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Evidence From France**

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Parental Income and Higher Education Patterns: Evidence From France

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Abstract

In this paper, we present new stylized facts on inequality of enrollment in higher education by parental income in France. On average, an increment of 10 percentiles in the parental income distribution is associated with a 5.8 percentage-point increase in the proportion of children entering higher education. This overall degree of inequality is surprisingly close to that observed in the United States. We identify potential explanatory factors driving comparable levels of inequality in the two countries with markedly different institutional contexts. Finally, we explore a consequence of enrollment disparities by assessing the distribution of public spending on higher education.

JEL Codes: H52, I2, J62.

Keywords: Higher Education, Parental Income, Expenditures, Human Capital, Resource Allocation, France.¹

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¹**Declarations of Interest:** None. **Availability of Data:** Restrictions apply to the availability of these data, which were used under license for this study. Data are available from ADISP (*Archives de Données Issues de la Statistique Publique*) for the main databases (*ENRJ 2014* and *ERFS 2014* surveys), from INSEE (*Institut National de la Statistique et des Etudes Economiques*) for additional variables and from the Ministry of Higher Education and Research (*Direction Générale de l'Enseignement Supérieur et de l'Insertion Professionnelle* (DGESIP)) for higher education spending (*Connaissance des coûts des activités des établissements d'enseignement supérieur et de recherche* project).

1 Introduction

Since the 1960s, the number of university students has soared throughout the developed world. In France, for instance, it increased eight-fold from 310,000 in 1960 to 2,551,000 in 2015 (MESRI-SIES, 2021). Is this increase in enrollment in higher education due to mass schooling actually a sign of equal opportunity? In this paper, we reassert the persistence of marked inequality in higher education attendance patterns, observing it from an innovative perspective, namely according to parental income.

Despite the extensive documentation of inequalities based on social origin (e.g. parents' education or occupation), since pioneering work in sociology in the 1960s in France (Bourdieu and Passeron (1964); Boudon (1973)), as well as in the United States (Blau and Duncan, 1967), surprisingly few studies have addressed the strictly economic dimension of these inequalities. This perspective has been adopted in recent studies in the United States (Chetty et al. (2014), Chetty et al. (2020)), Norway (Bütikofer et al., 2019), and Germany (Dodin et al., 2021) but remains rare in most countries.

Inequality according to parental income provides a continuous measure of the effect of social background, which is more suitable for international comparisons. However, enrollment in higher education is rarely studied in relation to parental income for two main reasons. The first is lack of administrative data on parental income in education data and the presence of significant biases in self-reported income (Moore et al., 2000), which complicates the interpretation of survey results; the second is the uneven representativeness of the surveys themselves. In fact, the specific situation of young adults raises difficult issues of survey design, such as multiple residences. This concern is important, because unrepresentative samples are subject to homogeneity bias and may underestimate the relationship between parental income and child outcomes (Solon, 1992).

In this article, we use an innovative survey design² where young adults are surveyed regardless of housing status (parents' home, own apartment, student housing), and parental income is retrieved from administrative tax data. This produces novel descriptive estimates of inequalities in attendance patterns in higher education by parental income in France. To the best of our knowledge, this is the first comparison between the United States and a European country of the degree of inequality in enrollment in higher education according to parental income, with a representative sample of the whole population and a reliable measure of parental income. We organize our analysis into three parts.

The first part presents new statistics on attendance patterns in higher education by parental income in France. Following the literature, we use the percentile rank of parental pre-tax household income³ to study relative attendance in higher education. We find large differences in

²The National Survey of Youth Resources or *Enquête Nationale sur les Ressources des Jeunes*, DREES-INSEE, 2014.

³We rank young adults aged 18-24 in 2014 by parents' pre-tax income. The rank specification is used more commonly than the log of income to measure intergenerational mobility because it yields more stable estimates (Chetty et al., 2014).

enrollment as a function of parental income: at the bottom of the income distribution, around 35 percent of individuals aged 19-24 enroll in higher education, compared with a more than 90 percent at the top. Enrollment in master's degree and selective programs is even more unequal. In the bottom 40 percent of the income distribution, under 10 percent of children do enroll in master's degree programs and under 5 percent to selective programs, compared with about 50 percent at the very top of the income distribution. We then compare our estimates with those obtained in the United States by [Chetty et al. \(2020\)](#). We find that the degree of inequality in France is only marginally lower than in the United States, despite the important institutional differences between the two countries. Specifically, a 10-percentile increase in the parental income rank is associated with a 5.8 percentage-point (p.p.) increase in participation in higher education in France and a 6.1 p.p. increase in the United States. However, the functional form is different: in the U.S. the effect of income on enrollment in higher education is linear, whereas in France it is much greater in the upper than in the lower half of the parental income distribution: a 10-percentile increase in rank is associated with a 4.9 p.p. increase in attendance in higher education in the lower half of the income distribution and 8.6 p.p. in the upper half.

In the second part of the paper, we scrutinize the variations in institutional contexts between France and the United States to shed new light on the surprising similarity in their levels of higher education inequality. We present descriptive statistics comparing the two countries to examine the hypothesis that the comparable level of inequality in higher education attendance patterns in both France and the United States results from a mix of different institutional factors exerting opposing influences on educational disparities. The higher cost of attending higher education as well as greater income inequalities in the United States would suggest stronger higher education inequalities. The paradox of a similar level of inequalities in France can be reconciled if we consider the strong correlation between academic performance of parents socio-economic background, as well as the existence of early tracking.

In the third section, we compare the distribution of higher education spending in France and in the United States. We also combine our estimates of attendance inequality with new data on higher education spending to assess the redistributive profile of higher education public spending in France. While disaggregated data for the most expensive elite programs are unfortunately lacking, we find substantial differences in higher education spending along the parental income distribution. On average, children in the bottom third of the income distribution (percentiles 0-30, or P0-P30) receive around €9,000 worth of investment in higher education over six years of studies, compared with €32,000 for those in the top 10 percent – broken down into €21,000 of public investment and €11,000 of private investment through the tuition paid by their parents. In France, attendance disparities are the main contributor of public spending inequalities by parental income, while differences in annual cost and duration of studies have a more limited role.

Our paper is structured as follows. We begin in Section 2 by presenting the related literature. Section 3 describes the institutional context of the French higher education system. Section 4

describes the data and the main variables of our analysis. In Section 5, we present the main results in terms of enrollment in higher education according to parental income. Section 6 delves into a comparison of institutional factors in France and the United States, examining how they might contribute to the observed similarities in higher education inequalities between the two countries. Section 7 examines the redistribution that occurs through public spending on higher education, related to these attendance inequalities in higher education. Section 8 concludes.

2 Related Literature

Our paper builds on several strands of the literature. First, it relates to the extensive work on intergenerational mobility reviewed by [Black and Devereux \(2011\)](#). Ensuring broad and equitable enrollment in higher education can be seen as a corollary of Rawls' theory of justice ([Rawls, 1971](#)) and his second principle, namely equality of opportunity, which means that the assignment of individuals to a place in the social hierarchy is not fixed by birth. There is currently no consensus on the level of social mobility in France compared to other countries.⁴ Given this ambiguity, it is crucial to compare how enrollment in higher education – a known driver of social mobility ([Blau and Duncan, 1967](#); [Chetty et al., 2020](#)) – varies by parental income in France relative to other countries.

Our paper refers more directly to the literature directed to estimating the elasticity of educational attainment with respect to parental income ([Taubman \(1989\)](#), [Haveman and Wolfe \(1995\)](#), [Mayer \(1997\)](#), [Blau \(1999\)](#)).⁵ Our estimate of the impact of parental income on enrollment in higher education in France contributes in two ways. First, the vast majority of studies on this issue refer to the U.S., whereas in most European countries the effect of income on university attendance has not been assessed. And yet, the magnitude of the effect could depend at least partly on country-specific institutional factors such as higher education cost, the diversity of higher education programs, information dissemination about the returns to higher education, existing public aid or the relationship between students' academic performance and their

⁴Some studies, like those by [Lefranc and Trannoy \(2005\)](#) and [Alesina et al. \(2018\)](#), suggest that France has a moderate to high level of social mobility, falling between the U.S. and Nordic countries or even paralleling Sweden. However, other research, such as by [Corak \(2016\)](#) and [Perez-Arce et al. \(2016\)](#), suggests that France has lower social mobility than one might expect, especially given its moderate income inequality. This inconsistency challenges the commonly accepted "Gatsby curve," which typically shows a negative relationship between social mobility and income inequality. Recent findings by [Kenedi and Sirugue \(2023\)](#) and [Sicsic \(2023\)](#) also highlight the persistence of income across generations in France, mirroring trends seen in the U.S. by [Chetty et al. \(2014\)](#).

⁵This literature has not yet produced a consensus on the magnitude of this effect. [Taubman \(1989\)](#) finds that the elasticity of educational attainment with respect to parental income ranges from 3 to 80 percent, and [Mayer \(1997\)](#) reports that the average effect of a 10 percent increase in parental income on years of schooling ranges from 0.024 to 0.104 years. In France, [Ben-Halima et al. \(2014\)](#) show an increase in the effect of father's income on educational outcomes between 1993 and 2003 using a parental income variable estimated on the basis of other observable characteristics (father's occupation and education). We update and extend this work with a survey matched with tax administrative data, which allows direct study of the relationship between parental income and children's education, with no need to estimate parental income.

parents' educational attainment. Second, our results span the entire distribution of parental income and apply to a representative sample of all young adults aged 19-24 in France. This makes them complementary to the studies that seek to measure the causal effect of income on educational attainment using an instrument whose validity is by definition local – i.e. at a specific point in the parental income distribution (Shea (2000), Acemoglu and Pischke (2001), Maurin (2002), Løken (2010), Hilger (2016)).

Our research also aims to contribute to comparative studies on how the characteristics of education systems influence educational inequalities in different countries. We focus on France and the United States, which offer stark contrasts in their higher education systems. Key differences include the cost of higher education, the proportion of expenses subsidized by state funding, and the extent of student debt. Based on these criteria alone, one might anticipate significantly higher enrollment inequality in the United States. However, a thorough understanding of the relationship between higher education participation and parental income requires considering additional country-specific factors. These include the correlation between parental socio-economic status and academic performance, the variety of educational pathways available, and how resources are distributed (Causa and Chapuis (2011), Chmielewski and Reardon (2016)). From a policy perspective, fostering a higher education system capable of accommodating and educating the largest possible number of individuals is crucial for development and productivity in both the medium and long term, as exemplified by the Morrill Act in the United States (Ehrlich et al. (2018)). Nevertheless, comparative research in this domain remains scarce.

