-year university or enrollment in a selective university.  $Cohort_i$  denotes a set of indicators capturing the timing of exposure to the pandemic, with the pre-pandemic cohort as the reference category.  $Parental\ education_i$  and  $Household\ income_i$  represent student's socioeconomic background.  $X_i$  is a vector of control variables, including gender and the inverse Mills ratio used to adjust for panel attrition.  $\varepsilon_i$  is the error term.

Predicted probabilities are computed from Model 2 and plotted by cohort across levels of parental education and household income. Moreover, the longitudinal design allows us to assess the robustness of the results after controlling for earlier educational choices that precede the transition to higher education, although objective measures of academic achievement capturing learning loss or schools' responses during the pandemic are not available<sup>3</sup> (see Appendix C).

## **6. Results**

### **6.1. Cohort Effects on University and Selective University Enrollment**

Table 2 presents the results of linear probability models for four-year university enrollment and selective university enrollment. In Model 1, the probability of enrolling in a university increases significantly with socioeconomic background. Specifically, an additional year of parental education is associated with an increase of about 0.049 in the probability of university enrollment, and a one-unit increase in household income is associated with an increase of about 0.123. These socioeconomic differences persist even when conditioning on university enrollment. Among students who enrolled in a university, those with one additional year of parental education are about 0.032 more likely to attend a selective university, and a one-unit increase in household

income is associated with an increase of about 0.039 in the probability of selective university enrollment. Both vertical stratification in university enrollment and horizontal stratification among university entrants persist in the transition to higher education amid educational expansion.

Turning to cohort effects, the probability of university enrollment does not differ significantly across cohorts. Experiencing the pandemic at the time of transition does not significantly reduce the probability of university enrollment (C2). Also, the university enrollment rate for cohorts exposed during high school (C3) or compulsory education (C4) is not significantly different from that of the pre-pandemic cohort (C1). Although the results remain unchanged when all cohorts are included as separate dummy variables (see Appendix B), a similar pattern is observed for selective university enrollment. Experiencing the pandemic at the time of transition does not significantly affect the probability of entering a selective university, even though the probability of enrolling in a selective university is significantly lower for the C3 cohort.<sup>4</sup>

[Table 2 about here]

Model 2 includes interaction terms between cohort and socioeconomic background. For university enrollment, neither parental education nor household income shows significant interactions with cohort. Experiencing the pandemic at the time of transition does not significantly widen disparities by parental education or household income compared with the pre-pandemic cohort, suggesting that educational inequality in the transition to university remained stable. Similarly, the interactions between the C2 cohort and both parental education and household income are not statistically significant even for selective university enrollment, indicating no immediate widening of socioeconomic disparities in access to selective universities.

However, a delayed widening of inequality emerges in educational attainment at selective thresholds involving high-stakes examinations. For selective university enrollment, the interaction between the C4 cohort and parental education is positive and statistically significant, whereas that for the C3 cohort is not. This indicates that the effect of parental education becomes stronger among students who experienced the pandemic during compulsory education. The interaction between the C4 cohort and household income is negative and statistically significant, which may reflect other changes affecting income-based disparities, including the possible role of financial aid programs. These results suggest that educational inequality is driven less by exposure at the transition itself and more by exposure during compulsory education, implying that the consequences of pandemic exposure may unfold with a delay at the transition to higher education.

## **6.2. Predicted Probabilities of Educational Inequality across Cohorts**

Figures 2 and 3 further present predicted probabilities of university and selective university enrollment by cohort and socioeconomic background. Figure 2, which displays predicted probabilities by parental education, shows that even among students with lower levels of parental education, there is no clear decline in the probability of university enrollment for the C2, C3, or C4 cohorts. However, for the C4 cohort, which experienced the pandemic during compulsory education, the probability of enrolling in a selective university declined substantially among students from non-college-educated families, particularly those with 9 or 12 years of parental education, even though no comparable decline was observed in the C2 or C3 cohorts.

Figure 3, which displays predicted probabilities by household income, shows similar results, indicating that vertical educational inequality in university enrollment remains stable even when focusing on the lowest-income group (Q1). However, for selective university enrollment,

the probability increases slightly among low-income students (Q1) in the C4 cohort, while it declines among high-income students (Q5), although the pattern for household income is less consistent. These results indicate that neither vertical nor horizontal educational inequality widened for cohorts that faced the transition to higher education during the pandemic, and therefore do not support Hypothesis 1. While no immediate widening of inequality is observed for either parental education or household income, horizontal educational inequality widened with a delay for parental education, supporting Hypothesis 2, whereas the pattern for household income could partly reflect other factors, including the potential impact of governmental financial aid programs (Ministry of Education, Culture, Sports, Science and Technology, 2025b).

