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Shifting Preferences: COVID-19 and Higher Education Application*

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Abstract

This paper provides descriptive evidence on how the COVID-19 pandemic influenced secondary school students' application patterns to higher education in France, offering insights into the reallocation of preferences across academic fields and degree types. Using detailed administrative data, we document significant shifts in application shares during 2021, with increased interest in competitive tracks and concurrent declines in applications to bachelor's and vocational programs. These findings suggest that students responded to the pandemic by favoring structured and selective pathways with clear labor market prospects, while moving away from generalist degrees. Students' share of applications to STEM degrees increased, while applications to health and business programs remained stable. At the same time, analyzing the probability of applying to at least one program in a given field or degree reveals a decline in application diversification, as students concentrated their choices in fewer fields, reflecting a more risk-averse and selective approach in response to the pandemic. Our analysis highlights substantial heterogeneity in these effects across demographic groups.

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1 Introduction

Higher education choices play a crucial role in shaping career trajectories, earnings potential, and social mobility. While family background strongly influences these choices (Lentz and Laband, 1989; Barrios Fernández et al., 2021; Altmejd, 2024), economic crises can disrupt established patterns, forcing students to reassess their academic and career pathways in response to changing labor market conditions (Issehnane and Moulin, 2024). Economic downturns influence students' field choices by shifting perceptions of job security and long-term career prospects (Betts and McFarland, 1995; Bradley, 2012; Blom et al., 2021). In times of uncertainty, students tend to prioritize fields with stable labor market prospects, such as STEM, business, and health (Grenet et al., 2024; Liu et al., 2019). However, these adjustments are not equally accessible to all students. Those from disadvantaged backgrounds, who face financial constraints or lack access to guidance, may struggle to pivot toward these fields (Kirkeboen et al., 2016). This dynamic raises concerns about whether economic crises exacerbate educational inequalities and highlights the need to study how students respond to labor market stress.

While past research has examined how economic recessions influence educational decisions, the COVID-19 pandemic presented an unprecedented challenge—combining economic instability with an abrupt transition to remote learning. Beyond disrupting traditional learning environments, the pandemic may have reshaped students' perceptions of higher education, influencing both program selectivity and field of study choices. While prior studies have begun exploring the short-term effects of the pandemic on education (Betthäuser et al., 2023; Stantcheva, 2022; Werner and Woessmann, 2023), less attention has been given to its immediate impact on students' application behavior. To what extent did the COVID-19 pandemic reshape students' application decisions—particularly in terms of program selectivity and field preferences? How did these shifts vary across socioeconomic backgrounds and gender?

We analyze students' application choices using administrative data from Parcoursup, France's centralized higher education admissions platform, which provides comprehensive, real-time records of applications across institutions and socioeconomic groups.[1] This allows us to precisely track whether students adjusted their application portfolios in response to pandemic-induced uncertainty. We analyze two key dimensions of student behavior: (i) the intensive margin, which captures how students distribute their applications across different fields, and (ii) the extensive margin, which indicates whether students applied to at least one program in a given category. Since students submit applications in January of their final year, the 2019-2020 cohort reflects pre-pandemic choices, while the 2020-2021 cohort applied after nearly a year of COVID-19 lockdown policies. By comparing these two groups, we assess how students adapted their application strategies in response to the crisis. While year-to-year

[1]The platform centralizes applications, allowing students to rank their preferences and receive offers based on academic records, motivation letters, and institutional criteria.

variations in applications may be influenced by multiple factors, the unprecedented nature of the pandemic provides a strong external shock, allowing us to attribute significant shifts to its impact. Although our analysis is descriptive rather than causal, it documents substantial changes in student behavior, likely reflecting their responses to heightened uncertainty about education, employment, and economic stability.

We first analyze the degree programs students applied to, which differ in selectivity, duration, and career prospects upon completion. Prior evidence suggests that degree choice is correlated with individual demographics (Bonneau and Grobon, 2024) and can be influenced by external interventions (Guyon and Huillery, 2021; Hakimov et al., 2023). We focus on the three possible types of degrees: i) CPGE (*Classes Préparatoires aux Grandes Écoles*), ii) bachelor's degrees, and iii) vocational degrees. CPGE, among the most selective programs in France, prepare students for entrance exams to competitive and elite institutions such as *École Polytechnique*, *École Normale Supérieure*, and *HEC*, offering intensive two-year preparatory training in sciences, humanities, and economics. In contrast, bachelor's programs, typically three years long, are less selective and provide a broad academic foundation across disciplines, including arts, sciences, business, and engineering. Technical vocational programs, including apprenticeships and specialized institute courses, focus on practical skills for careers in engineering technology, healthcare, and trades, prioritizing workforce readiness over academic selectivity. Our underlying hypothesis is that the pandemic-induced uncertainty led students to prioritize more selective and structured educational pathways, such as CPGE, over less selective bachelor's and vocational programs, reflecting a shift towards perceived academic prestige and long-term career stability.

Next, we examine shifts in students' choice of academic fields. Field selection is closely linked to individual demographics—for instance, gender significantly influences field choice (Breda et al., 2023) – and can be altered by external shocks (Aalto et al., 2023). Specifically, we examine whether there were changes in applications to three key fields: i) STEM (Science, Technology, Engineering, and Mathematics), ii) business, and iii) health programs. Since some programs overlap—for example, CPGE includes STEM-focused tracks—students may be counted in both categories, allowing us to distinguish between institutional selectivity and career-driven preferences. STEM programs, traditionally considered challenging, have gained more attention in recent years, reflecting both global trends in innovation and the need for technological expertise. Business programs also remain a popular choice, offering a wide range of specializations from management to finance and entrepreneurship. Health programs, especially in fields like medicine, nursing, and public health, have seen increased interest, partly due to the ongoing pandemic, which emphasized the importance of healthcare and medical research. This field distinction aligns with Bradley (2012), who finds that during a recession trough, freshmen are less likely to remain undecided about their major and are more likely to select fields with stronger job security and earnings potential, including those examined in this study. We hypothesize that the pandemic shifted applications toward job-secure fields like STEM and health while reducing interest in less stable options like business.

Our results show that the pandemic increased applications to highly selective programs like CPGE, while reducing interest in vocational and bachelor's programs. These trends were more pronounced among higher-SES students, suggesting that the crisis may have widened existing inequalities in access to prestigious educational pathways. Students increasingly favored selective, competitive programs like CPGE, with applications to CPGE rising by 0.4%, while applications to bachelor's and vocational programs decreased by 0.9% and 1.1%, respectively. These trends are confirmed also when considering the likelihood of applying at least to one of the types, showing that more students in the 2021 cohort included CPGE in their portfolios, while fewer considered bachelors and vocational tracks. As for field of study, STEM fields saw a slight increase in applications within portfolios, though fewer students overall considered STEM. In contrast, applications to business and health programs remained stable within portfolios, but the likelihood of applying to these fields decreased overall, suggesting a reallocation of preferences rather than a broader increase in interest. Socioeconomic background and gender played important roles in shaping these shifts. Higher-SES students were more likely to pivot towards selective fields like CPGE, while lower-SES students were more likely to apply to vocational programs. Female students exhibited a smaller negative effect compared to male students across most fields, with gender disparities in application behavior observed in some fields. Overall, the findings highlight a trend towards more selective and structured educational pathways, with significant heterogeneity in how different demographic groups responded to the pandemic, exacerbating existing educational inequalities.