The stylized facts developed here also contribute to the literature on the mechanisms explaining the link between parental income and educational attainment. Two main channels have been identified in this literature. The first is parents' direct investment in children's education. Traditional models of human capital investment (Becker and Tomes, 1979) emphasize the importance of credit constraints in explaining low-income families' relative lack of enrollment in higher education. In France, tuition fees in public programs are set at a very low level (see Section 3); however, there may still be credit or budget constraints related to the cost of student living, especially since most universities are located in large cities where the cost of living is high, plus the opportunity cost incurred by students when they opt for education over immediate employment. The second channel consists in long-run factors associated with parental income (parents' education and occupation, transmission of aspirations or risk aversion, etc.), including the intergenerational transmission of academic skills or abilities.⁶ Although our data do not allow us to isolate the specific causal pathways through which parental income affects educational outcomes, the comprehensive nature of the survey facilitates a thorough descriptive examination of multiple contributing factors, including prior academic credentials and as-

⁶The importance of this transmission has been confirmed in France by recent studies (OECD (2018b), Herbaut (2019), Barhoumi and Caille (2020)). An important debate in this literature concerns the relative significance of nature and nurture in the intergenerational transmission of abilities. In a study of donor children in Denmark, Lundborg et al. (2021) find that net of genetic skill transfers, only the mother's education matters in explaining the children's school performance.

pirations. Such an analysis can shed light on potential underlying mechanisms that lead to similar levels of educational inequalities in both France and the United States, despite their distinct institutional frameworks in higher education.

Lastly, our paper contributes to the literature on the redistributive impact of public higher education spending. The empirical question of the degree of regressivity of spending on higher education has been the subject of intense methodological debate since the 1970s. The first empirical studies, conducted in the United States starting in 1969, gave rise to a controversy between Hansen and Weisbrod (1969), who find higher education spending in California to be regressive – individuals at institutions with the least subsidies being less wealthy on average – and Pechman et al. (1970), who claim that higher education spending in California is progressive – wealthy people paying more in taxes than they receive in subsidies compared with the less affluent. The issue of redistribution via in-kind transfers has also recently received renewed attention in distributional accounts research (Piketty et al. (2018), André et al. (2023)). Table A1 in the Appendix reviews the findings on the redistributivity of educational spending in different institutional settings and based on different methodological choices. Our study updates and extends the work of Albouy et al. (2002) on higher education spending, allowing several contributions to this literature. First, it addresses the lack of recent results in the U.S. or Europe (Johnson (2006)) and includes an unprecedented comparison of the distribution of higher education spending between France and the United States. Then, it explores a specific context of a European country with low tuition fees yet high levels of educational inequality; and uses data that, for the first time in France, disaggregates the costs of different higher education programs and fields.

3 Institutional Background

The French Higher Education System. The French higher education system is characterized by significant institutional differentiation and academic hierarchy among tracks. Higher education is divided into three main tracks: technical and vocational, non-selective academic (university) and selective academic, i.e. preparatory programs and elite graduate schools (*Grandes écoles*). Among first-year students in 2014-2015, 35% were on the technical and vocational track, 45% on the university track, and 20% on the selective academic track (MENESR-DEPP, 2015). The coexistence of two academic tracks is a specificity of the French system. Until 2018, university attendance was formally available to anyone holding the high school graduation exam (*Baccalauréat*),⁷ but enrollment in elite graduate schools was highly selective, admission being based on performance in competitive national exams, and candidates being required to take an intensive 2-3-year preparatory course (*Classes Préparatoires aux Grandes Écoles*) for eligibility to

⁷Of students with a high school diploma (academic, technical or vocational) 75% enrolled in higher education; among those with an academic diploma, 99%.

take the exams. Attending these preparatory courses after high school is already selective.⁸

Tracking. The stratification of the French education system begins as early as the 10th grade when students must decide between a vocational track and a general or technological track in high school. This stratification continues with the choice of majors within the academic or technological tracks (before 11th grade). The STEM major is the most prestigious and the one that most often leads to selective programs in higher education, while the vocational track is the least likely to lead to enrollment in higher education.

The Financing of Higher Education. Most French higher education institutions are publicly funded, with tuition set at a very low level. In 2014-2015, tuition in public universities were €184 for undergraduate students, €256 for master’s students, €391 for Ph.D. students, and €610 for most engineering schools.⁹ The private sector accounted for 18% of total enrollment in higher education (MENESR-DEPP, 2015). All universities are public, and the private sector consists mainly of business schools, a third of engineering schools, plus other specialized schools (journalism, paramedical, social, cultural and artistic, etc.). Tuition at business schools generally ranges from €9,000 to €15,000 a year, for private engineering schools around €7,000.

4 Data and Variable Definition

In this section, we first describe our data and the construction of our main sample, present summary statistics, and define the key variables and concepts.

4.1 The Data

Survey of Young Adults and Their Parents. The main dataset used in our work is the National Survey of Youth Resources (*Enquête Nationale sur les Ressources des Jeunes*, ENRJ) from 2014, collaboratively administered by the *Direction de la Recherche, des études, de l'évaluation et des Statistiques* (DREES) and the *Institut National de la Statistique et des études économiques* (INSEE). This survey targeted a representative subset of young adults between the ages of 18 and 24, as well as their respective parents. The sample is smaller than in studies based on administrative or census data, but these data offer the advantage of combining detailed questions about young adults’ educational background and the resources they have to live on, with the reliability of administrative data on parental income, on a representative sample of the young adult population.¹⁰ The parental income data within the ENRJ is sourced directly from admin-

⁸These students account for just 3.4 percent of total enrollment in higher education (MENESR-DEPP, 2015). In 2014-2015, 39% of the students in preparatory courses had passed their high school graduation exam with highest honors – a GPA of 16/20 or better – compared with 3% of technical/vocational students and 6% of university students (Bonneau et al., 2021).

⁹Order of August 12, 2014, setting tuition rates for public higher education institutions under the authority of the ministry of higher education (<https://www.legifrance.gouv.fr/loda/id/JORFTEXT000029409760/>).

¹⁰As highlighted by Dodin et al. (2021), administrative datasets, despite their vast sample sizes and the ability to link parents with their children, are often constrained by a paucity of variables, typically lacking insights into

istrative tax records of the surveyed parents. The final sample includes 5,776 young adults and 6,304 parents. Out of these, in 5,197 instances, responses were received from both the young adult and at least one parent. Survey weights are used to account for nonresponse bias.

Higher Education Cost Data in France. The final section of our analysis incorporates supplementary data on higher education expenditure. In national accounts and in earlier studies focused on France, higher education expenditures are typically grouped into just three categories, irrespective of the specific track or field of study (MESRI-SIES, 2021). Our research utilizes additional data from the "Cost Awareness" project.¹¹ This project, conducted from 2016 to 2019 across 65 higher education institutions (representing about one-third of all French students), provides a more detailed breakdown of costs across various programs and fields. Notably, it enables the calculation of the instructional expenditures in higher education, excluding research costs that are present in more aggregated data sources.

We use the information contained in the main survey (*ENRJ*) on the studies undertaken by individuals to match the two data sources at the level of each track and field of study.¹² The link with the *ENRJ* survey data also makes it possible to gauge private investment in higher education through tuition fees paid by parents, a distinction not generally made in the literature on France.

Higher Education Cost Data in the United States. For the United States, the data is sourced from IPEDS 2015 (Integrated PostSecondary Education Data System). IPEDS is a comprehensive survey of higher education institutions that covers areas such as college finance, enrollment, admissions, completions, graduation rates, outcomes, and institutional characteristics. To ensure consistency with the data on France, which only includes instruction expenditure, we compute per student spending for instructional expenditure. This is derived by dividing the total instructional expenditure¹³ by the total fall enrollment of the institution.

4.2 Sample Definition

The main sample includes young adult respondents to the survey and aged between 19 and 24 ($n=3,947$). We exclude 18-year-olds, as individuals in this age group are likely to still be in high school. When the parents are still living together, only one was interviewed and answered

other aspects of parental background, like education or occupation. Census data, such as those used by [Dodin et al. \(2021\)](#) and [Hilger \(2015\)](#), partly address these limitations by offering large samples. Nevertheless, a significant drawback is that they predominantly cover children still living with their parents. This is a potential bias, especially concerning enrollment in higher education—a crucial juncture when an important share of students moves out, with these departures potentially correlating with parental income.

¹¹*Connaissance des coûts des activités des établissements d'enseignement supérieur et de recherche*, DGESIP 2016-2019 ([Boiteau and Jameux, 2019](#)).

¹²See Appendix B.2.2.3 for more details on these new higher education cost data and Table B5 for annual public spending per student, broken down by field of study and track, the level of disaggregation that we are using.

¹³This expense category includes expenses of the colleges, schools, departments, and other instructional divisions. It covers costs related to general academic instruction, occupational and vocational instruction, community education, preparatory and adult basic education, and regular, special, and extension sessions.

questions about their partner.¹⁴ When parents are separated (26% of our sample young adults), both were interviewed in 46% and only one in 54% of the cases, in which case we have no information about the non-responding parent. In analysing spending on higher education, we restrict ourselves to individuals aged 22-24, who are the most advanced in their education in our sample and we infer the educational trajectories until 24 for individuals aged 22 and 23.

4.3 Descriptive Statistics

Table 1 presents some descriptive statistics of our sample of young adults aged 19-24, by quintile of parental pre-tax income. On average, they are 21.5 years old, and 49 percent are female. The average pre-tax income of parents – the sum of father’s and mother’s household income, divided by two when there are two distinct households – ranges from €9,400 per year in the bottom quintile to €92,700 in the top quintile, with a mean of €41,900. The parents of students or former students are more affluent on average, with an annual pre-tax income of €50,900. A bit more than 10 percent of all the parents have a bachelor’s or graduate degree, compared with over 20 percent of the parents of students or former students. The higher income quintiles tend to have a greater proportion of parents of high socio-economic status (SES) and with advanced degrees: more than 55 percent of individuals in the top quintile have a father of high SES, compared with 3 percent in the bottom quintile. About two thirds of the parents are still living together and a quarter are separated. The father is unknown or deceased in 7 percent of cases, the mother in 2 percent. As to geographic origin, 17 percent of the individuals in our sample have at least one parent living in the Paris region and another 29 percent in an urban center of at least 100,000 inhabitants (excluding Paris). The proportion of individuals in the Paris region or other large urban centers is greater at the top of the income distribution.

A concern here could be that the top deciles of the distribution concentrate the oldest parents and accordingly also the oldest young adults in our sample, which would bias the estimate of inequality in enrollment in higher education. However, this is not the case: neither the age of the young people nor that of their parents is statistically different across income groups.

[place Table 1 here]

4.4 Definitions of the Variables

In this section, we define the key variables used to measure enrollment in higher education by parental income.

Enrollment in Higher Education. We define individuals – aged 19-24 in our sample – as having enrollment in higher education if they meet any of the following criteria in the year

¹⁴Some 67% of the young adults in the sample have their parents still living together. In 68% of these cases, the mother answered the parents’ questionnaire.

of the survey: they are enrolled in a higher education program, they have already obtained a higher education degree, or they have reached a higher education level without obtaining the corresponding degree. To be considered as enrolling in higher education, an individual must therefore have been enrolled for at least one year in higher education. Similarly, we define attendance in a specific program (master's degree, medical school, selective higher education, etc.) as being currently enrolled in, having graduated from, or having reached some level in one of these programs without necessarily graduating.