As a robustness check, I exploit the longitudinal design to control for prior educational choices, although objective measures of academic achievement are not available. Even after controlling for educational expectations, the impact of parental education on selective university enrollment becomes stronger among the C4 cohort that experienced the pandemic during compulsory education, suggesting that the delayed widening of inequality in selective university enrollment cannot be explained solely by prior educational choices, and may be consistent with widening disparities in academic achievement during compulsory education (see Appendix C).

[Figure 2 about here]

[Figure 3 about here]

## **7. Discussion and Conclusion**

The COVID-19 pandemic led to school closures and economic disruption, raising concerns about widening educational inequality worldwide (OECD, 2021). While a large body of studies has documented its negative effects on children's academic achievement and mental health (Betthäuser et al., 2023; Cruz et al., 2025; Di Pietro, 2023; Hammerstein et al., 2021; König & Frey, 2022; Wisenöcker et al., 2025), far less is known about how these disruptions translated into educational attainment (Ravn, 2025; van de Werfhorst et al., 2024). Using cross-cohort longitudinal survey data on Japanese high school students, this study examines how the timing of exposure to the pandemic shapes educational inequality, distinguishing between vertical inequality in university enrollment and horizontal inequality in selective university enrollment.

The first key finding is that the COVID-19 pandemic did not immediately exacerbate socioeconomic inequality in educational attainment. Neither university enrollment nor selective university enrollment showed a significant widening of inequality among cohorts that experienced the pandemic at the time of the transition to higher education. Specifically, neither parental education nor household income had significantly stronger effects among cohorts that faced the transition during the pandemic. These results provide no evidence of an immediate widening of inequality and therefore do not support Hypothesis 1.

The second key finding is that the negative effects of the pandemic reached the transition to higher education with a delay. While vertical inequality in overall university enrollment remained stable even in later cohorts, delayed inequality emerged more clearly in selective university enrollment, which is characterized by high-stakes entrance examinations. Specifically, among cohorts that experienced the pandemic during compulsory education, the effect of parental education on selective university enrollment became significantly stronger, although the pattern for household income was less consistent. This pattern remains robust after controlling for earlier

educational choices (see Appendix C) and suggests a delayed widening of inequality in access to selective universities by parental education, supporting Hypothesis 2.

These findings extend cumulative disadvantage theory by showing that temporary societal disruptions can generate delayed inequalities in educational attainment. In the short term, families may be able to buffer the immediate effects of negative societal shocks, so inequalities in educational attainment do not necessarily widen immediately. However, given that learning is cumulative and younger students from disadvantaged backgrounds are more likely to face greater difficulties in recovery (Hammerstein et al., 2021; König & Frey, 2022), these initial disadvantages tend to persist and widen over time (DiPrete & Eirich, 2006). This suggests that short-term assessments of the impact of negative societal shocks on educational outcomes may underestimate their long-term consequences. This perspective also helps explain why existing studies have found limited evidence of pandemic-related inequality in educational attainment (Repo et al., 2025; van de Werfhorst et al., 2024) and may therefore have overlooked delayed educational inequality.

Furthermore, this pattern illustrates how cumulative disadvantage arising from exogenous societal shocks such as the pandemic is conditioned by the structure of the education system. Educational inequality widened particularly among cohorts that experienced the pandemic during compulsory education, rather than increasing gradually and linearly across cohorts. This pattern highlights the vulnerability of compulsory education as a critical period for exposure to societal shocks, as well as the institutional effects of strongly stratified academic tracking in high school. Because students' subsequent educational trajectories are largely shaped by high school track placement in Japan (Kariya, 2011), cohorts already placed in high school may be less susceptible to changes in educational choices following negative societal shocks. By contrast, inequalities emerging prior to high school entry are more likely to be carried over into later educational

transitions. These findings suggest that cumulative disadvantage does not necessarily unfold in a linear manner but may instead be shaped by educational institutions.