This paper contributes to two strands of literature: (i) research on the determinants of college field choices, and (ii) studies on how external shocks—particularly the COVID-19 pandemic—reshape educational decisions. By leveraging large-scale administrative data, we distinguish between program selectivity and field preferences, while also highlighting heterogeneity in student responses across socioeconomic backgrounds and gender.

The decision to attend college is largely driven by the expected returns to higher education (Altonji et al., 2012, 2016), with labor market fluctuations and broader macroeconomic shocks influencing these choices (Altonji et al., 2016; Han and Winters, 2020; Finamor, 2023; Acton, 2021; Grenet et al., 2024). For instance, Ersoy (2020) show that there was a shift from recession-sensitive majors towards recession-resistant majors during the U.S. recession. However, the sensitivity of major choice to expected earnings appears modest (Berger, 1988; Beffy et al., 2012; Long et al., 2015); for instance, Beffy et al. (2012) estimate elasticities ranging from 0.09 to 0.14 for Sciences and Humanities/Social Sciences. Beyond traditional recessions, the COVID-19 pandemic introduced additional disruptions, reshaping students' field choices. Aalto et al. (2023) document a decline in top-ranked applications to certain vocational programs among Swedish middle school students, despite stable demand for academic programs. Meanwhile, Del Bono et al. (2022) find no significant average effects on university applications in the UK but highlight disparities, with students from minority backgrounds less likely to receive offers. This paper contributes to the literature by leveraging

large-scale administrative data to examine how labor market conditions and macroeconomic shocks influence higher education applications. It distinguishes the role of expected returns in shaping program selectivity versus field preferences and highlights heterogeneity in responses across socioeconomic backgrounds and gender.

Our second contribution extends the literature on the impact of the COVID-19 pandemic on education (Werner and Woessmann, 2023; Betthäuser et al., 2023) by examining how the pandemic reshaped college application patterns and how these shifts varied across individual characteristics. The immediate academic consequences of COVID-19 were severe, with students experiencing an average learning loss equivalent to 35% of a traditional school year (Betthäuser et al., 2023; Jakubowski et al., 2023; Agostinelli et al., 2022). However, the pandemic's impact extended beyond learning loss, leading to increased dropout rates (Bulman and Fairlie, 2022; Schueler and Miller, 2023; Schanzenbach and Turner, 2022; Dagorn and Moulin, 2025) and negatively affecting student well-being (Sandner et al., 2023). While prior research has examined learning loss and dropout rates, fewer studies have investigated how the pandemic reshaped students' higher education application choices and how these shifts varied by socioeconomic status and gender. We build on recent findings by Aalto et al. (2023) and Del Bono et al. (2022) by leveraging individual-level application data to examine shifts in both degree program selectivity and field of study preferences. Ultimately, our contribution provides evidence on the long-term consequences of the pandemic for educational inequalities (Stantcheva, 2022), as shifts in college applications are likely to exacerbate disparities in labor market integration.

The rest of the document is organized as follows. Section 2 provides some institutional background on the settings of higher education in France, information on the evolving policy response to COVID-19 in France during the study period. Section 3 describe the data and the construction of our main variables of interest. Section 4 presents the methodology. Section 5 presents our results on the relationship between the COVID-19 pandemic and students' application, and discusses several mechanisms. Section 6 concludes.

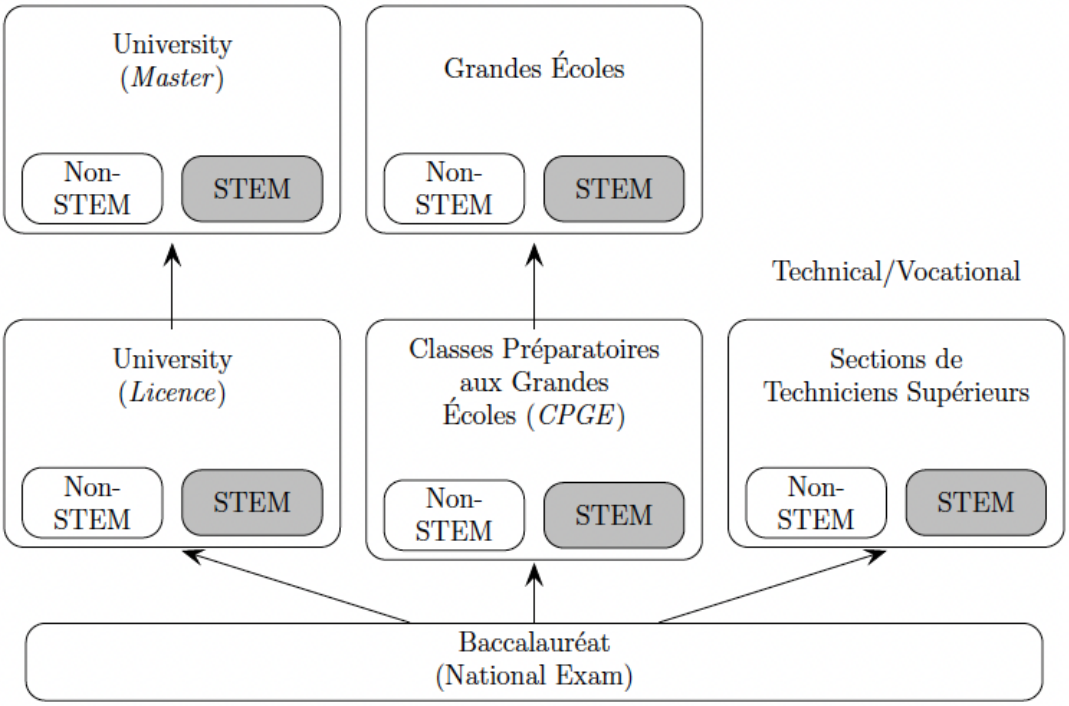
2 Institutional settings

The French educational system is similar to the ones in countries with centralized higher education applications. At the end of high school, all students take a national exam called the "*baccalauréat*". Those who pass the "*baccalauréat*" are eligible to apply for tertiary education. The French Higher Education System includes three different types of undergraduate programs - selective and non-selective. While the "*bachelor or licence*" (undergraduate degree) at universities is mainly non-selective and open to all high school graduates, other programs such as the two-year vocational program ("*Sections de Techniciens Supérieurs*"), and"*Classes Préparatoire aux Grandes Ecoles*" are selective.[2] Figure 1 provides a summary

[2] *Classes Préparatoire aux Grandes Ecoles* are among the most prestigious and selective programs and prepare students to take the entry exams of the most competitive graduate schools (*Grandes Ecoles*).

of the main French Higher Education institutions and the main choices that students have to make from high school to undergraduate and graduate programs.

Figure 1: Higher Education in France



Since 2018, during their final year of high school, students in France utilize a centralized platform called *Parcoursup* to apply for postsecondary education. This platform offers students the ability to explore different programs using various filters, such as institution type, location, and public or private status. The procedure takes place in several stages. In the first stage, students enter their choices on the application. The first stage happens between January and early March. Through *Parcoursup*, students can submit up to 10 choices, without any specific order, and within these choices, they can make a maximum of 20 sub-choices.[3] Sub-choices are generally limited to 20 per application and 10 per choice.[4] In the second stage (from March till April), students can no longer modify their choices, but have to decide whether to validate them (which corresponds to submitting them to higher education establishments) or not. In the third and final stage (May), students consult admission proposals and decide on their affection for the following year.[5]

[3]For example, a candidate's application may consist of choice A with 9 sub-choices $A_1, ..., A_9$, choice B with 1 sub-choice B_1 and choice C with 3 sub-choices $C_1, ..., C_3$. This student's application is made up of 13 choices.