Selective Higher Education. We define selective programs as preparatory courses, elite graduate schools, medical school and Ph.D. programs. The degree of selectivity of each of these programs can be assessed by ranking all students on the basis of their performance on the high school graduation exam. In 2016-2017, the median percentile rank of non-medical students in university was 50.2, that of students in medical studies was 68.1, that of students in preparatory courses was 84.9, and that of students in elite graduate schools was 72.8 (Bonneau et al., 2021).

Parent Income. Following Chetty et al. (2014) and Chetty et al. (2020),¹⁵ our preferred specification uses the percentile of parental pre-tax income, defined as the sum of the father's pre-tax household income and the mother's pre-tax household income, divided by two when we have both parents' household income.¹⁶ Parental income retrieved from income tax returns corresponds to individual income (before transfers) from wages, unemployment benefits, pensions, alimony, disability pensions, life annuities, agricultural income, industrial and commercial income, and noncommercial income. Capital income (property income, rent, finance, and securities) is not included. Taking property and capital incomes into account would mainly affect rankings within the top decile and only marginally those in the rest of the distribution.

To further assess the representativeness of our sample, we compare the distribution of pre-tax incomes of parents in the ENRJ sample and individuals aged 42-62 in the ERFS, another survey with a much larger sample (n=50,096) where income data are taken from tax sources as well. Overall, pre-tax income are quite similar in the two samples (Table B3). Parents of young adults (ENRJ sample), exhibited a slightly higher disposable income and a slightly reduced standard of living when compared to the individuals in the general population (ERFS sample), due to the presence of children. Table B4 shows that the average parental income in France is lower than in the United States, being \$53,000 compared to \$97,000. Moreover, the standard deviation for France is considerably smaller, at \$46,000, as opposed to \$353,000 in the U.S. (all amounts in 2012 dollars).

Parent Tax Income Versus Self-Reported Income. Our data show that self-reported income is correlated quite weakly with parental income obtained from tax administrative sources. The deciles obtained with the two datasets coincide for only 34 percent of the youths, and the cor-

¹⁵The authors show that using a rank specification provides much more stable estimates of intergenerational mobility than using the logarithm of parental income and allows for the inclusion of zeros in parental income.

¹⁶This household measure of income increases with cohabitation, to ensure that this feature does not generate bias, we present in Appendix C.3.2 a robustness test of our main results based on the sum of individual parental income – sum of the father's and mother's pre-tax income, regardless of marital status.

relation coefficient of the two variables is only 0.67. The gap in enrollment in higher education is significantly underestimated when self-reported income is used instead of administrative income – by 5 to 12 percentage points, depending on the specification – due to underestimation of enrollment rates at the top of the distribution.

Parents' Occupation. For occupations, we rely on the Department of Education's statistical service¹⁷ classification, which classes them in four groups by socio-economic status (SES). High SES encompasses professionals, managers, CEOs, teachers, professionals and artists. Upper-middle SES corresponds to intermediate occupations, technicians, foremen and supervisors. Lower-middle SES refers to farmers, artisans, shopkeepers and white-collar employees. Low SES is defined as blue-collar workers and non-working people. Table B2 in the Appendix details the four SES categories and the corresponding occupations.

Parents' Diploma. The data contains information on the highest degree obtained by parents. We define six categories: elementary school certificate or less, middle school certificate, high school diploma or equivalent, two-year university degree, bachelor's or master's degree, and M.D. or Ph.D.

Socio-Economic Position Index. For some analyses, we rely on a composite index of economic, social and cultural status (ESCS), based on OECD PISA 2015 and 2018 data. This index integrates a range of resources available to students. These resources are derived from the education and occupations of their parents, as well as an index summarizing numerous household possessions that serve as proxies for material wealth or cultural capital (OECD (2016)).

5 Unequal Enrollment in Higher Education by Parental Income

This section sets out our main findings on income-related disparities in enrollment in higher education and to different programs in France. We then explore the interplay between attendance disparities, which are linked to parental income, and other parental background characteristics, such as education and occupation. Following this, we compare the correlations between parental income and children's enrollment in higher education in France and the United States.

5.1 Inequalities in Higher Education Enrollment by Parents' Income

The proportion of 19-24-year-olds enrolled in higher education rises sharply with parental income (Figure 1): around 35 percent of those whose parents are in the bottom income quintile (P0-P20) are or have been students, compared with more than two times as many – around 90 percent – in the top decile.

¹⁷*Direction de l'évaluation, de la prospective et de la performance (DEPP).*

[place Figure 1 here]

Enrollment in master's degrees and selective programs – preparatory courses, elite graduate schools, medical school and Ph.D. – is more unequal still (Figure 2). Up to the 5th income decile for master's degrees and the 9th for selective programs, under 10% of individuals enter these studies. On the other side of the distribution, around 50 percent of individuals whose parents are in the top 2 percent of the income distribution (P98-P100) reach the master's level or enter a selective program between the ages of 19 and 24. These results confirm the problem of a dual system of higher education in France, in which enrollment in the most prestigious courses of study remains highly dependent on parental income.

[place Figure 2 here]

Robustness Checks. A first concern is the possible mis-estimation due to the fact that our parental income is calculated for a single year and so could well be affected by transitory fluctuations (Solon, 1992). To test this, we use an alternative measure of parental income: the parents' household taxable income. This administrative variable is available in our sample at the household level for years t and $t - 2$. We then compare the attendance differential between these two years, as shown in Table C6. Higher education attendance rates by decile of parental household taxable income in year t and in year $t - 2$ do differ slightly, but the difference is never statistically significant. These results are consistent with the finding that the measure of social mobility is little affected by the number of years for which parental income is measured.¹⁸

A second concern is that the household measure of income, which we use for consistency with Chetty et al. (2014) and Chetty et al. (2020), increases with cohabitation. We thus perform a robustness check with individual parental income – the sum of the individual incomes of the mother and father, regardless of marital status – in Appendix C.3.2. Figure C1 shows that overall, the results in terms of enrollment in higher education are very close to our main specification. The non-linearity of the effect of parental income on enrollment in higher education, discussed in a subsequent section, is nevertheless more pronounced when using individual parental income.

5.2 Complementarity of Inequalities Related to Parents' Income, Education and Occupation

Enrollment in higher education is often evaluated based on social background factors like parents' educational degree or occupation, rather than purely economic criteria. Our analysis delves into the connections among parental income, education, and occupation in relation to

¹⁸See Figure III Panel B of Chetty et al. (2014).

higher education attendance. We document descriptively that a significant portion of the higher education attendance gap based on parental income is associated with parental education or occupation, though not the entirety.

The heatmap in Figure 3 highlights disparities associated with parental income and occupation (Panels a and b) as well as parental education (Panels c and d). It depicts a staircase pattern, suggesting links between these factors. Specifically, within a given parental income bracket, there's an observed association between higher parental occupation or educational qualifications and increased enrollment in higher education – and the reverse is also true. This stair-step trend is notably evident when observing parental occupation. When considering parental educational attainment, there are pronounced discontinuities based on the number of years of education. Interestingly, this marked shift occurs at the 14-year education mark. This corresponds to the point where parents have attained a higher education degree themselves. For instance, 87 percent of individuals whose mother has a higher educational degree – 14 years of education or more – have enrollment in higher education between the ages of 19 and 24, as against 47 percent of those whose mother does not. This observation aligns with a pattern where offspring of parents with higher education qualifications are often found in higher education themselves. Notably, this gap is even more pronounced when looking at the mother's education level, underscoring its pivotal role in a child's educational prospects. This is in line with some previous findings in the literature (Currie and Moretti (2003), Sacerdote (2007), Chevalier et al. (2013), Lundborg et al. (2021)).

[place Figure 3 here]

More formally, we explore the complementarity of the different dimensions of inequality by observing the evolution of the regression coefficient of parental income on enrollment in higher education by successively adding various parental background controls (Table 2).¹⁹ These descriptive regressions do not aim to establish a causal impact of parental income on higher education enrollment but rather to illustrate the complementarity among inequalities stemming from parental income, occupation, and education. For a given occupation and educational degree, the higher the percentile rank of parental income, the greater the proportion of individuals enrolling in higher education and different programs. For example, those whose mother's highest degree is a high school diploma – 12 years of education or less – have a 36 percent rate of enrollment in higher education between the ages of 19 and 24 when their parents are in the bottom income quintile and 77 percent when they are in the top quintile. Conversely, for a given level of parental income, the more privileged the parents' occupation or the higher their educational degree, the higher the proportion of children entering higher education.

Our most comprehensive regression controls not only for parents' education and occupation, but also for other observable characteristics likely to be linked to participation in higher

¹⁹See table D9 in the Appendix for the details of all the coefficients on the control variables.

education: family structure, and size of residential area. After controlling for all these factors, a residual significant effect of parental income remains, albeit only at the lower end of the parental income distribution. This descriptive analysis does not show a causal effect of parental income on higher education enrollment; rather, it simply indicates that the correlation between parental income and higher education enrollment cannot be fully explained by these observable characteristics alone.

[place Table 2 here]

We have examined how the differences in enrollment in higher education by parental income, can partly overlap with inequalities related to other factors, such as parental education and occupation, but remains significant while controlling for these observable factors. In the next section, we compare the higher education attendance inequalities in France and the United States.

5.3 Comparison With the United States

Very few works have studied enrollment in higher education in relation to parental income on a nationally representative basis. One exception to this is [Chetty et al. \(2020\)](#) in the United States, which studies college enrollment between the years individuals turn 19 and when they turn 22, using extensive administrative data. We compare these estimates with our sample, which is representative of individuals aged 19-24.

Surprisingly, given the differences in institutional contexts, the inequality appears to be almost as pronounced in France as in the United States (Figure 4). In the U.S., an increase of one decile in parental income is associated with an increase of 6.1 p.p. in the proportion of young people entering higher education, compared to 5.8 p.p. in France. We cannot reject that the coefficient in France is similar to the coefficient in the U.S.²⁰ In both countries, the proportion of individuals in higher education at the bottom of the income distribution is around 35 percent and that at the top is around 90 percent.

[place Figure 4 here]

Linearity of the Income Effect. Although the relationship between parental income and children enrollment in higher education is broadly similar between the two countries, its functional form differs. The link is linear in the United States, but much higher in the upper as in the

²⁰The 95% confidence interval for the coefficient of parent's income percentile rank on enrollment in higher education in France is [5.3 ; 6.3].

lower half of the distribution in France, where an increase of one decile in parental income is associated with an increase of 4.6 p.p in the proportion of young people entering higher education in the lower half of the income distribution and 9.6 p.p. in the upper half. Although attendance rates are quite similar at the two extremes of the income distribution, these non-linearities imply that the enrollment rate to higher education is lower in the middle of the income distribution in France than in the U.S.