While the timing and magnitude of delayed educational inequality are embedded in education systems, educational policy can also shape its trajectory. The weakened association between household income and educational attainment in later cohorts may reflect changes in income-related disparities, including the possible influence of financial aid programs, which may require time to become widely recognized and effectively utilized by eligible families (Ministry of Education, Culture, Sports, Science and Technology, 2025b). However, the strengthened effect of parental education among the same cohorts suggests that financial support may mitigate income-related disparities but may be less effective in offsetting inequalities associated with cumulative academic disadvantage and culturally mediated advantages. These results highlight the importance of distinguishing between different socioeconomic dimensions when evaluating policy effectiveness, although the present analysis does not directly identify policy effects.

Overall, this paper suggests that the negative effects of the pandemic may reach the transition to higher education with a delay, whereas socioeconomic inequality in university enrollment remains relatively stable over the longer term. One possible explanation is that pandemic-related disparities in academic achievement (e.g. Betthäuser et al., 2023) may have become more consequential in access to selective universities, where high-stakes entrance examinations amplify relatively small differences in preparation (Ono, 2007). At the same time, educational expansion opens pathways to university even for students with lower academic achievement (Amano & Poole, 2005), making such disruptions less likely to translate into inequalities in overall university enrollment. These findings suggest that future studies should

consider both vertical stability and horizontal divergence in educational attainment (Lucas, 2001, 2009), particularly in the context of large-scale social shocks such as the COVID-19 pandemic.

While the findings show that aggregate stability in university enrollment can mask delayed divergence in access to selective institutions, this paper has some limitations. First, the analysis does not include direct measures of academic achievement, which limits the ability to examine whether learning loss mediates the observed changes in educational inequality. Future research incorporating standardized test scores or other objective indicators of academic performance would help clarify the mechanisms underlying delayed inequality. Second, the analysis follows cohorts who experienced the pandemic only up to around Grade 8 prior to their transition to higher education. Cohorts exposed to the pandemic at younger ages may exhibit larger delayed educational inequalities, and the present study may therefore underestimate the impact of the pandemic, especially on university enrollment.

Despite these limitations, the findings show that aggregate stability in university enrollment can coexist with delayed divergence in access to selective universities, underscoring the importance of distinguishing vertical stability from horizontal divergence when assessing the long-term consequences of large-scale social shocks. Comparative research is needed to assess whether delayed educational inequality emerges across different institutional contexts and whether its timing and magnitude vary depending on the structure of educational stratification.

## **Research Ethics Statement**

This study uses anonymized secondary survey data. The original survey was conducted in accordance with ethical guidelines and informed consent was obtained from participants.

## **Data availability statement**

The data used in this study are available from the Social Science Japan Data Archive (SSJDA) with permission from the data providers. Some of the most recent waves are not yet publicly available and can be accessed only with permission from the project administrators.

## **Note**

1. Household income was measured in the final year of high school (Grade 12). In cases where this information was missing, the value from the previous year (Grade 11) was used instead, taking advantage of the longitudinal design.
2. The analysis of horizontal differences does not estimate total socioeconomic inequality in the full population, which includes vertical socioeconomic differences in university enrollment. Instead, it isolates horizontal inequality by conditioning on university enrollment and examining whether socioeconomic disparities persist among university entrants.
3. The JLSCP includes self-reported evaluations of academic performance in high school measured on a five-point scale. However, in a strongly tracked upper secondary education system, such measures are not comparable across schools and therefore do not provide nationally comparable indicators of academic ability or objective learning loss.
4. A decline in the predicted probability of enrolling in selective universities among the C3 cohort, who experienced the pandemic during high school, does not necessarily indicate an increase in educational inequality. Instead, this pattern may reflect reduced access to guidance counseling for selective university admissions during this period.

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## Tables

**Table 1. Descriptive Statistics of Variables Used in the Analysis**

	<i>N</i>	Mean	SD
University enrollment	7191	0.657	
Selective university enrollment	7191	0.205	
Parental education (Years of education)	6710	14.995	1.693
Household income (logged)	6656	6.540	0.540
Cohort (Pandemic exposure)			
C1: Pre-pandemic	7366	0.366	
C2: Transition to higher education	7366	0.242	
C3: High school	7366	0.216	
C4: Compulsory education	7366	0.176	
Gender			
Men	7360	0.467	
Women	7360	0.533	
Inverse Mills ratio	6428	0.647	0.180

*Note.* The inverse Mills ratio was obtained from a probit model predicting participation in Graduation survey (see Appendix A for details).