[4]Although this may be different for some types of undergraduate program.

[5]The process of allocating students to programs on the *Parcoursup* platform involves a dynamic implementation of a deferred acceptance mechanism, where colleges make offers to students based on their preferences and program capacities. On offer day, students may receive multiple offers or none at all. In such cases, students have two options: (i) permanently accept one offer while rejecting the others, typically when it comes from their preferred program, or (ii) or wait for alternative offers, hoping to receive an offer from a more preferred program in the future. This choice is often made when a student receives an offer from a program that is not their top choice.

During the 2019-2020 and 2020-2021 academic years, the COVID-19 pandemic led to significant disruptions in French high school education. A national lockdown was imposed from March 17 to May 11, 2020, with high schools closing and remote learning taking place. After May 11, a regional approach allowed schools to reopen gradually with strict health protocols. In June, restrictions eased, and schools resumed most activities. After the summer break, a policy was introduced to close schools based on local COVID-19 cases, though it remains unclear if the virus spread was accurately measured within schools. We acknowledge that students had different schooling experiences depending on local virus spread, but we cannot account for this variation in our analysis. In the 2020-2021 school year, secondary schools stayed open during the second lockdown (October 30 to December 15) and operated in person. Given the timing of the COVID-19 spread and of the application deadline (early March), students applying for higher education in the 2019-2020 academic year were not significantly affected in their choices by the pandemic, as their applications were submitted before the lockdowns and widespread school closures. However, students applying in the 2020-2021 academic year had lived through an entire year of pandemic-related disruptions. These students experienced half a year of their penultimate year and a half-year of their final year before making their higher education choices, under lockdowns, remote learning, and significant uncertainty. The challenges of this prolonged experience likely influenced their higher education decisions, as they had to navigate a disrupted academic environment before making their choices in early 2021.

We focus on application behaviors in the 2020-2021 academic year, nearly one year after the initial surge of COVID-19. In contrast, the application period for the 2019-2020 academic year occurred before the pandemic's full impact, so students' decisions were unaffected by the disruptions that followed, and are used as baseline. By focusing on the 2020-2021 cohort, we can capture how students adjusted their educational choices after experiencing the full impact of the pandemic, including lockdown, school closures, and the associated uncertainty. The analysis is limited to the 2021 cohort because the 2022 cohort experienced significant curriculum reforms, making comparisons between these cohorts unreliable. We specifically focus on the first stage of the Parcoursup application process for several reasons. First, the initial selection of programs reflects students' true educational preferences before they are influenced by institutional responses or admission constraints. Since most students validate their initial choices, examining later stages would provide little additional insight into their original preferences. Second, analyzing final allocations would be misleading: the matching process in Parcoursup is dynamic, with students adjusting their choices based on evolving admission offers. By limiting our analysis to Stage 1, we avoid confounding institutional decisions with students' initial intentions, ensuring that we capture students' educational preferences independently of institutional acceptance mechanisms, thus offering the most reliable insight into how the pandemic shaped their application behaviors.

3 Data and variables of interest

We use administrative data from the Parcoursup system, which provides detailed records of each student's higher education applications. As outlined in Section 2, students can submit up to ten choices through this centralized platform. Using this data, we construct two key measures: the share of applications allocated to each of the three university types and the three selected fields, and an indicator of whether a student applied to at least one program in each category. By analyzing these application patterns, we assess how the pandemic influenced students' choices between highly selective academic tracks and career-oriented alternatives, while also examining shifts in field-specific applications to understand how evolving economic and health conditions shaped student interest in different sectors.

To evaluate whether the pandemic influenced student preferences for more or less selective programs, we analyze both the distribution of applications and the likelihood of submitting at least one application to CPGE(*Classes Préparatoires aux Grandes Écoles*), bachelor's degrees, and technical vocational programs. The uncertainty surrounding the job market during the pandemic may have increased the appeal of CPGE, as students sought to secure spots in prestigious institutions that could offer long-term career stability. In contrast, bachelor's programs, typically lasting three years, are less selective and offer a broad academic foundation across disciplines such as arts, sciences, business, and engineering. Given the disruption to in-person learning and concerns about university resources during the pandemic, some students may have reconsidered applying to bachelor's programs, perceiving them as less structured and more vulnerable to educational disruptions. Technical vocational programs, which include apprenticeships and specialized institute courses, emphasize practical skills in fields such as engineering, healthcare, and trades, prioritizing workforce readiness over academic prestige. The pandemic-induced economic uncertainty and concerns about immediate employability may have led some students to delay their entry into the labor market by opting for longer academic tracks rather than vocational programs, which are more directly tied to the job market.

Beyond program selectivity, we examine whether the pandemic influenced students' choice of academic fields, particularly in STEM, business, and health programs. STEM programs, traditionally considered challenging, have gained prominence in recent years, driven by global trends in innovation and the increasing demand for technological expertise. However, the shift to remote learning and the disruption of hands-on coursework may have deterred some students, while others may have viewed STEM as a resilient sector with strong job prospects in an uncertain economy. Business programs also remain a popular choice, offering a wide range of specializations from management to finance and entrepreneurship. The economic instability caused by the pandemic may have influenced students' interest in business degrees, as some might have been drawn to fields with perceived financial security, while others may have hesitated due to uncertainty in global markets. Health programs, especially in fields like medicine, nursing, and public health, have seen increased interest,

partly due to the ongoing pandemic, which emphasized the importance of healthcare and medical research. The heightened visibility of healthcare professionals and the crucial role of medical workers during the crisis likely motivated more students to consider careers in health-related fields.

In addition to application trends, we incorporate student characteristics to better understand how individual backgrounds influenced responses to the pandemic. Our dataset includes information on gender, socioeconomic status (SES), eligibility for free lunch during high school, and final grades on the *Baccalauréat* exam. SES is classified according to the official categorization of the French Ministry of Education, which defines four groups (low, medium-low, medium-high, high) based on the occupation of the student's legal guardian.[6] Since eligibility for free lunch is a common proxy for financial need, we include it as an additional indicator of socioeconomic disadvantage, following previous research showing its influence on educational pathways (Fack and Grenet, 2015). Finally, we account for academic performance by using students' *Baccalauréat* scores, distinguishing between four achievement levels: no mention (scores between 10 and 11.99/20), *Mention Assez Bien* (12–13.99/20), *Mention Bien* (14–15.99/20), and *Mention Très Bien* (16/20 or higher). Although the *Baccalauréat* exam is taken after students submit their applications, we include this variable as a proxy for academic ability.