Table 2 shows in more details the non-linear association in France between income and enrollment in higher education. Students with parents in the top income quintile are observed to attend college 30 percentage points more frequently than those in the middle quintile. Conversely, students with parents in the bottom quintile are observed to attend college 18 percentage points less often than those in the middle quintile. The stronger correlation between parental income and children's higher education attendance in the upper half of the income distribution is somewhat counterintuitive. If this effect were related to credit constraints, one would expect a larger impact at the lower end of the spectrum, where households are typically more financially constrained. This suggests that the income gradient in higher education attendance might be linked to other parental characteristics that correlate with parental income. However, when accounting for parental characteristics, a notable association between parental income and higher education enrollment emerges primarily in the lower half of the income distribution (Table 2). This descriptive pattern suggests that financial constraints might play a more significant role for individuals with lower incomes, while disparities linked to income-correlated characteristics could be more prevalent in the upper half of the distribution. This provides only suggestive evidence on the matter, as these associations are merely descriptive.

In this section we have set out novel estimates of inequality in enrollment in higher education according to parental income in France – using reliable income data from administrative tax sources – and compared our estimate to that observed in the United States. We find similar levels of inequality in France and the United States, which may seem surprising given the very different higher education contexts between the two countries. In the following section, we present some potential explanations for the similar levels of enrollment inequalities observed between the two countries.

6 Institutional Factors Related to Education Inequality in France and the U.S.

We analyze institutional differences between France and the United States to understand their similar levels of higher education inequality. Specifically, we explore education costs, early tracking and education disparities before entering higher education. The arguments presented here suggest that the similar levels of inequality in higher education enrollment observed between France and the United States can be attributed to different institutional factors. Atten-

dance disparities in the U.S. are associated with a higher cost of higher education and more pronounced income inequalities. In France, enrollment in higher education could be hindered by early tracking and academic results that highly correlate with social origin.

6.1 Cost of Studies and Income Inequalities

We emphasize the institutional factors related to the cost of education and income inequalities in the two countries, which might suggest a lower level of higher education enrollment disparities in France compared to the United States.

First, higher education is much more expensive in the United States. In 2014-2015, average tuition in the United States was \$9,139 at public four-year colleges for in-state students and \$31,231 at private nonprofit institutions ([The College Board, 2014](#)), incomparably more than the cost of between €184 and €610 for most programs in France (see Section 3 for more details).

Second, income inequality is more pronounced in the U.S. than in France, with greater disparities between the top and bottom deciles.²¹ Greater income inequalities means that the top and bottom income deciles are more different in the United States than in France. Moreover, higher income inequalities could exacerbate skill inequalities ([Causa and Chapuis \(2011\)](#)). Some studies also indicate that countries or regions with higher income inequality often exhibit greater educational inequality ([Duncan et al. \(2017\)](#), [Workman \(2022\)](#)).

Ultimately, greater income inequality has a knock-on effect on educational inequality through the returns to higher education. The latter are greater in the United States – estimated to about 14% as against 10% in France ([Psacharopoulos and Patrinos, 2018](#)). Given the significant relationship between parental and child education, countries with higher returns to education are likely to have a stronger link between parental income and children’s educational outcomes.

This section addresses a notable paradox: France and the United States exhibit similar levels of income-related educational inequality, despite stark contrasts in their educational and economic landscapes. In the United States, higher education costs substantially more, income inequality is greater, and the financial returns to education are higher compared to France. The next two sections will examine institutional factors in France that could explain the similar levels of enrollment inequalities in higher education. These include the strong correlation between parents’ socio-economic status and children’s academic achievement, as well as early tracking.

6.2 Unequal Academic Performance Before Higher Education

The unequal participation in higher education in France likely reflects an accumulation of inequalities from earlier schooling. The link between the parents’ socio-economic status and PISA results in math, reading, and science at age 15 is stronger in France than in the U.S.

²¹Table B4 details parental income distribution in both countries. In 2012 dollars, the standard deviation of parental household income is \$353,430 in the U.S. compared to \$45,640 in France. In 2014, the top income decile accounted for 46% of total income in the U.S. and 33% in France, respectively(<https://wid.world/data/>).

(Figure 5 (a)). According to the 2015 PISA survey, 20 percent of the variation in science performance is explained by socio-economic status in France, as against only 11 percent in the United States and an OECD average of 13 percent (OECD, 2018b). France is one of the OECD countries where educational performance is most closely correlated with social background. Socio-economic disparities in school performance are observed in both primary and secondary education (Barhouni and Caille (2020); Barasz et al. (2023)).

[place Figure 5 here]

We employ Das Gupta (1991) decomposition method to examine the contribution of prior credentials on the higher education attendance gap between the top and bottom income deciles (Table 3).²² The middle school certification gap accounts for 21 percent of the total higher education enrollment disparity, while the high school certification gap among middle school graduates contributes 50 percent. These degrees thus explain 71% of the gap in higher education attendance; the remaining 29% being unexplained by prior credentials. In the United States, disparities in high school graduation rates based on parental income are less pronounced. We compare our data with the analysis conducted by Ziol-Guest and Lee (2016) for the U.S.: the proportion of high school graduates in France is substantially lower in the bottom half of the income distribution than in the U.S., with a gap of at least 20 percentage points. Furthermore, in France, the percentage of high school graduates increases with parental income in the top half of the income distribution. In contrast, in the United States, the proportion of high school graduates remains consistently above 90% across all income levels in the upper half of the distribution.²³

[place Table 3 here]

Inequalities likely encompass both academic/cognitive skills and social-behavioral/non-cognitive skills. The disparity between students from high and low socio-economic status, especially in terms of perceived self-efficacy, is more pronounced in France than in the U.S. France also exhibiting a considerably lower average perceived self-efficacy score (Figure 5 (b)). France's lag in incorporating social and behavioral skills in its educational system (Algan and Huillery (2022)) might be a factor exacerbating these socio-economic-based inequalities.

6.3 Early Tracking and School Segregation

Early Tracking. Early tracking in France might enhance the strong correlation between socio-economic status and academic performance. From the 10th grade onwards, students and their

²²See Appendix B.2.3 for more details on this decomposition method.

²³Refer to table 2, p.5, in Ziol-Guest and Lee (2016) for detailed data.

parents have to make key decisions about their school careers. These decisions are highly correlated with socio-economic status: [Herbaut et al. \(2019\)](#) found that 92% of students with parents holding a higher education diploma choose the general and technological track in high school over the vocational track. In contrast, only 52% make the same choice among students whose parents have just a high school diploma. The authors also show that such decisions significantly impact educational and career trajectories. These differences in orientation according to social origin are only partially explained by differences in previous academic achievement: for the generation entering 6th grade in 1995, [Ichou and Vallet \(2012\)](#) observed that half of the academic track attendance gap between the working classes and the upper classes was due to differences in educational outcomes, while the other half was not explained by previous academic performance.

When comparing educational systems between countries, earlier tracking leading to separate pathways is generally associated with a higher level of educational inequality ([Van de Werfhorst \(2019\)](#)). The French "republican elitism" ([Baudelot and Establet \(2009\)](#)) stems from the Napoleonic system, in which schools were expected first and foremost to train the nation's elite. Until the 1970s, both secondary and higher education catered mainly to an upper-class minority.²⁴ This socio-economic divide persisted after primary school until the 1975 introduction of an unified middle school (*collège unique*, ([Merle \(2009\)](#))).²⁵ In the United States, tracking is much less marked up to high school ([Brunello and Checchi \(2007\)](#)).

Countries with early tracking also tend to exhibit more pronounced disparities in educational aspirations based on socio-economic status ([OECD \(2017\)](#)). Our sample of young adults in France shows notable variations in educational aspirations along the parental income distribution. Among 18-19-year-olds,²⁶ those in the top income decile predominantly aim for advanced degrees (master's or Ph.D.) – nearly 80%. In contrast, only about 35% from the bottom quintile express the same aspiration (Figure 6 (a)). When comparing the aspirations of high-achieving students using PISA data, a significantly higher proportion of disadvantaged French students do not expect to succeed in tertiary education compared to their U.S. counterparts (Figure 6 (b)).²⁷

[place Figure 6 here]

Students on vocational tracks in France are significantly less likely to enroll in higher education than students from academic tracks. Addressing this issue by ensuring that high-ability

²⁴In 1930, less than 7% of children aged 11-17 pursued education beyond primary school ([Isambert-Jamati, 1970](#))

²⁵One track catered to the upper classes (secondary education), while another track, established in the late 19th century, targeted the intermediate classes (upper primary education). Notably, restricted higher education participation remained, despite the late 19th-century educational laws and the 1930 provision for free secondary education.

²⁶We focus on the youngest to minimize the influence of completed schooling on aspirations.

²⁷The important correlation between lower aspirations and later educational inequalities has been documented in France by [Guyon and Huillery \(2021\)](#).

students from low socio-economic backgrounds have better access to high school academic tracks present an interesting prospect for increasing their enrollment in higher education.

School Segregation. The wider use of private schools in France also accentuates socio-economic segregation at school (Boutchenik et al. (2021)), potentially reinforcing income-based inequalities. In 2018, only 80% of 15-year-old French pupils attended public schools, compared to 93% in the United States (OECD, 2020). Moreover, the socio-economic disparity between students in public and private institutions in France has been growing since the early 2000s (Guillerm and Monso, 2022).

In this section, we have outlined institutional factors that could explain the similarly observed levels of enrollment inequality in higher education in both France and the U.S. In France, the pronounced correlation between a student's academic performance and their parents' socio-economic status could be mitigated by the lower cost of attending higher education, while in the U.S., these factors might interact in the opposite direction. The following section provides a more detailed analysis of the distribution of higher education spending in France and in the U.S.

7 Unequal Public Expenditure for Young Adults

In this last section, we analyze the implications of the unequal enrollment in higher education based on parental income by assessing the redistributive profile of higher education expenses.²⁸

First, we analyze the distribution of public higher education spending for all individuals, regardless of parental income. We also compare the annual distribution of higher education instruction expenditures between France and the United States. Then, we examine the distribution of spending across full higher education trajectories in France. We eventually assess the rank-rank correlation between higher education spending and parental income and examine in more detail the distribution of higher education spending by parental income in France. This approach enables us to decompose descriptively the role of three factors – attendance disparities, duration of studies, and annual costs – on the inequality in public spending for higher education among individuals from the lowest and highest parental income deciles.

Table A1 in the appendix presents a review of the literature on the redistributivity of education spending in different institutional settings and applying different methodologies. Usually, spending on K-12 education tends to be redistributive and that on higher education regressive. The table shows that the various studies are based on key methodological choices, such as how to take into account the socio-economic status of parents, whether or not to take taxes into account,²⁹ and in some cases the use of a life-cycle approach, although most of the studies are

²⁸Unequal enrollment in higher education is also associated with inequalities in lifetime earnings, which we approximate using recent estimates of Garbinti et al. (2023) and differences in the degrees attained by young adults aged 22 or over in our sample. This other implication of the unequal enrollment is explored in Appendix D.4.5.