**Table 2. Linear Probability Models of University and Selective University Enrollment**

	Model 1		Model 2	
	University	Selective university	University	Selective university
<b>Parental education (Years of education)</b>	0.049*** (0.004)	0.032*** (0.005)	0.054*** (0.007)	0.020* (0.009)
<b>Household income (logged)</b>	0.123*** (0.012)	0.039* (0.016)	0.119*** (0.020)	0.071** (0.026)
<b>Cohort (ref. C1: Pre-pandemic)</b>				
C2: Transition to higher education	0.005 (0.016)	-0.021 (0.020)	0.052 (0.208)	0.141 (0.289)
C3: High school	0.007 (0.017)	-0.099*** (0.021)	0.118 (0.216)	-0.011 (0.270)
C4: Compulsory education	0.019 (0.024)	-0.047 (0.030)	0.103 (0.221)	-0.224 (0.303)
<b>Interaction terms with Parental education</b>				
Parental education × C2: Transition			-0.005 (0.010)	0.008 (0.013)
Parental education × C3: High school			-0.021 (0.011)	0.001 (0.013)
Parental education × C4: Compulsory			0.001 (0.011)	0.055*** (0.015)
<b>Interaction terms with Household income</b>				
Household income × C2: Transition			0.003 (0.033)	-0.043 (0.042)
Household income × C3: High school			0.030 (0.033)	-0.015 (0.041)
Household income × C4: Compulsory			-0.015 (0.034)	-0.101* (0.044)
<b>Women (ref. Men)</b>	0.032* (0.013)	-0.032* (0.016)	0.032* (0.013)	-0.031 (0.016)
<b>Inverse Mills ratio</b>	0.029 (0.049)	0.160** (0.062)	0.031 (0.049)	0.165** (0.062)

<b>Intercept</b>	-0.916***	-0.472***	-0.969***	-0.518**
	(0.097)	(0.128)	(0.140)	(0.194)
<b>Observations</b>	5892	3880	5892	3880
<b>R<sup>2</sup></b>	0.070	0.021	0.070	0.026

Notes. \*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$  (two-tailed tests). Robust standard errors are in parentheses.