4 Empirical approach

To analyze changes in students' field preferences, we examine shifts in application patterns at the student level, using the share of a specific program type or field as the dependent variable in the following specification:

$$Y_{itz} = \beta_0 + \sum_{t=2020}^{2021} \beta_t \text{year}_t + \mathbf{X}_i'\delta + \eta_z + +\epsilon_{izt} \tag{1}$$

Y_{it} represents the share of application to a specific field and programme type, e.g., the share of applications to a specific field (STEM, health, business & law) and program type (bachelor, CPGE, vocational) for student i in year t in school z. t takes two values, 2020, which reflect choices made by students before the pandemic and used as baseline, and 2021, which reflect choices made after the pandemic, β_{2021} is considered to be the main parameter of interest . $\mathbf{X}_i'$ is a set of individual characteristics; namely students' gender, SES, free lunch status, and *Baccalauréat* exam result. These variables control for differences in preferences that could be driven by individual characteristics rather than the pandemic itself. η_z repre-

[6]Students' SES is determined based on the official classification of the French Ministry of Education, which categorizes SES into four groups according to the occupation of the student's legal guardian. The classifications are as follows: high SES (including company managers, executives, liberal professionals, engineers, intellectual occupations, and arts professionals), medium-high SES (technicians and associate professionals), medium-low SES (farmers, craft and trade workers, service, and sales workers), and low SES (manual laborers and individuals without employment).

sent a high-school field of study fixed effect, helping to account for differences in application patterns that are due to the specialization of the high school attended. The specialization refers here to general *baccaulérat*, including academic (*e.g.* scientific, humanities) and vocational tracks (*e.g.* health, business). The error term ϵ_{izt} is robust and clustered at the school level to account for potential within-school correlation of errors. The estimated parameter thus reflects the variation in the share of applications among a student's set of choices, to a given field, within high-school specialization, controlling for students level characteristics.

As an alternative estimation, we also estimate equation 1 using the outcome variable that indicates whether students included at least one application in each of the three types of degree and field of study. This is estimated using a logit model. While the share of applications provides insight into the intensive margin, estimating the probability of submitting at least one application sheds light on the extensive margin.

This model estimates the average effect of the pandemic on application patterns for the entire student population. However, this approach assumes that all groups are equally affected by the pandemic, which is unlikely. Different demographic groups may experience distinct challenges and opportunities as a result of the pandemic, leading to variations in their field preferences. We extend this model by introducing interaction terms between demographic characteristics and year coefficients, which enables us to assess whether the impact of the COVID-19 pandemic varied across different demographic groups. By leveraging both within-year and between-demographic variations, this approach provides insight into how the crisis influenced student preferences over time.

$$Y_{itz} = \beta_0 + \sum_{t=2020}^{2021} \beta_t \text{year}_t + \sum_{t=2020}^{2021} \gamma_t(\text{year}_t \times X_i) + \mathbf{X}_i'\delta + \eta_z + \epsilon_{izt} \tag{2}$$

Equation 2 introduces interaction terms between each year dummy (year t) and demographic characteristics (X_i). This allows for estimating the effect of the COVID-19 pandemic on the application share for specific demographic groups in each year. The inclusion of the interaction terms $\gamma_t(\text{year}_t \times X_i)$ enables us to capture how the effect of the pandemic varied across different demographic groups. More in details we estimate two separate regressions: one including the interaction with the gender, and another one including the interaction with socio-economic status, using male and high SES respectively as reference category.

The analysis conducted is purely descriptive, documenting how students from two consecutive cohorts—one making choices in a regular setting and the other making choices after the onset of COVID-19—make different decisions. Of course, we cannot claim that the differences in choices are directly caused by the pandemic, as our estimates are not causal. We are simply documenting a before/after COVID-19 change in applications, which we believe could be (at least partially) due to the experiences lived by the exposed cohort. Controlling for relevant covariates should help mitigate the risk that the differences are due to compositional effects, but it does not fully eliminate the possibility.

5 Results

5.1 Descriptive statistics

Table 1 presents descriptive statistics on students' application behavior in the 2020 and 2021 academic years, focusing on both degree types (CPGE, bachelor, and vocational) and fields of study (health, STEM, and business). The table reports two key measures: the share of applications, which represents the proportion of total applications submitted within each category, and the proportion of students submitting at least one application, indicating the breadth of interest in each field or degree type. Overall, application shares remained relatively stable across the two cohorts, though slight shifts emerged. This initial descriptive evidence aligns with Del Bono et al. (2022), which finds no significant change in overall application trends in the UK.

Table 1: Descriptive statistics of the outcome variables

	Type of degree			Field of study		
	CPGE	Bachelor	Vocational	Health	STEM	Business
Share of applications						
2020	0.052	0.372	0.380	0.213	0.198	0.120
2021	0.054	0.363	0.374	0.215	0.200	0.119
At least one application						
2020	0.140	0.689	0.627	0.390	0.347	0.298
2021	0.140	0.674	0.612	0.384	0.343	0.292

Notes: The share of applications represents the proportion of application to each degree type and field of study within a student set of choices. The "at least one application" row indicates the proportion of students who applied to at least one program in each category.

Table 2 presents the distribution of key socio-economic characteristics of the student population for the 2020 and 2021 academic years. The data is categorized by socio-economic status (low, middle-low, middle-high, and high) and includes two additional control variables: gender and eligibility for free lunch. We find an over-representation of high SES students and female students, respectively 30% and 54.8% of the students population. However, the distribution of socio-economic status remains largely stable between the two years.

Table 2: Descriptive statistics of demographics per year

	Low SES	Middle-low SES	Middle-high SES	High SES	Female	Free lunch
2020	0.072	0.353	0.275	0.300	0.548	0.232
2021	0.076	0.344	0.278	0.303	0.544	0.239

Notes: Notes: The table presents the distribution of key socio-economic and demographic characteristics of the student population for the 2020 and 2021 academic years.

5.2 Changes at the intensive margin between 2020 and 2021

The results presented in Table 3 illustrate the impact of the year 2021 on the share of applications to three program types and relevant academic fields on the Parcoursup platform, controlling for demographics and secondary school educational tracks. Each coefficient can be interpreted as the shift in percentage associated with the 2021 year in the share of a given field of study or program type based on the 2020 year.

Students' application behaviors shifted notably in response to the pandemic, reflecting a preference for more structured and competitive educational pathways. CPGE programs saw a 0.4% increase in applications, while bachelor's and vocational programs experienced declines of 0.9% and 1.1%, respectively, suggesting that students prioritized selective tracks with stronger perceived career stability. A possible explanation for this trend is the difficulties universities faced in adapting to remote learning, which may have led students to seek programs with higher student-teacher interaction, such as CPGE. Turning to field choices, STEM programs experienced a modest but significant 0.2% increase in their share within applicants' portfolios, while health and business programs showed no significant variation, indicating stable student interest in these fields. The sustained attractiveness of health-related careers may stem from their well-established job security, whereas the stability in business applications likely reflects the perceived versatility of such degrees despite economic uncertainty. Overall, the findings indicate a reallocation of applications toward competitive programs and specialized fields, potentially reflecting concerns about long-term career prospects and educational quality.

Table 3: Changes in share of applications within students' portfolio

Type of degree	CPGE	Bachelor	Vocational
2021	0.004***	-0.009***	-0.011***
	(0.000)	(0.001)	(0.001)
Field of study	Business	Health	STEM
2021	-0.000	-0.000	0.002***
	(0.001)	(0.001)	(0.001)
Observations	1,117,485	1,117,485	1,117,485

Notes: The table reports the estimates for the coefficient β_{2021} estimated using equation (1). Each cell is a different estimation. Controls for students' gender, SES, free lunch status, Baccalauréat exam result, and high school type fixed effects are included but not reported. Standard errors clustered at the school level are in parentheses.