²⁹When taxes are not taken into account, the authors generally find that higher education spending is regressive.

estimated in cross-section. This also points out the lack of recent estimates for France and the United States, and the need to supplement this literature.

7.1 Distribution of Spending on Higher Education in France and the United States

We begin by examining the distribution of spending on higher education in France and in the United States, without connecting it to parental income. Spending on higher education is highly concentrated in both countries, as illustrated in Figure 7. In both cases, the bottom half of the distribution of higher education expenditure is marginal, mainly due to the fact that an important share of individuals do not pursue higher education and thus have zero spending for higher education. In France, the lower 50% of individuals account for 4.1 percent of the total spending, while in the United States, they account for 3.4 percent. However, the concentration of spending at the upper end is more pronounced in the U.S. Specifically, in the U.S., the top 10 percent of individuals who receive the highest spending on higher education account for 44.9 percent of the total expenditure. In contrast, in France, this figure stands at 28 percent. Similarly, the top one percent in the U.S. receives 16 percent of the total higher education spending, whereas in France, they receive 5 percent.

For France, we are able to map out comprehensive higher education trajectories, focusing on individuals aged 22 to 24 in our sample. This provides insights into the distribution of higher education expenditures over the span of 6 years, from ages 18 to 24. As presented in Figure D2 in the Appendix, approximately 40 percent of individuals – specifically those who do not pursue higher education – accrue no educational expenditures. Merely 10 percent incur an educational cost exceeding €30,000 during their studies. Furthermore, the top 1 percent accrue €71,000 over their 6-year educational journey. This is 2.4 times the expenditure faced by those at the 90th percentile and 9 times that of the median, which stands at €7,800.

In the subsequent section, we delve deeper into the breakdown of public and private higher education expenditures in relation to parental income in France.

[place Figure 7 here]

7.2 Inequality in Spending on Higher Education by Parental Income in France

We find strong inequalities in educational spending according to parental income, suggesting a strong link with the inequalities in participation highlighted above (Figure 8). Those in the

Conversely, when all the taxes paid by households are taken into account, the authors generally conclude that higher education spending is progressive, because wealthy people pay more in taxes than they receive in subsidies for public higher education.

bottom 50 percent receive €8,000 to €11,000 worth of investment in higher education between the ages of 19 and 24, compared with €32,000 – of which €21,000 in public funds – for those in the top 10 percent (Figure 8a). The differences in private investment in higher education are also quite substantial: parents at the bottom of the income distribution pay an average of €200 in tuition for their child over six years, compared with more than €10,000 for those at the top. The ratio of higher education spending between the top and bottom income deciles (D10/D1) is equal to 4.0:1, while that of public investment alone is 2.7:1. In Appendix D.4.4, we discuss how taking into account parental taxes to fund public higher education would alter these findings.

Another way of gauging inequalities in public spending for higher education is to consider the correlation between the percentile rank of parental income and that of public spending on higher education (Figure D3). On average, a 1-percentile increase in parental income is correlated with a 0.4-percentile increase in the distribution of public spending on higher education. Individuals whose parents are in the lowest decile of pre-tax income are on average in the 30rd percentile of public spending for higher education, while those whose parents are in the top decile are in the 68th percentile.

[place Figure 8 here]

7.3 Decomposition of Inequalities in Public Spending

The observed disparities in higher education public spending based on parental income can arise from three potential factors: variations in enrollment rates in higher education, unequal duration of studies, or differential spending across distinct higher education programs, considering existing enrollment disparities. The aim of this section is to delineate the influence of these underlying determinants.

In France, the inequalities in public spending appear to derive primarily from differences in higher education attendance: inequality is much less pronounced when only higher education students are considered (Figure 8b). Students whose parents are in the highest deciles receive only a slightly higher public investment between the ages of 18 and 24 (about €24,000 in the top third, compared to €20,000 in the lowest two third). Those at the very top of the distribution, however, still benefit from a much larger private investment in higher education: about €11,000 over 6 years on average in the top 10%, compared with €500 for those at the bottom of the income distribution and between €1,000 to €3,000 in the rest of the distribution.

We use Gupta's rate decomposition method (Das Gupta, 1991) to further decompose public expenditure inequalities between an extensive margin – enrollment in higher education – and an intensive margin related to the duration of studies and differences in annual cost.³⁰ Inequalities in enrollment account for about 67 percent of the disparity in spending between the top

³⁰See Appendix B.2.3 for more details on this decomposition method.

and bottom income deciles (Table 4 and Figure D5). The remainder is almost entirely explained by differences in the duration of studies – students at the bottom of the income distribution pursuing higher education for an average of 3.3 years, compared with 4.5 years for students at the top (Figure D4).³¹ In our main specification, there is almost no difference in annual public spending between students whose parents are at the top and the bottom of the income distribution. This is primarily because, although high-income students are largely overrepresented in selective programs (Figure 2), low-income students more often enroll in vocational programs, which also benefit from a much higher endowment than university programs (Table B5).

[place Table 4 here]

Robustness Check: Matching Richer Individuals to Better-Endowed Programs. One concern about this finding of equal annual public spending for higher education students may be limited ability to match students with the specific program in which they are enrolled and to disaggregate spending on some of the most selective programs (elite graduate schools in particular). The contribution of enrollment disparities to inequality in public spending would then be overestimated.

We simulate a variant of public spending on higher education to predict how a more uneven distribution of public spending within each track and field might alter this result (Table 4). Positing that within a particular field of study and track, the most affluent consistently benefit from the most expensive programs and from the most expensive elite graduate schools (column 2),³² the contribution of the attendance gap declines significantly but still accounts for about half of the total difference in public spending for higher education between the poorest and richest individuals.

In this section, we have determined that the discrepancies in higher education spending in France largely result from disparities in enrollment rates, rather than from differences in funding across programs. In contrast, in the United States, disparities in educational spending seem to be primarily associated with differences in funding across programs. [Bonneau \(2020\)](#) posits that, given the variance in spending within a particular educational level in the United States, the degree of educational spending inequality would persist nearly unchanged even if everyone reached the same level of educational attainment. To draw more conclusive remarks on these topics, further research would be needed for a more comprehensive comparison between the two countries.

³¹To match the public spending on higher education of those in the middle-income bracket (P50-P60), the enrollment rate for students from the bottom third of parental income distribution would need to rise by 19 percentage points. This required increase is only slightly higher than the current enrollment gap of 15 percentage points.

³²This specification can be seen as an upper bound of inequalities in educational expenditure. See Appendix C.3.3 for more details on the assumptions made in this counterfactual scenario associating the wealthiest individuals with the best-endowed programs.

8 Conclusion

Using a detailed survey of young adults together with administrative data on their parents' income, this study examines inequality of enrollment in higher education and selective programs according to parental income. On average, a 10-percentile increase within the parental income distribution is associated with a 5.8-percentage-point increase in the proportion of children enrolling in higher education. The level of attendance inequality according to parental income in France is very similar to that in the United States despite much lower tuition fees and income inequalities in France. This is a new result that we interpret by the importance of intergenerational transmission of educational outcomes and early tracking in France. In France, spending on higher education is regressive. This is primarily due to the inequalities in participation that we have highlighted, even though the concentration of resources among higher education institutions is less uneven than in the United States.

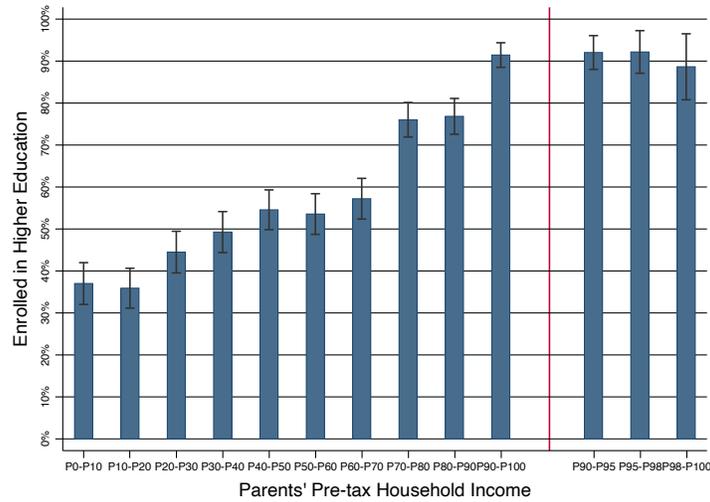
Our analysis reveals a disparity in the prerequisites for higher education enrollment, calling for earlier and more robust skill support of low-income students. Specifically, policies aiming at reducing the attendance gap in high school academic tracks based on socio-economic background could be a beneficial strategy to enhance higher education enrollment of low-income students. Additionally, the significant disparities in enrollment rates for selective programs among high school graduates highlight the importance of giving disadvantaged students targeted, transparent, and clear information about the various higher education programs available. The effectiveness of need-based scholarships ([Fack and Grenet, 2015](#)) as well as marked differences in parental transfers among students ([Grobon, 2018](#)), indicate a need for more comprehensive need-based scholarships to adequately cover higher education expenses. This need is particularly acute for students in the middle-income bracket, who benefit the least from the combination of public support and parental tax deductions.

Our research identifies a key divide in higher education enrollment inequalities based on parental income. In some countries, these inequalities could arise primarily due to financial barriers to entry, while in others, they could result from earlier disparities in the accumulation of human capital. Applying this perspective to European or developing countries could be insightful. In Europe, a crucial question is how to align this divide with the differences between social democratic and liberal welfare state regimes, as outlined by [Willemse and De Beer \(2012\)](#), and the contrast in social mobility between Nordic and liberal countries. For developing countries, this divide should be considered in relation to the level of public funding for higher education systems. This funding could affect income inequalities through an increase in human capital, as discussed by [Ehrlich and Kim \(2007\)](#).

This need for international comparison of inequality in enrollment in higher education calls for educational data to be further enriched with reliable data on parental income. Detailed comparative data on spending differentials in higher education, especially for selective programs, would further contribute to the public debate by allowing more systematic estimation of the redistribution occurring through higher education public spending.