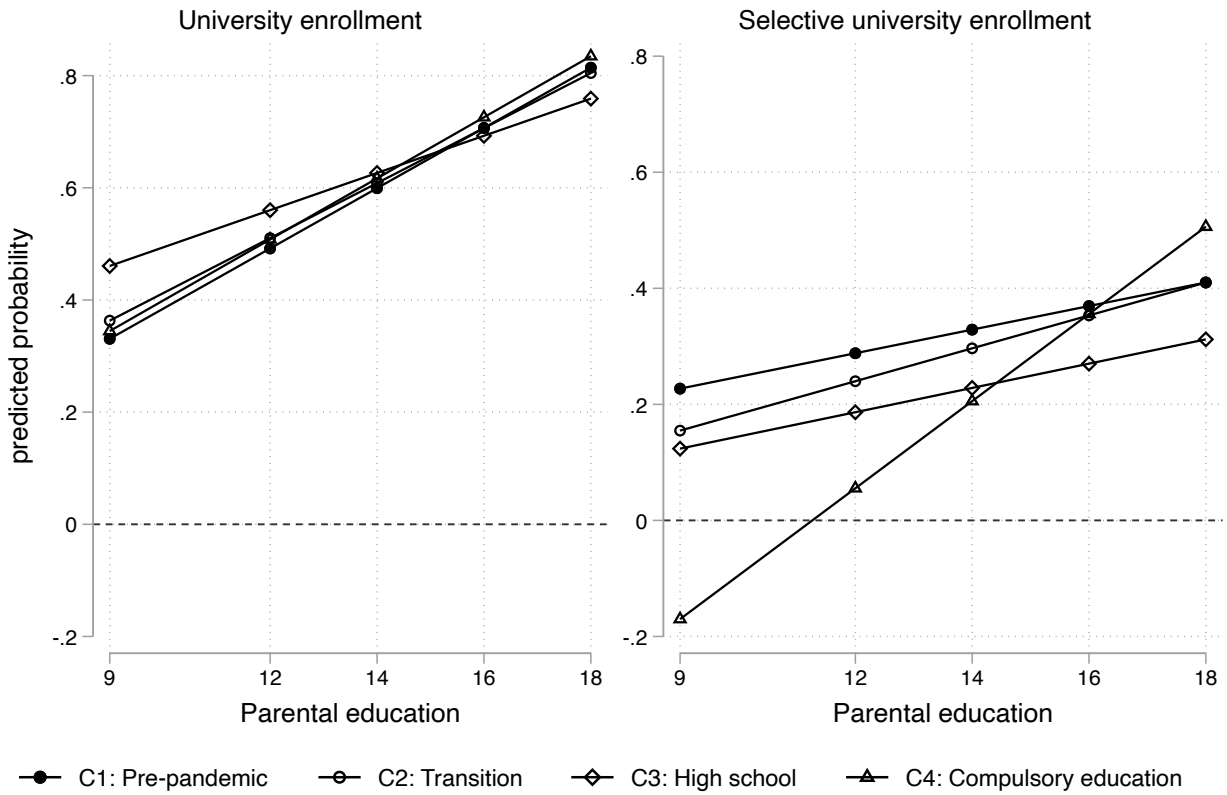
## Figures

**Figure 1. Survey Flow of the Japanese Longitudinal Study of Children and Parents**

Birth Cohort	Compulsory education							High school			Graduation	Pandemic Exposure
	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12		
1998								2015	2016		Mar. 2017	C1: Pre-pandemic
1999								2015	2016	2017	Mar. 2018	C1: Pre-pandemic
2000							2015	2016	2017	2018	Mar. 2019	C1: Pre-pandemic
2001						2015	2016	2017	2018	2019	<b>Mar. 2020</b>	C2: Transition to higher education
2002					2015	2016	2017	2018	2019	<b>2020</b>	Mar. 2021	C2: Transition to higher education
2003				2015	2016	2017	2018	2019	<b>2020</b>	2021	Mar. 2022	C3: High school
2004			2015	2016	2017	2018	2019	<b>2020</b>	2021	2022	Mar. 2023	C3: High school
2005		2015	2016	2017	2018	2019	<b>2020</b>	2021	2022	2023	Mar. 2024	C4: Compulsory education
2006	2015	2016	2017	2018	2019	<b>2020</b>	2021	2022	2023	2024	Mar. 2025	C4: Compulsory education

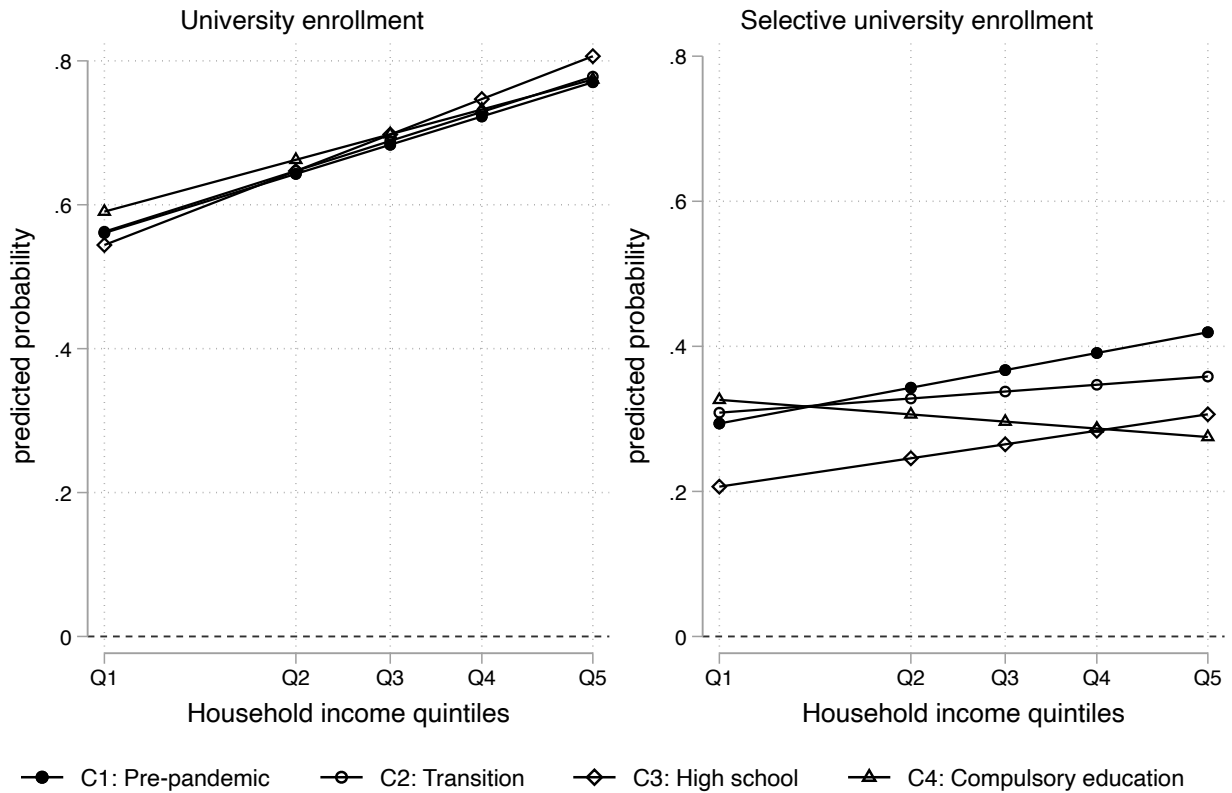
*Note.* The baseline survey (Wave 1) was conducted between July and August 2015. Follow-up surveys were administered annually between July and August until respondents reached G12, at which point a graduation survey was conducted in March of the same academic year.