We conduct a heterogeneity analysis to assess whether these effects vary across demographic groups. Higher-SES students, benefiting from greater financial stability and academic support, may have been more likely to apply to selective programs like CPGE, whereas lower-SES students, facing economic uncertainty and learning disruptions, may have been discouraged. Gender disparities in STEM may have widened, with male students more inclined to pursue these fields amid heightened job insecurity. Identifying these patterns is

crucial to determining whether COVID-19 reinforced existing inequalities or reshaped educational opportunities.

Figure 2 presents estimates from Equation 2 for each program type and field of study under scrutiny. Each figure presents results from three different regressions, the first being the baseline effect of being in the post-pandemic year (green dot labeled as "baseline"), as shown in the first column of Table 3, estimated using Equation 1. The second is Equation 2, interacting the variable gender with the year dummy (purple dots), using male as the reference category, and the third is Equation 2, interacting the variable SES with the year dummy (blue dots), using high-SES as the reference category.

The coefficient associated with the 2021 dummy (purple dot labeled as "gender") can be interpreted as the effect of being in the post-pandemic year for males, and the interaction between 2021 and female (purple dot, "2021 x female") shows the differential effect of being in 2021 for females. Similarly, the coefficient associated with the 2021 dummy (blue dot labeled as "SES") can be interpreted as the effect of being in the post-pandemic year for high-SES students, and the subsequent blue dots show the differential effect of belonging to other SES categories.

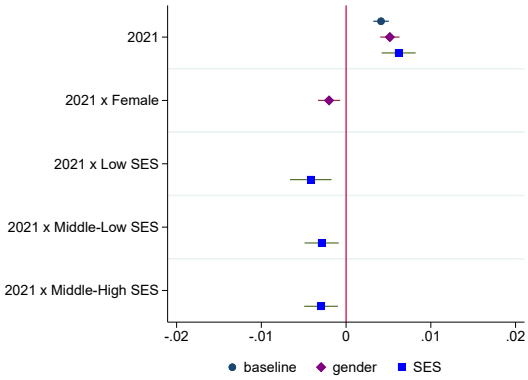
Panel (a) illustrates that, in CPGE programs, baseline effects indicate a general increase in applications. However, the share of CPGE applications among female students and students from all socioeconomic backgrounds, is lower compared to males and high-SES students. This suggests that the disruptions caused by the COVID-19 crisis, including school closures, remote learning challenges, and unequal access to academic resources, may have disproportionately affected students from disadvantaged backgrounds, as well as female students, exacerbating existing inequalities in access to CPGE programs, potentially due to factors such as limited academic support and digital exclusion, which are more pronounced among disadvantaged groups.

Panel (b) examines applications to bachelor's programs, where we observe an opposite trend relative to CPGE. The coefficient for the female interaction is positive, and the same holds true for middle-low and middle-high SES students, meaning that the reduction in application to bachelor is lower for those groups, with respect to males or high SES students.

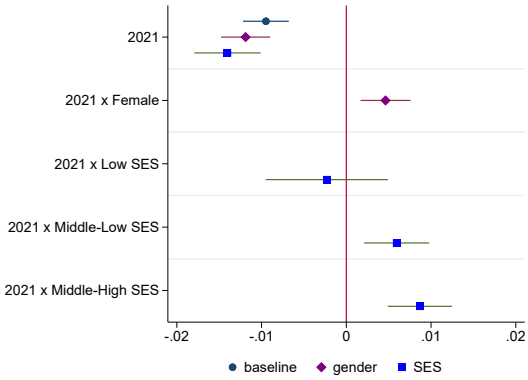
Panel (c) focuses on vocational programs, which show a different pattern: similar to CPGE for gender, and opposite to CPGE for socioeconomic status. So applications for both gender decrease, but the overall decrease was higher for females rather than male. As for SES, decrease in application were higher for high SES students, than from all the other groups. It could imply that vocational programs are viewed differently by students based on their socioeconomic status, possibly due to differences in the perceived value or access to vocational versus academic pathways.

When examining the results by field of study, Panel (d) reveals that in the business field, there is no significant difference between male and female students, and as in the baseline the effect is zero for both groups. However, students from all socioeconomic backgrounds show a decrease in the share of applications compared to high-SES students.

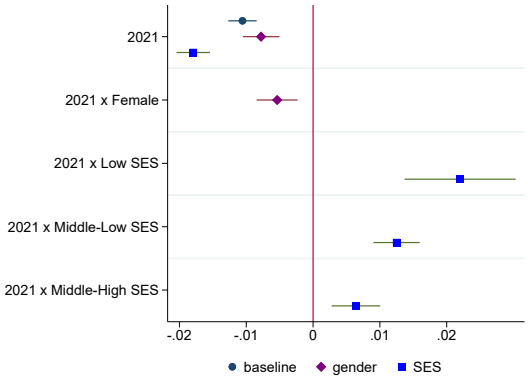
Figure 2: Heterogeneity analysis on portfolio applications: share of applications



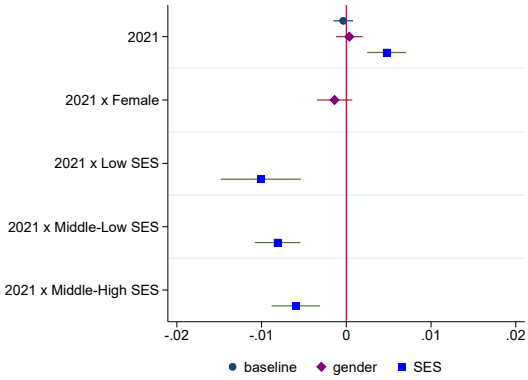
(a) Type: CPGE



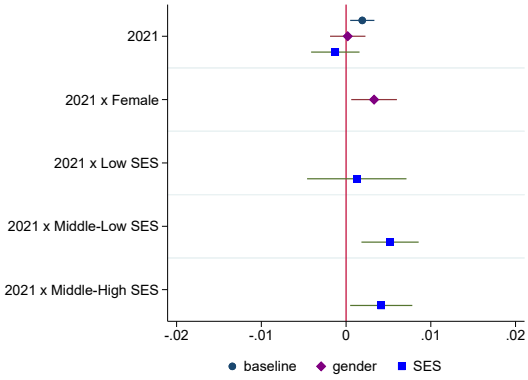
(b) Type: Bachelor



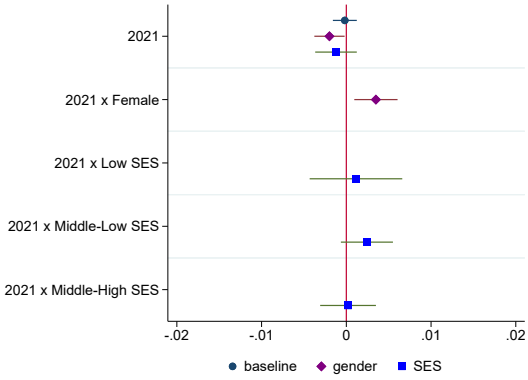
(c) Type: Vocational



(d) Field: Business



(e) Field: STEM



(f) Field: Health

In contrast, Panel (e) shows that in STEM fields, students from lower socioeconomic backgrounds (in particular for Middle-low SES) actually have a slightly higher share of applications, as do female students. This suggests that the pandemic may have prompted an increased interest in STEM among these groups, possibly driven by shifts in labor market demands or a reevaluation of career opportunities.

Finally, Panel (f) reveals a more nuanced pattern in health-related fields. While there

is no clear overall effect of the pandemic on health applications, female students have increased their share of applications, with respect to males, but the overal increase is close to zero also for them. This may reflect changing career prospects and perceptions of job security in health-related professions during the COVID-19 crisis, with female students perhaps responding more positively to the stability and growth opportunities in the sector.