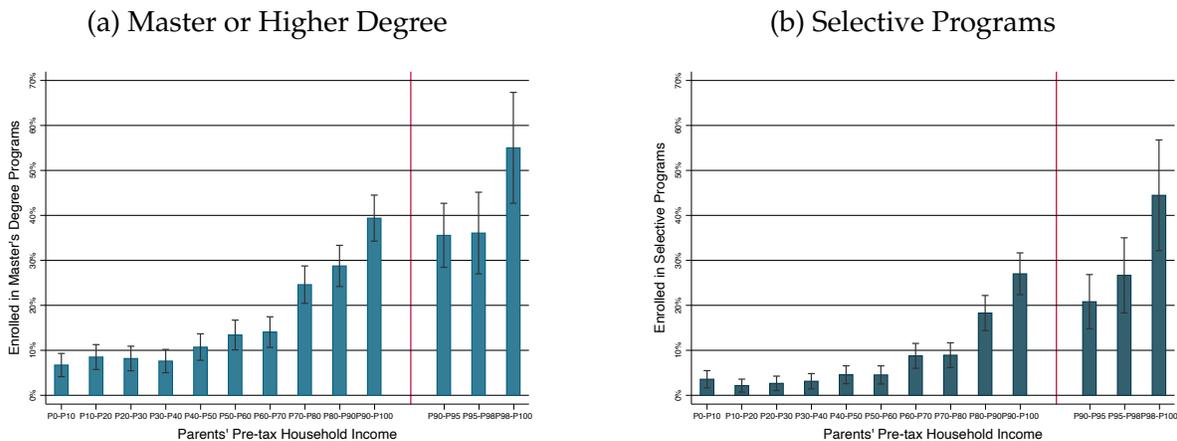
Figures

Figure 1: Proportion of Individuals Enrolling in Higher Education, by Parents' Pre-Tax Income



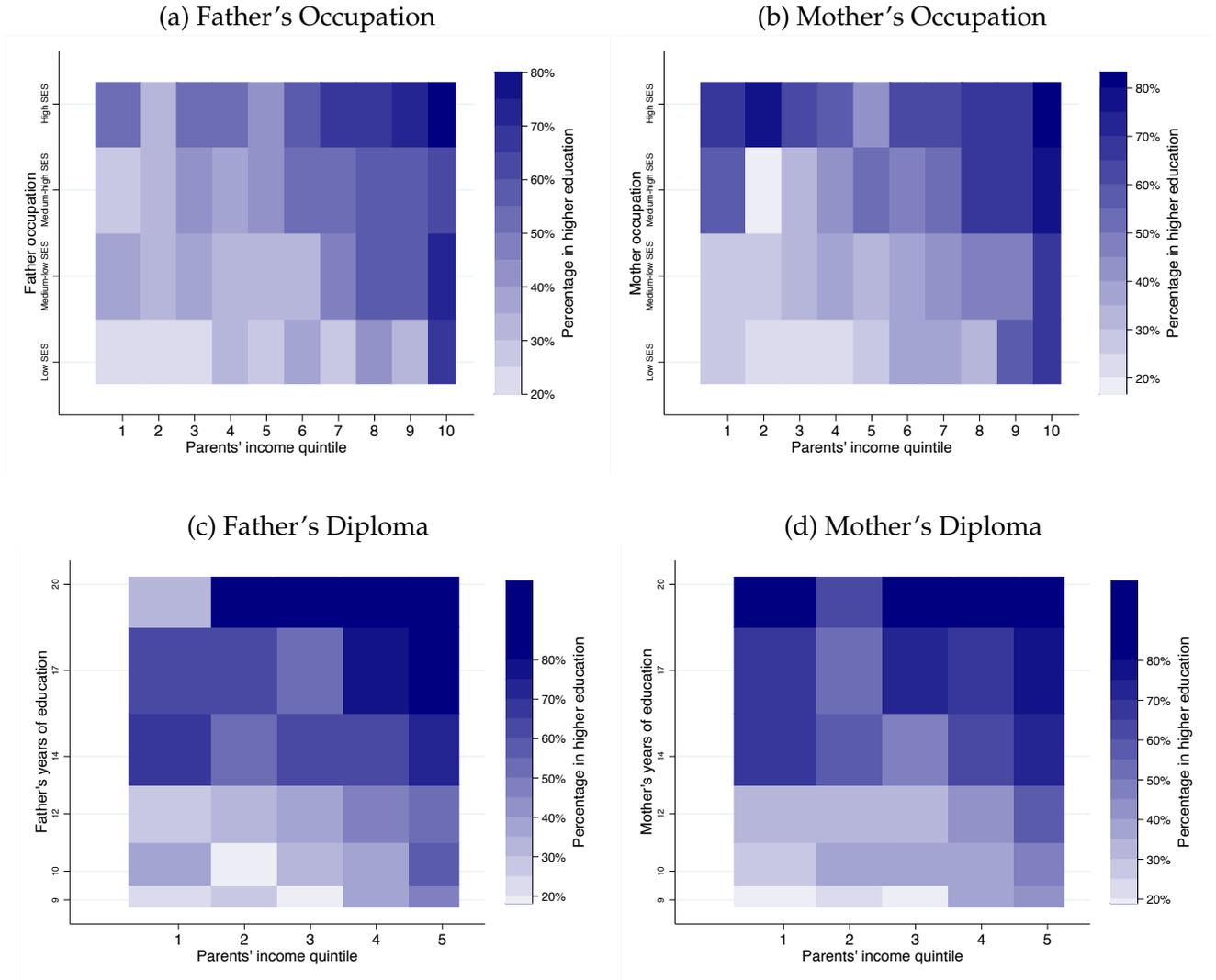
Notes: This figure displays the proportion of individuals aged 19-24 who are currently enrolled, have enrolled in higher education without necessarily obtaining a degree, or already hold a higher education degree, by parental income. The parental income used is the sum of the pre-tax income of the father's household and the mother's household, divided by two when there are two different households. Deciles are based on this definition. We further decompose the top 10 percent of the distribution (x-axis). The black line represents the standard errors.

Figure 2: Proportion of Individuals Enrolling in Master's Degree or Selective Programs, by Parents' Pre-Tax Income



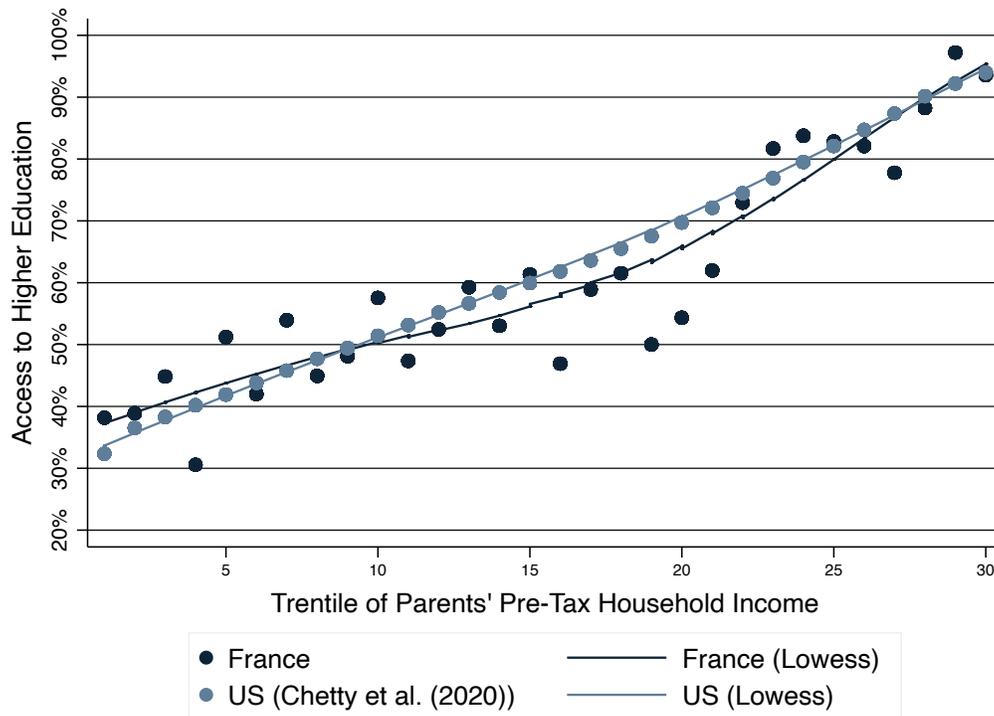
Notes: These figures show the proportion of individuals entering master's degree programs or selective programs between the ages of 19 and 24, according to parental income. Panel (a) displays the proportion of individuals aged 19-24 currently enrolled in or having already reached the master's level, without necessarily obtaining the diploma, or already holding a master's degree or higher, by parental income. Panel (b) shows the proportion of 19-24 year olds currently enrolled in or having obtained a certain level of selective programs without necessarily having graduated, or already holding a degree from a selective program, by parental income. We define selective programs as preparatory courses, elite graduate schools, medical school and Ph.D. The parental income used is the sum of the pre-tax income of the father's household and the mother's household, divided by two when there are two different households. Deciles are based on this definition. We further decompose the top 10 percent of the income distribution (x-axis). The black line represents the standard errors.

Figure 3: Higher Education Attendance by Parents' Pre-Tax Income, Occupation, and Diploma



Notes: These heatmap show the proportion of individuals enrolling in higher education between the ages of 19 and 24, according to parental income (x-axis) and parents occupation (Panel a and b) or parents diploma (Panel c and d). The parental income used is the sum of the pre-tax income of the father's household and the mother's household, divided by two when there are two different households. Deciles are based on this definition. Parental occupations are grouped into four categories – high SES, upper-middle SES, lower-middle SES and low SES (see Table B2 for more details on this variable). We measure parental education with six diploma categories – primary school or less (9 years of education), middle school diploma (10 years of education), high school diploma (12 years of education), two-year higher education degree (14 years of education), Bachelor's or master's degree (17 years of education), and M.D. or Ph.D. (20 years of education).

Figure 4: Enrollment in Higher Education in France and in the United States, by Parents' Pre-Tax Income

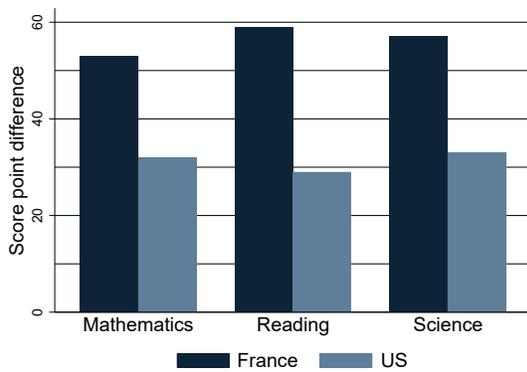


Notes: This figure shows the proportion of individuals enrolling in higher education in France and in the United States, by parental income (for the U.S., based on figures from Chetty et al. (2020)). In both countries, the parental income used is the sum of the pre-tax income of the father's household and the mother's household, divided by two when there are two different households. In the U.S., these figures represent the proportions of individuals who enrolled in higher education at least once between the ages of 18 and 21. In France, we consider individuals aged 19-24 currently enrolled in or having graduated from higher education as these individuals are most likely to have entered higher education between the ages of 18 and 21. We exclude the youngest (18-year old individuals) from our sample in order to limit the minor bias stemming from the fact that some are still in high school. We do not include property and capital incomes in the estimate for France because it is not possible to identify them independently of the incomes of all household members, thus also including the incomes of cohabiting young adults. Taking property and capital incomes into account would mainly affect rankings within the top decile and only marginally those in the rest of the distribution. Chetty et al. (2020) study cohorts born between 1980 and 1982 in the United States, whereas the survey used in our study focuses on cohorts born between 1990 and 1996 in France.³³

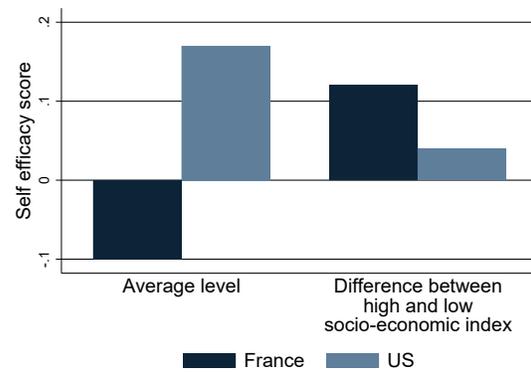
³³A previous version of our study (see the French Council of Economic Analysis focus <https://www.cae-eco.fr/enseignement-superieur-un-acces-inegal-selon-le-revenu-des-parents>) used older data from Chetty et al. (2014). The update of Chetty et al. (2020) including Pell Grant recipients who were not counted in the 1098-T data used for Chetty et al. (2014) makes the estimates of higher education attendance by parental income in France and the United States even more similar.