**Figure 2. Predicted Probabilities of University and Selective University Enrollment by Cohort and Parental Education**



*Note.* Predicted probabilities of university enrollment and selective university enrollment by parental education are computed from Model 2 in Table 2.

**Figure 3. Predicted Probabilities of University and Selective University Enrollment by Cohort and Household Income**



*Note.* Predicted probabilities of university enrollment and selective university enrollment by household income are computed from Model 2 in Table 2. Household income is categorized into quintiles (Q1–Q5), where Q5 indicates the highest income group and Q1 the lowest.

## Appendix A: Adjustment for Panel Attrition Using the Inverse Mills Ratio

The JLSCP is a multi-cohort longitudinal study in which the time required to reach the graduation survey administered in March of Grade 12 varies across cohorts. Table A1 presents descriptive statistics for the Wave 1 sample that was expected to respond to the graduation survey. Among the 13,288 families in the birth cohorts from 1998 to 2006, 55.4% reached the graduation survey, whereas 44.6% did not. Because not all families who participated in Wave 1 in 2015 responded to the graduation survey, and because students from more advantaged backgrounds may be more likely to remain in the panel, failing to account for attrition may bias estimates of the association between socioeconomic background and educational attainment.

**Table A1. Descriptive Statistics for the Baseline Sample**

	N	Mean	SD
Response at Graduation Survey			
Did not respond	13288	0.446	
Responded	13288	0.554	
Parental education (Years of education)	11750	14.905	1.698
Household income (logged)	12564	6.423	0.511
Birth cohort			
2006	13288	0.122	
2005	13288	0.110	
2004	13288	0.106	
2003	13288	0.107	
2002	13288	0.111	
2001	13288	0.116	
2000	13288	0.113	
1999	13288	0.107	

1998	13288	0.107
<b>Gender</b>		
Male	13253	0.494
Female	13253	0.506

*Note.* Household income is based on measurements from Wave 1 conducted in 2015.

Table A2 presents the results of a probit regression predicting participation in the graduation survey. The results show that students with higher parental education and higher household income are more likely to participate in the graduation survey, implying that failing to adjust for attrition could bias estimates of socioeconomic inequality in educational attainment. In addition, compared with the 2006 birth cohort, which required the longest follow-up period to reach the graduation survey, cohorts born from 1998 to 2005 are more likely to participate in the graduation survey. Female students are also more likely than male students to remain in the panel until the graduation survey. Based on these results, an inverse Mills ratio is constructed and included in the main models to adjust for potential selection associated with panel attrition (see Table 2 in the main text).

**Table A2. Probit Regression Results Predicting Participation in Graduation Survey**

	Model 1
<b>Parental education (Years of education)</b>	0.045*** (0.008)
<b>Household income (logged)</b>	0.079** (0.026)
<b>Birth cohort (ref. 2006)</b>	
2005	0.369*** (0.049)
2004	0.327***

	(0.050)
2003	0.734***
	(0.050)
2002	0.850***
	(0.051)
2001	0.421***
	(0.049)
2000	0.825***
	(0.050)
1999	0.936***
	(0.052)
1998	0.368***
	(0.051)
<b>Women (ref. Male)</b>	0.162***
	(0.024)
<b>Intercept</b>	-1.594***
	(0.166)
<hr/>	
Observations	11179
Pseudo $R^2$	0.046

*Note.* \*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$  (two-tailed tests). Standard errors are in parentheses.