5.3 Changes at the extensive margin

To complement our main analysis, we estimate whether students included at least one choice from a given field in their application portfolio. This examines the extensive margin of application behavior, capturing whether the pandemic influenced students' likelihood of considering specific fields. In contrast, our primary analysis focuses on the intensive margin, measuring changes in the share of applications within portfolios. Together, these approaches help distinguish between broader field inclusion and reallocation within portfolios. Table 4 replicates the analysis from Table 3, now assessing whether a student submitted at least one application to CPGE, bachelor, vocational, business, STEM, or health programs. The table presents odds ratios from logistic regressions estimating the likelihood of including a specific field in 2021 compared to the previous year.[7]

Table 4: Changes in share of applications within students' portfolio

Type of degree	GPGE	Bachelor	Vocational
2021	1.031***	0.932***	0.885***
	(0.009)	(0.006)	(0.006)
Observations	1,117,425	1,117,485	1,117,483
Field of study	Business	Health	STEM
2021	0.965***	0.951***	0.957***
	(0.005)	(0.004)	(0.005)
Observations	1,117,483	1,117,485	1,117,485

Notes: The table reports the estimates for the coefficient β_{2021} estimated using equation (1). Each cell is a different estimation. Controls for students' gender, SES, free lunch status, Baccalauréat exam result, and high school type fixed effects are included but not reported. Standard errors clustered at the school level are in parentheses.

Controlling for demographics and educational background, the likelihood of applying to at least one CPGE program increased (odds ratio = 1.031), while the likelihood of applying to vocational and bachelor's programs decreased. Similarly, students were less likely to apply to business (odds ratio = 0.965), health (0.951), and STEM (0.957) programs. These findings suggest a shift in student preferences toward more selective and structured pathways, with a growing emphasis on CPGE, likely driven by its perceived stability and professional

[7]Note that some columns do not display a consistent number of observations, as the dependent variable was perfectly predicted by the independent variable in certain cases (e.g., field of specialization and demographics).

advantages in a post-pandemic world. The increase in CPGE applications reflects a strategic shift among students already applying to multiple programs, reinforcing the trend toward competitive academic tracks. In contrast, the decline in applications to bachelor's and vocational programs highlights a move away from less selective and more generalist options, underscoring a broader trend of students prioritizing programs with stronger labor market prospects.

The analysis of field of study choices reveals shifting patterns in student applications. The increase in the share of STEM applications within students' portfolios suggests that those already considering STEM programs simply allocated more of their portfolio to these fields. However, the slight decrease in the likelihood of including STEM in portfolios indicates that fewer students were considering STEM altogether, pointing to a broader decline in interest. In contrast, applications to business and health programs show a stable share within portfolios, but a notable decrease in the likelihood of applying to these fields overall. This suggests that, while these fields continue to occupy a similar proportion of students' portfolios, fewer students are actively choosing them. These trends highlight how students are reallocating their preferences, likely driven by evolving perceptions of stability and employability in a post-pandemic context.

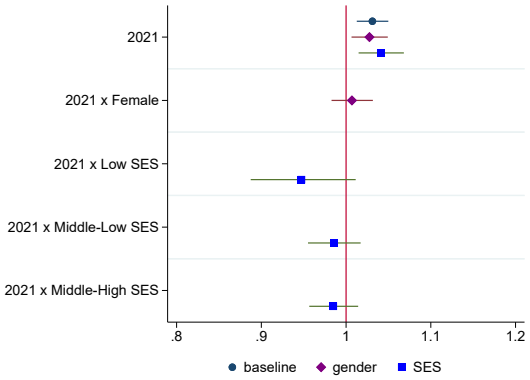
When analyzing application behavior by students' characteristics, we find notable differences across socio-economic groups. As shown in Figure 3, while the likelihood of applying to CPGE remains consistent across groups, lower SES students are more likely to apply to vocational degrees but less likely to apply to bachelor's programs compared to their high SES counterparts. Upon including interactions with demographic characteristics, no significant differences emerge for health and STEM fields based on socio-economic background. However, higher SES students are more likely to apply to business programs. Interestingly, across all fields of study and degree types, female students show a smaller negative effect compared to male students, as indicated by the consistently positive interaction. These findings highlight how socio-economic status and gender influence students' higher education choices in different ways.

5.4 Potential mechanisms

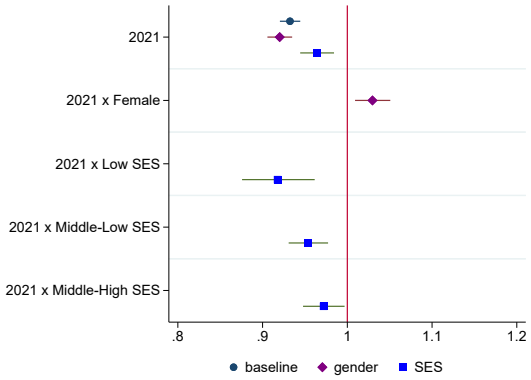
The COVID-19 pandemic altered student application behavior through multiple interconnected mechanisms, including economic constraints, increased risk aversion, psychological stress, and shifts in field salience. These forces did not operate in isolation; rather, they interacted with pre-existing structural inequalities, amplifying disparities in access to higher education. Understanding these mechanisms is crucial for assessing how external shocks shape educational trajectories.

One of the most immediate consequences of the pandemic was the sharp rise in economic uncertainty, which likely influenced students' application choices. The surge in applications to CPGE and STEM fields suggests a shift toward structured, high-return pathways, as these

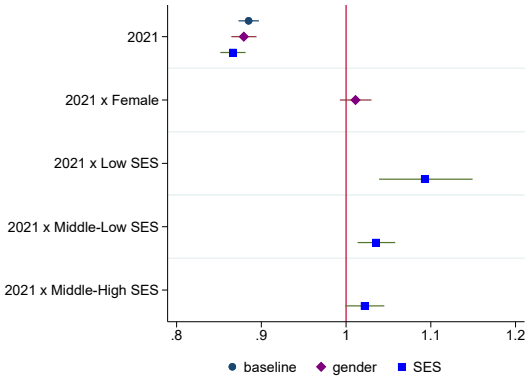
Figure 3: Heterogeneity analysis on portfolio applications: at least one choice