Figure 5: Correlations Between Academic Skills, Behavioral Skills and Socio-Economic Status in France and in the United States

(a) Impact of Socio-Economic Index Increase on Academic Skills Score



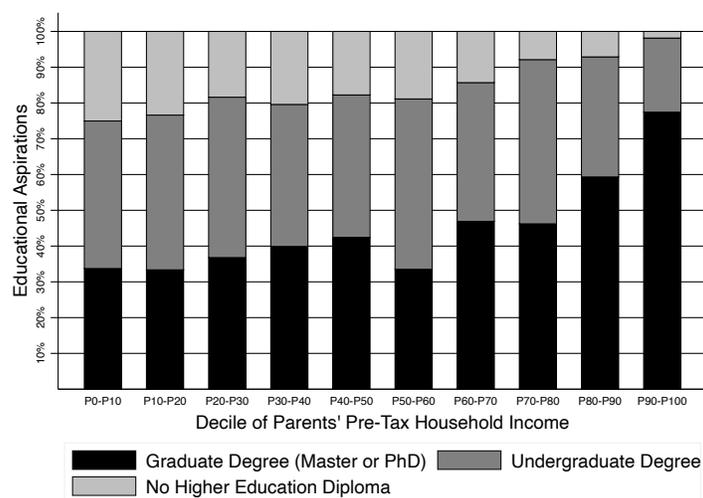
(b) Self-Efficacy Score by Socio-Economic Status



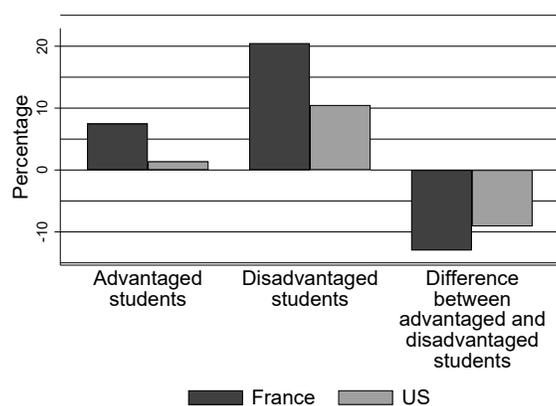
Notes: These figures illustrate the correlation between socio-economic background and academic skills (Figure (a)) or self-efficacy score (Figure (b)) in France and the U.S. Figure (a) is based on 2015 data, while Figure (b) is based on 2018 data. The measure of parental background is derived from the Socio-Economic Index (ESCS) in PISA data. This index is a composite measure combining the financial, social, cultural, and human-capital resources available to students into a single score. It is calculated from parents' education, occupations, and an index summarizing home possessions that represent material wealth or cultural capital. Self-efficacy (Figure (b)) is defined as the degree to which individuals believe in their own ability to perform specific tasks and engage in activities, particularly in adverse circumstances (Bandura (1977)). In 2018, PISA asked students about their general sense of efficacy or competence, especially in challenging situations. These figures are sourced from the PISA 2015 and 2018 database (OECD (2018a), OECD (2021)).

Figure 6: Educational Aspirations in France and the United States

(a) Educational Aspirations in France, by Parents' Pre-Tax Income

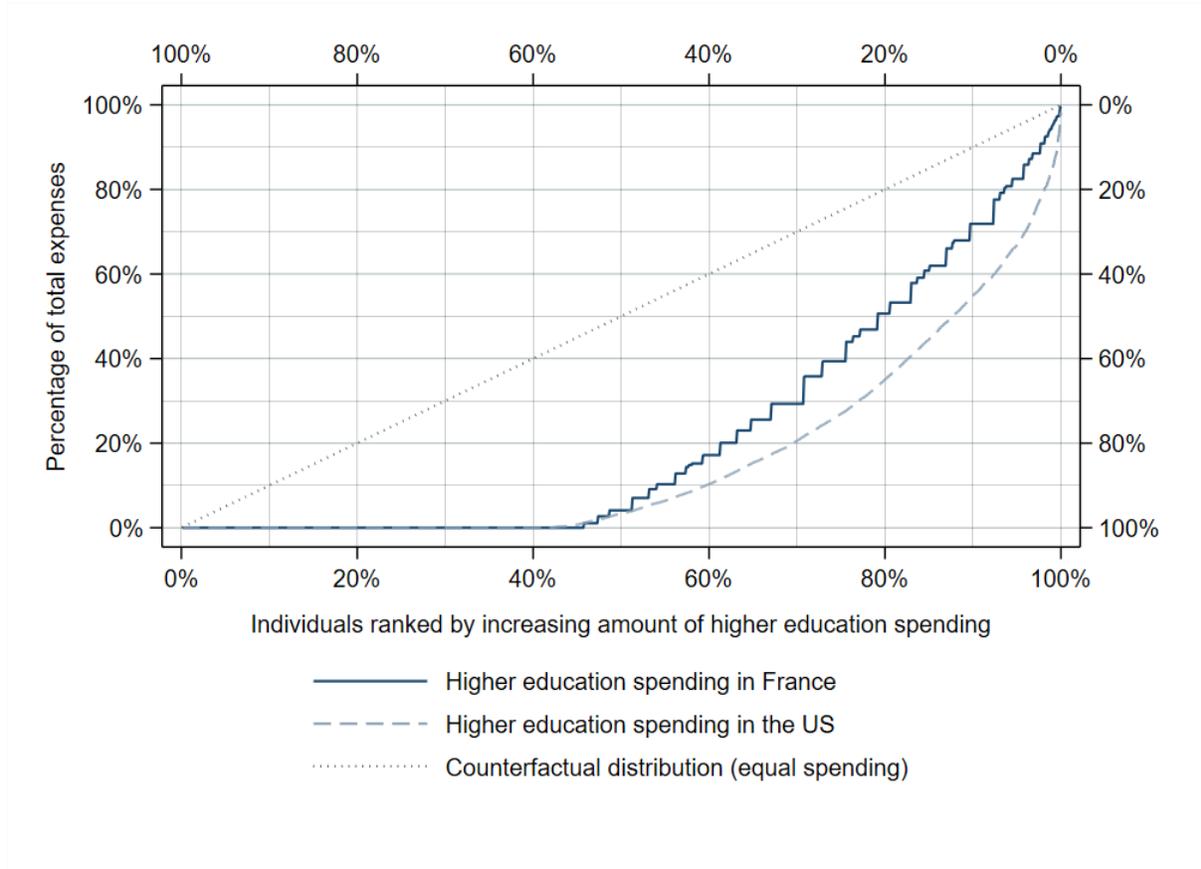


(b) High Achieving Student Not Expecting to Enroll in Tertiary Education, by Socio-Economic Status



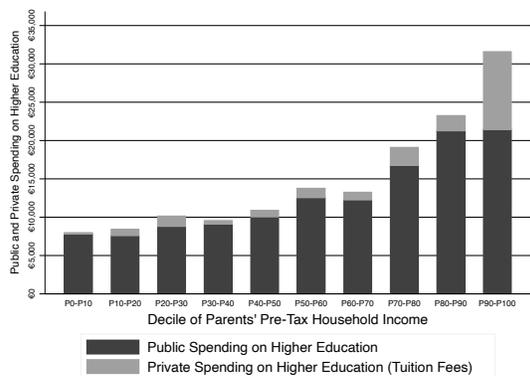
Notes: Figure (a) shows the educational aspirations of individuals aged 18 and 19, based on parental income. These educational aspirations are reported by young adults in the survey. We restrict ourselves to individuals aged 18 and 19 in order to avoid having educational aspirations influenced by years of schooling completed in higher education. The parental income used is the sum of the pre-tax income of the father's household and the mother's household, divided by two when there are two different households. Deciles are based on this definition. Figure (b) shows the percentage of high-achieving students in France and the U.S. who do not expect to complete tertiary education. High-achieving students are defined as those who have achieved at least minimum academic proficiency (Level 2) in the three core PISA subjects and are high performers (Level 4) in at least one subject. The data for these figures is sourced from the PISA 2018 database (OECD (2019)).

Figure 7: Distribution of Higher Education Spending Over One Year in France and in the United States

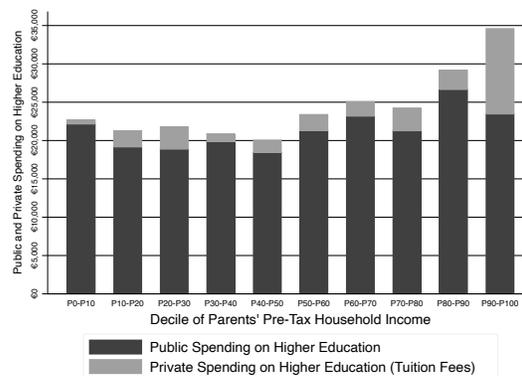


Notes: The figure presents the distribution of higher education expenditure over a single year for both France and the United States. Individuals with zero spending represent those who do not enroll in higher education. The data for France appear noisier due to the sampling of only 65 higher education institutions. However, these institutions have been demonstrated to be representative of public higher education institutions overseen by the Ministry of Higher Education (Bennani et al., 2021). The U.S. data are sourced from the 2015 IPEDS dataset. In France, we use data from the "Cost Awareness" project (Boiteau and Jameux, 2019) and MESRI-SIES (2021).

Figure 8: Inequalities in Public and Private Spending on Higher Education in France



(a) All Individuals (22-24)



(b) Students or Former Students (22-24)

Notes: These figures display the disparities in public and private spending on higher education, by parental income. Panel (a) shows the total amount of public and private investment in higher education for all individuals until 24, as a function of parental income. Panel (b) shows total public and private investment in higher education for students or former students until 24, by parental income. For a complete analysis of educational pathways up to age 24, we restrict the sample to 22- to 24-year-olds and the length of study for 22- and 23-year-olds is extended by parental income decile based on the continuation rates observed in the sample. Private spending corresponds to tuition paid by the parents and expanded over the 6-year period, taking into account the number of years of education completed by each individual. The parental income used is the sum of the pre-tax income of the father's household and the mother's household, divided by two when there are two different households. Deciles are based on this definition (x-axis). We use the "Cost Awareness" project and [MESRI-SIES \(2021\)](#) data for higher education spending.