## **Appendix B: Robustness Check Using Alternative Cohort Definitions**

To facilitate interpretation and improve the stability of the estimates, this study groups cohorts into four categories based on the timing of exposure to the pandemic: C1 (pre-pandemic), C2 (transition), C3 (high school), and C4 (compulsory education). However, this operational classification may raise concerns about potential bias. For example, the cohort that graduated in March 2020 experienced largely normal high school conditions and was exposed to the pandemic only briefly just before graduation. Including this cohort in C2 (transition) could obscure cohort differences and lead to an underestimation of the immediate impact of the pandemic.

Table B1 reports results from models in which cohorts from 2020 to 2025 are included as separate dummy variables, rather than being grouped into the C2–C4 categories. The results are largely consistent with those presented in Table 2 of the main text. For both university enrollment and selective university enrollment, the interaction terms between socioeconomic background and the cohort that graduated in March 2020, which experienced the pandemic only shortly before graduation, are not statistically significant. Similarly, even when focusing on the cohort that graduated in March 2021, whose transition to higher education coincided entirely with the pandemic, there is no evidence that educational inequality widened significantly.

Further examining the interactions with parental education for selective university enrollment, positive and statistically significant coefficients are observed for the cohorts graduating in March 2024, who experienced the pandemic in grade 9, and March 2025, who experienced it in grade 8, both during compulsory education. This pattern is consistent with the possibility that disruptions during compulsory education had particularly consequential effects. Similarly, for the cohort graduating in March 2024, the interaction with household income is

negative and statistically significant, which may reflect a temporary reduction in income-based disparities, potentially related to financial aid. A more detailed discussion of these results is presented in the main text.

**Table B1. Linear Probability Models with Graduation-Year Dummies**

	Model 1		Model 2	
	University	Selective university	University	Selective university
<b>Parental education (Years of education)</b>	0.046***	0.036***	0.052***	0.024**
	(0.004)	(0.006)	(0.007)	(0.009)
<b>Household income (logged)</b>	0.121***	0.042**	0.117***	0.077**
	(0.012)	(0.016)	(0.020)	(0.026)
<b>Cohort (ref. 2017-2019)</b>				
2020	0.023	-0.047	0.076	0.030
	(0.025)	(0.033)	(0.268)	(0.384)
2021	-0.002	-0.014	0.050	0.207
	(0.020)	(0.025)	(0.263)	(0.354)
2022	0.000	-0.061*	0.178	0.488
	(0.020)	(0.024)	(0.268)	(0.336)
2023	0.037	-0.185***	0.075	-0.730*
	(0.029)	(0.036)	(0.288)	(0.321)
2024	0.030	-0.091**	0.328	-0.084
	(0.027)	(0.035)	(0.269)	(0.364)
2025	0.065	-0.097	-0.071	-0.545
	(0.042)	(0.056)	(0.318)	(0.441)
<b>Interaction terms with Parental education</b>				
Parental education × 2020			-0.015	0.019
			(0.014)	(0.017)
Parental education × 2021			0.003	-0.001
			(0.012)	(0.016)

Parental education × 2022			-0.022 (0.013)	-0.003 (0.016)
Parental education × 2023			-0.020 (0.015)	0.009 (0.017)
Parental education × 2024			0.010 (0.014)	0.050** (0.018)
Parental education × 2025			-0.013 (0.016)	0.063** (0.021)
<b>Interaction terms with Household income</b>				
Household income × 2020			0.025 (0.042)	-0.055 (0.057)
Household income × 2021			-0.015 (0.041)	-0.032 (0.051)
Household income × 2022			0.024 (0.041)	-0.076 (0.050)
Household income × 2023			0.040 (0.046)	0.059 (0.053)
Household income × 2024			-0.069 (0.042)	-0.117* (0.054)
Household income × 2025			0.050 (0.046)	-0.082 (0.060)
<b>Women (ref. Men)</b>	0.024 (0.014)	-0.019 (0.018)	0.025 (0.014)	-0.017 (0.018)
<b>Inverse Mills ratio</b>	-0.049 (0.078)	0.302** (0.101)	-0.052 (0.078)	0.329** (0.102)
<b>Intercept</b>	-0.819*** (0.123)	-0.641*** (0.161)	-0.872*** (0.157)	-0.707** (0.215)
<b>Observations</b>	5892	3880	5892	3880
<b>R<sup>2</sup></b>	0.069	0.023	0.070	0.030

Notes. \*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$  (two-tailed tests). Robust standard errors are in parentheses.