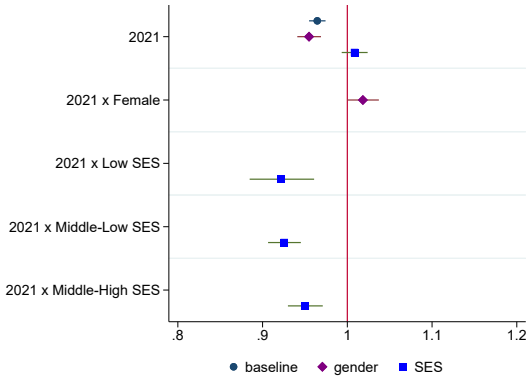
(a) Type: CPGE



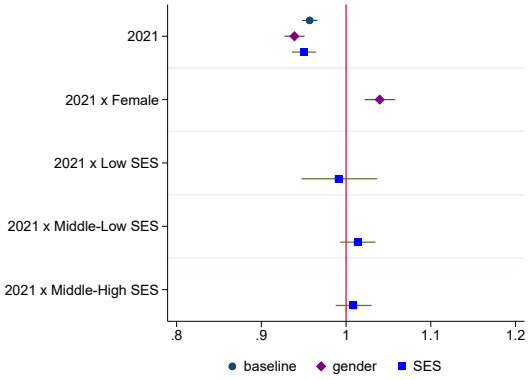
(b) Type: Bachelor



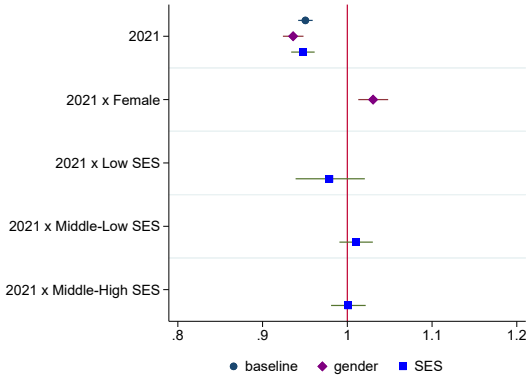
(c) Type: Vocational



(d) Field: Business



(e) Field: STEM



(f) Field: Health

fields are associated with greater job stability and clearer career prospects. Conversely, students may have been discouraged from applying to bachelor's and vocational programs, which are often perceived as offering less immediate employability and being more vulnerable to economic fluctuations. This pattern aligns with existing evidence on the relationship between risk aversion and educational decision-making (Belzil and Leonardi, 2013; Patnaik et al., 2022). In times of heightened uncertainty, applicants tend to favor academically rig-

orous and economically secure tracks over more flexible or uncertain alternatives. These trends are consistent with human capital models, where individuals facing economic instability prioritize fields with higher expected returns and lower employment volatility.

The pandemic's impact on application behavior also varied across demographic groups, driven in part by disruptions to social interactions. School closures and remote learning significantly reduced students' engagement with peers and teachers, limiting their exposure to key sources of information and guidance. For instance, Bechichi and Kenedi (2024) document strong peer effects, showing that students are more likely to apply to the same degree as a marginally enrolled older schoolmate. The disruption of in-person interactions likely weakened these peer influences, particularly affecting students from disadvantaged backgrounds, who often rely more on school networks to navigate higher education choices. Similarly, while teacher recommendations are sometimes viewed as a source of bias—potentially reinforcing stereotypes or limiting access to competitive tracks (Carlana et al., 2022) – they may also play a crucial role in encouraging students, particularly those from underrepresented groups, to apply to specific programs. The transition to remote learning likely reduced the extent to which teachers could provide individualized guidance, further disadvantaging students who might have benefited from direct encouragement to pursue competitive tracks. The absence of these reinforcing mechanisms—both peer-driven and teacher-led—may have contributed to shifts in application patterns, further exacerbating inequalities.

Another key mechanism explaining the heterogeneous impact of the pandemic on college applications is the unequal spread of COVID-19 across different socioeconomic groups. The pandemic did not affect all communities uniformly; lower-income neighborhoods experienced higher infection and mortality rates (Brandily et al., 2021) and were more likely to face prolonged school closures (Parolin and Lee, 2021). This disproportionate exposure among disadvantaged households likely intensified financial insecurity, academic disruptions, and psychological stress, further limiting students' ability to focus on higher education applications. Additionally, heightened exposure to the pandemic may have influenced students' socio-emotional development, potentially reducing pro-social behaviors (Terrier et al., 2021), which have been shown to play a role in securing admission to competitive colleges (Boon-Falleur et al., 2024). These combined factors suggest that beyond economic constraints, the broader social and psychological consequences of the pandemic further restricted access to highly selective higher education pathways, particularly for lower-SES students.

6 Discussion & Conclusion

This study provides novel insights into how the COVID-19 pandemic influenced students' application patterns on the Parcoursup platform. Although this study is purely descriptive, comparing application trends between pre- and post-pandemic cohorts, the results reveal significant shifts in student preferences. These changes reflect the interplay between external shocks and decision-making processes shaped by perceptions of stability, employability, and

access to resources during a period of global uncertainty. As hypothesized, the pandemic-induced uncertainty led students to concentrate their choices on competitive, structured pathways like CPGE and STEM while reducing diversification in applications.

This paper highlights two main findings regarding the impact of the COVID-19 pandemic on university application patterns in France. First, the pandemic prompted a significant shift in application behavior, with students favoring structured and stable fields. CPGE and STEM applications increased, reflecting a move toward competitive tracks perceived as offering strong labor market prospects, while bachelor's and vocational applications declined, likely due to concerns about employability and the challenges of remote learning. Health applications remained stable, indicating that its job security continued to attract students, and business applications showed no significant shift. Second, the pandemic affected both the intensive margin (share of applications within portfolios) and the extensive margin (likelihood of applying to a field), with students concentrating their choices in fewer fields, reducing application diversification. These findings underscore how the pandemic not only influenced students' field preferences but also led to a narrowing of application strategies, highlighting the role of external shocks in shaping both the composition and breadth of higher education choices. Finally, we find significant differences in application behavior by gender and socioeconomic background, with higher-SES students disproportionately favoring selective tracks like CPGE, while lower-SES students showed more constrained shifts in their choices.

The findings of this study offer valuable insights for policymakers and educational institutions aiming to adapt to the evolving landscape of higher education in the aftermath of the COVID-19 pandemic. In particular, targeted financial aid programs could support low-SES students in accessing competitive programs like CPGE and STEM fields, while enhanced career counseling and outreach initiatives could provide disadvantaged students with essential guidance on application strategies. This recommendation aligns with recent evidence on the SES gap in confidence – and, more broadly, in access to information – when applying to selective degree programs. The reduced interaction with teachers during the pandemic may have exacerbated this bias, making it even more critical to implement interventions that bridge these informational disparities (Hakimov et al., 2023; Tincani et al., 2023).

Future research should build on this study by examining the underlying mechanisms driving these shifts, such as perceived labor market stability, risk aversion, or financial constraints, through the integration of survey data on students' expectations. Additionally, leveraging the success of online tutoring programs during the COVID-19 pandemic could help address the widening SES gap in college applications (Carlana and La Ferrara, 2024). Further extensions could link application data to post-enrollment and labor market outcomes, shedding light on whether these changes translate into longer-term impacts on graduation rates, job placements, and earnings. Comparative analyses across countries with different education systems would also be valuable in assessing whether similar trends emerged globally, providing a broader perspective on how external shocks influence educational decision-making.

Declarations of interest

The authors report there are no competing interests to declare.

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References

Aalto, A.-M., Müller, D. and Tilley, J. L. (2023), 'From epidemic to pandemic: Effects of the covid-19 outbreak on high school program choices in sweden', *Labour Economics* **82**, 102346.

Acton, R. K. (2021), 'Community college program choices in the wake of local job losses', *Journal of Labor Economics* **39**(4), 1129–1154.

Agostinelli, F., Doepke, M., Sorrenti, G. and Zilibotti, F. (2022), 'When the great equalizer shuts down: Schools, peers, and parents in pandemic times', *Journal of public economics* **206**, 104574.

Altmejd, A. (2024), 'Inheritance of fields of study'.

Altonji, J. G., Arcidiacono, P. and Maurel, A. (2016), The analysis of field choice in college and graduate school: Determinants and wage effects, *in* 'Handbook of the Economics of Education', Vol. 5, Elsevier, pp. 305–396.