## **Appendix C: Robustness Check Controlling for Prior Educational Choices**

The longitudinal design of the JLSCP allows the use of educational expectations measured one year prior to the transition to higher education. Specifically, educational choices reported in Grade 11, the year preceding the transition, can be incorporated into the analysis. Although objective measures of academic achievement and micro-level indicators of school responses to the pandemic are not available, it remains important to assess whether the effect of parental education increases even when prior educational choices that may capture secondary effects are held constant.

Educational expectations measured in the previous year were available for 6,937 respondents. Of these, 6.18% planned to enter employment after graduation, 7.71% intended to enroll in vocational schools (ISCED 4), 3.21% in junior colleges (ISCED 5), and 73.6% in universities or higher education (ISCED 6–8), while 9.20% reported being undecided. These distributions indicate that most students planned to pursue university education, underscoring the importance of considering qualitative differences in university enrollment.

Table C1 presents the results after controlling for educational expectations. In Model 1, educational choices in the previous year strongly predict university enrollment: students who had already planned to enroll in university are associated with a 0.707 higher probability of university enrollment. Similarly, for selective university enrollment, students who had decided early to pursue university education are about 0.171 more likely to enroll in a selective university. However, Model 2 shows that even after controlling for educational choices, the interaction between parental education and the C4 cohort remains positive and statistically significant, indicating that the effect of parental education strengthens even when students have similar prior educational plans. Moreover, the interaction between household income and the C4 cohort remains negative and

statistically significant after controlling for educational choices. These patterns suggest that the changes reported in Table 2 of the main text are not fully explained by differences in prior educational choices. They are consistent with the possibility that widening gaps in academic achievement during compulsory education became more consequential at selective thresholds.

**Table C1: Linear Probability Models Controlling for Educational Expectations**

	Model 1		Model 2	
	University	Selective university	University	Selective university
<b>Parental education (Years of education)</b>	0.008*	0.028***	0.013*	0.018*
	(0.004)	(0.005)	(0.006)	(0.009)
<b>Household income (logged)</b>	0.047***	0.030	0.042*	0.062*
	(0.011)	(0.016)	(0.018)	(0.026)
<b>Cohort (ref. C1: Pre-pandemic)</b>				
C2: Transition to higher education	0.021	-0.022	0.006	0.158
	(0.014)	(0.020)	(0.182)	(0.290)
C3: High school	0.036*	-0.092***	0.239	0.020
	(0.015)	(0.021)	(0.184)	(0.275)
C4: Compulsory education	0.048*	-0.038	0.069	-0.217
	(0.020)	(0.030)	(0.190)	(0.306)
<b>Educational expectations (ref.: High school (ISCED 3))</b>				
Vocational school (ISCED 4)	0.079***	-0.009	0.079***	-0.026
	(0.022)	(0.085)	(0.022)	(0.086)
Junior college (ISCED 5)	0.091**	-0.064	0.091**	-0.071
	(0.032)	(0.087)	(0.032)	(0.089)
University or higher (ISCED 6–8)	0.707***	0.171*	0.707***	0.161*
	(0.016)	(0.076)	(0.016)	(0.077)
Undecided	0.325***	-0.001	0.325***	-0.006
	(0.025)	(0.080)	(0.025)	(0.080)

**Interaction terms with Parental education**

Parental education × C2: Transition	-0.007	0.008
	(0.009)	(0.013)
Parental education × C3: High school	-0.012	-0.001
	(0.010)	(0.013)
Parental education × C4: Compulsory	-0.005	0.052***
	(0.010)	(0.015)

**Interaction terms with Household income**

Household income × C2: Transition	0.018	-0.046
	(0.029)	(0.042)
Household income × C3: High school	-0.003	-0.014
	(0.029)	(0.042)
Household income × C4: Compulsory	0.008	-0.095*
	(0.030)	(0.044)

<b>Women (ref. Men)</b>	0.051***	-0.037*	0.051***	-0.036*
	(0.011)	(0.016)	(0.011)	(0.016)
<b>Inverse Mills ratio</b>	0.007	0.157*	0.006	0.162**
	(0.043)	(0.062)	(0.043)	(0.062)
<b>Intercept</b>	-0.386***	-0.512***	-0.429***	-0.556**
	(0.086)	(0.148)	(0.124)	(0.208)

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<b>Observations</b>	5759	3797	5759	3797
<b>R<sup>2</sup></b>	0.320	0.033	0.320	0.037

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Notes. \*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$  (two-tailed tests). Robust standard errors are in parentheses.