Altonji, J. G., Blom, E. and Meghir, C. (2012), 'Heterogeneity in human capital investments: High school curriculum, college major, and careers', *Annu. Rev. Econ.* **4**(1), 185–223.

Barrios Fernández, A., Neilson, C. and Zimmerman, S. D. (2021), 'Elite universities and the intergenerational transmission of human and social capital', *Available at SSRN 4071712* .

Bechichi, N. and Kenedi, G. (2024), 'Older schoolmate spillovers on higher education choices', *Unpublished manuscript* .

Beffy, M., Fougere, D. and Maurel, A. (2012), 'Choosing the field of study in postsecondary education: Do expected earnings matter?', *Review of Economics and Statistics* **94**(1), 334–347.

Belzil, C. and Leonardi, M. (2013), 'Risk aversion and schooling decisions', *Annals of Economics and Statistics/Annales d'économie et de statistique* pp. 35–70.

Berger, M. C. (1988), 'Predicted future earnings and choice of college major', *ILR Review* **41**(3), 418–429.

Betthäuser, B. A., Bach-Mortensen, A. M. and Engzell, P. (2023), 'A systematic review and meta-analysis of the evidence on learning during the covid-19 pandemic', *Nature Human Behaviour* **7**(3), 375–385.

Betts, J. R. and McFarland, L. L. (1995), 'Safe port in a storm: The impact of labor market conditions on community college enrollments', *Journal of Human resources* pp. 741–765.

Blom, E., Cadena, B. C. and Keys, B. J. (2021), 'Investment over the business cycle: Insights from college major choice', *Journal of Labor Economics* **39**(4), 1043–1082.

Bonneau, C. and Grobon, S. (2024), 'Parental income and higher education: Evidence from france'.

Boon-Falleur, M., Huillery, E. and Chevallier, C. (2024), Matching algorithms that reward patience increase social inequalities in higher education admissions, Technical report, Center for Open Science.

Bradley, E. S. (2012), 'The effect of the business cycle on freshman major choice'.

Brandily, P., Brébion, C., Briole, S. and Khoury, L. (2021), 'A poorly understood disease? the impact of covid-19 on the income gradient in mortality over the course of the pandemic', *European economic review* **140**, 103923.

Breda, T., Grenet, J., Monnet, M. and Van Effenterre, C. (2023), 'How effective are female role models in steering girls towards stem? evidence from french high schools', *The Economic Journal* **133**(653), 1773–1809.

Bulman, G. and Fairlie, R. (2022), 'The impact of covid-19 on community college enrollment and student success: Evidence from california administrative data', *Education Finance and Policy* **17**(4), 745–764.

Carlana, M., Ferrara, E. L. and Pinotti, P. (2022), Implicit stereotypes in teachers' track recommendations, *in* 'AEA Papers and Proceedings', Vol. 112, American Economic Association 2014 Broadway, Suite 305, Nashville, TN 37203, pp. 409–414.

Carlana, M. and La Ferrara, E. (2024), Apart but connected: Online tutoring, cognitive outcomes, and soft skills, Technical report, National Bureau of Economic Research.

Dagorn, E. and Moulin, L. (2025), 'Dropping out of university in response to the covid-19 pandemic', *Economics of Education Review* **104**, 102604.

Del Bono, E., Fumagalli, L., Holford, A. and Rabe, B. (2022), University access: The role of background and covid-19 throughout the application process, Technical report, ISER Working Paper Series.

Ersoy, F. Y. (2020), 'The effects of the great recession on college majors', *Economics of Education Review* **77**, 102018.

Fack, G. and Grenet, J. (2015), 'Improving college access and success for low-income students: Evidence from a large need-based grant program', *American Economic Journal: Applied Economics* **7**(2), 1–34.

Finamor, L. (2023), 'Labor market conditions and college graduation: evidence from brazil', *Economics of Education Review* **94**, 102403.

Grenet, J., Grönqvist, H., Hertegård, E., Nybom, M. and Stuhler, J. (2024), 'How early career choices adjust to economic crises'.

Guyon, N. and Huillery, E. (2021), 'Biased aspirations and social inequality at school: Evidence from french teenagers', *The Economic Journal* **131**(634), 745–796.

Hakimov, R., Schmacker, R. and Terrier, C. (2023), Confidence and college applications: Evidence from a randomized intervention, Technical report, Working Paper.

Han, L. and Winters, J. V. (2020), 'Industry fluctuations and college major choices: Evidence from an energy boom and bust', *Economics of Education Review* **77**, 101996.

Issehnane, S. and Moulin, L. (2024), 'In the eye of the storm: The disrupted career paths of young people in the wake of covid-19', *The BE Journal of Economic Analysis & Policy* **24**(2), 565–596.

Jakubowski, M., Gajderowicz, T. and Patrinos, H. A. (2023), 'Global learning loss in student achievement: First estimates using comparable reading scores', *Economics Letters* **232**, 111313.
URL: *https://www.sciencedirect.com/science/article/pii/S0165176523003385*

Kirkeboen, L. J., Leuven, E. and Mogstad, M. (2016), 'Field of study, earnings, and self-selection', *The quarterly journal of economics* **131**(3), 1057–1111.

Lentz, B. F. and Laband, D. N. (1989), 'Why so many children of doctors become doctors: Nepotism vs. human capital transfers', *Journal of Human Resources* pp. 396–413.

Liu, S., Sun, W. and Winters, J. V. (2019), 'Up in stem, down in business: Changing college major decisions with the great recession', *Contemporary Economic Policy* **37**(3), 476–491.

Long, M. C., Goldhaber, D. and Huntington-Klein, N. (2015), 'Do completed college majors respond to changes in wages?', *Economics of Education Review* **49**, 1–14.

Parolin, Z. and Lee, E. K. (2021), 'Large socio-economic, geographic and demographic disparities exist in exposure to school closures', *Nature human behaviour* **5**(4), 522–528.

Patnaik, A., Venator, J., Wiswall, M. and Zafar, B. (2022), 'The role of heterogeneous risk preferences, discount rates, and earnings expectations in college major choice', *Journal of Econometrics* **231**(1), 98–122.

Sandner, M., Patzina, A., Anger, S., Bernhard, S. and Dietrich, H. (2023), 'The covid-19 pandemic, well-being, and transitions to post-secondary education', *Review of Economics of the Household* **21**(2), 461–483.

Schanzenbach, D. W. and Turner, S. (2022), 'Limited supply and lagging enrollment: Production technologies and enrollment changes at community colleges during the pandemic', *Journal of Public Economics* **212**, 104703.

Schueler, B. E. and Miller, L. C. (2023), 'Post-pandemic onset public school enrollment and mobility: Evidence from virginia', *Educational Evaluation and Policy Analysis* p. 01623737231178299.

Stantcheva, S. (2022), 'Inequalities in the times of a pandemic', *Economic Policy* **37**(109), 5–41.

Terrier, C., Chen, D. L. and Sutter, M. (2021), 'Covid-19 within families amplifies the prosociality gap between adolescents of high and low socioeconomic status', *Proceedings of the National Academy of Sciences* **118**(46), e2110891118.

Tincani, M. M., Kosse, F. and Miglino, E. (2023), 'College access when preparedness matters: New evidence from large advantages in college admissions'.

Werner, K. and Woessmann, L. (2023), 'The legacy of covid-19 in education', *Economic Policy* p. eiad016.