Tables

Table 1: Descriptive Statistics

Quintile of income	P0-P20 n= 760	P20-P40 n= 796	P40-P60 n= 838	P60-P80 n= 820	P80-P100 n= 733	Total n= 3,947	Students or former students n= 2,353
Age of young adults	21.5 (1.7)	21.6 (1.7)	21.4 (1.7)	21.5 (1.7)	21.3 (1.7)	21.5 (1.7)	21.5 (1.7)
Age of fathers	55.5 (6.6)	54.5 (6.8)	53.3 (5.5)	53.0 (5.6)	53.6 (5.9)	53.9 (6.1)	53.9 (5.8)
Age of mothers	50.6 (6.2)	49.9 (5.6)	49.7 (5.0)	50.3 (4.6)	51.0 (4.4)	50.3 (5.3)	50.8 (5.0)
Female	0.53	0.47	0.50	0.49	0.47	0.49	0.53
Pre-tax household income of parents	9,360 (6,280)	24,050 (3,320)	36,050 (3,490)	49,690 (4,770)	92,690 (60,550)	41,904 (39,173)	50,869 (46,298)
Father's occupation							
Low SES	0.33	0.40	0.41	0.28	0.06	0.30	0.21
Lower-middle SES	0.35	0.28	0.22	0.22	0.14	0.24	0.24
Upper-middle SES	0.05	0.11	0.20	0.27	0.21	0.17	0.20
High SES	0.03	0.04	0.06	0.19	0.56	0.17	0.26
Mothers's occupation							
Low SES	0.27	0.20	0.19	0.13	0.04	0.17	0.10
Lower-middle SES	0.58	0.60	0.56	0.45	0.28	0.50	0.44
Upper-middle SES	0.05	0.11	0.13	0.27	0.30	0.17	0.23
High SES	0.02	0.04	0.07	0.11	0.37	0.12	0.19
Father's diploma							
Primary School or less	0.21	0.22	0.20	0.08	0.02	0.15	0.10
Middle School degree	0.03	0.05	0.04	0.06	0.04	0.04	0.04
High-School degree	0.23	0.43	0.51	0.54	0.29	0.40	0.38
Two-year degree	0.04	0.04	0.06	0.13	0.19	0.09	0.13
Bachelor or Master degree	0.03	0.02	0.04	0.11	0.32	0.10	0.16
M.D. or Ph.D.	0.00	0.01	0.01	0.01	0.10	0.02	0.04
Mother's diploma							
Primary School or less	0.44	0.29	0.19	0.10	0.02	0.21	0.12
Middle School degree	0.07	0.10	0.09	0.08	0.03	0.07	0.07
High-School degree	0.33	0.44	0.50	0.48	0.31	0.41	0.39
Two-year degree	0.04	0.08	0.09	0.19	0.24	0.13	0.19
Bachelor or Master degree	0.04	0.04	0.08	0.12	0.31	0.12	0.18
M.D. or Ph.D.	0.00	0.00	0.01	0.01	0.06	0.02	0.03
Marital status of parents							
Parents live together	0.37	0.55	0.70	0.81	0.87	0.65	0.70
Parents are separated	0.44	0.35	0.23	0.17	0.12	0.26	0.23
Father unknown or deceased	0.16	0.09	0.05	0.02	0.01	0.07	0.05
Mother unknown or deceased	0.03	0.02	0.02	0.01	0.01	0.02	0.02
Parents unknown or deceased	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Biggest urban center of parent's residence							
Parisian area	0.14	0.14	0.12	0.15	0.30	0.17	0.20
More than 100,000 inhabitants	0.33	0.29	0.28	0.27	0.29	0.29	0.29
Less than 100,000 inhabitants	0.51	0.56	0.59	0.57	0.41	0.53	0.49

Notes: The sample is constructed from the ENRJ survey. It includes only individuals for whom a young adult and at least one parent responded to the questionnaire. The number of observations is not equal for all parental income quintiles because in creating the parental income ranks we apply the survey weights for assessing non-response bias. The mother's occupation is missing for 4 percent of the observations and the father's for 9 percent. The mother's diploma is missing for 4 percent of the observations and the father's for 17 percent. When the parents are separated, both were questioned in 46 percent and only one in 54 percent of the cases. When the two parents do not live in the same city, we use the larger urban center.

Table 2: Enrollment in Higher Education, by Parents' Pre-Tax Income Quintile

Enrollment in higher education	(1)	(2)	(3)	(4)
Baseline proba. of enrollment	0.57	0.57	0.57	0.57
Parents' income quintile				
Parents' income quintile=1	-0.18***	-0.15***	-0.041	-0.087***
Parents' income quintile=2	-0.073***	-0.067***	-0.035	-0.048*
Parents' income quintile=3	0	0	0	0
Parents' income quintile=4	0.12***	0.057**	0.064***	0.040
Parents' income quintile=5	0.30***	0.091***	0.12***	0.032
Control variables included				
Father Occupation (26 categories)		X		X
Mother Occupation (26 categories)		X		X
Father Diploma (6 categories)			X	X
Mother Diploma (6 categories)			X	X
Family situation				X
Urban center size				X
Observations	3,947	3,616	3,066	3,019

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: This table presents the estimates of the effect of parental income on enrollment in higher education (1), successively adding controls for parental occupation (2), parental education (3), and all these controls simultaneously with family status and urban center size (4). Parental income used is the sum of the pre-tax income of the father's household and the mother's household, divided by two when there are two different households. Quintiles are based on this definition. We omit the third quintile. The coefficients should thus be interpreted as the difference from the baseline probability of higher education enrollment for individuals with parents in the third income quintile. The potential financial transfer variable represents what young adults would have received from their parents if they were studying, based on their characteristics (indicators for parents' income decile, number of siblings, father's degree, mother's degree, father's occupation, mother's occupation, parents' marital status, and size of urban center where the young adult lives). Parents' occupation is introduced in dummy variables for each of the 26 categories of occupation (Table B2), separately for father and mother. Parents' education is introduced in dummy variables for each of the 6 categories of degree (elementary school certificate or less, middle school certificate, high school diploma or equivalent, two-year degree, bachelor's or master's degree, and M.D. or Ph.D.), separately for father and mother. The family situation is introduced in 5 categories: parents together, separated, father unknown, mother unknown or parents unknown. Urban center size is introduced in three categories: Paris metropolitan area, urban center of more than 100,000 inhabitants, urban center of under 100,000 inhabitants. When the two parents do not live in the same urban center, we use the larger of the two.

Table 3: Decomposition of Higher Education Participation Rate Differences by Prior Credentials

Contribution of previous credentials to enrollment disparities (in percent)	Higher education	Selective programs	Master's degrees
Middle school graduation	21	9	10
High school graduation	50	21	24
Enrollment in higher education	–	12	15
Residual differential enrollment	29	58	51

Notes: This table presents the contribution of different credentials – middle school graduation, high school graduation for those who passed the middle school graduation exam, higher education attendance gap for those who passed the high school graduation exam – to the total difference in enrollment in higher education, selective programs, and master's degrees between individuals in the top and bottom 10 percent of the parental income distribution (in percent). To decompose the contribution of different factors, we rely on Gupta's decomposition methods (Das Gupta, 1991). See Appendix B.2.3 for more details on this decomposition method.

Table 4: Decomposition of Differences in Public Spending on Higher Education

	(1) Main specification	(2) Wealthier individuals attend more costly programs and elite graduate schools
Enrollment in higher education	67	49
Duration of study	23	17
Annual public spending	10	33

Notes: This table shows the contribution of different factors – enrollment in higher education, differences in duration of study for students, differences in annual public spending for students – to the total difference in public higher education spending between individuals in the top 10 percent and the bottom 10 percent of the income distribution (in percent). Parental income used is the sum of the pre-tax income of the father’s household and the mother’s household, divided by two when there are two different households. Deciles are based on this definition. For a complete analysis of educational pathways up to age 24, we restrict the sample to 22- to 24-year-olds and the length of study for 22- and 23-year-olds is extended by parental income decile based on the continuation rates observed in the sample. To decompose the contribution of different factors, we rely on [Das Gupta \(1991\)](#) decomposition method. See Appendix B.2.3 for more details on this decomposition method. Column (1) represents our main specification. Column (2) presents a simulation designed to address potential underestimation of inequalities in public spending on higher education in our data. This counterfactual approach involves associating the most expensive courses in the respective field with the most affluent students and adding consideration for increased spending on elite graduate schools. More specifically each combination of tracks and fields, we assign the 10th (or 25th) percentile of the distribution of student-weighted costs – or the next higher percentile when we do not have enough observations for the 10th or 25th percentile – to individuals whose parents are in the bottom 10 percent (or 25 percent) of the income distribution and the 75th percentile (or 90th percentile) – or the next lower percentile – to those whose parents are in the top 25 percent (or 10 percent) of the income distribution. Concerning elite graduate schools, individuals in the top 5 percent of the income distribution are assumed to enroll in schools with endowments three times the typical endowment and those in the next 5 percent to enroll in schools with endowments twice the typical endowment. See Appendix C.3.3 for more details on these simulations.

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A.1 Inequalities in Education Spending: A Literature Review

Table A1: Synthesis of the Economic Literature on the Redistributivity of Education Spending

Authors and Year	Country	Parental Background	Taxes Taken Into Account	Higher Education Only	Results in Terms of Redistributivity
Hansen and Weisbrod (1969)	U.S. (California)	Average income by university	Yes	Yes	Regressive
Hansen (1970)	U.S. (Wisconsin)	Average income by university	Yes	Yes	Regressive
Pechman et al. (1970)	U.S. (California)	Income deciles	Yes	Yes	Progressive
Fields (1975)	Kenya	Social origins	No	Yes	Regressive
Hatchuel (1976)	France	Social origins (occupation)	Yes	No	Progressive
Mendès France (1987)	France	Social origins (occupation)	No	No	Progressive up to age 15 Higher Ed. regressive
Lemelin (1992)	Quebec	Education level of parents	No	Yes	Regressive
Tsakloglou and Antoninis (1999)	Greece	Income quintiles	No	No	Progressive
Albouy et al. (2002)	France	Standard of living	Yes	No	Progressive up to 8th decile Higher Ed. regressive
O'Donoghue (2003)	European Union	Standard of living	Yes	No	Progressive
Barbaro (2002)	Germany	Standard of living	Yes	Yes	Progressive
Johnson (2006)	U.S.	Income, permanent income, dynastic income	Yes	Yes	Progressive
Allègre et al. (2012)	France	Permanent income (life cycle)	Yes	No	Progressive

Notes: This table summarizes the results of the empirical literature on the progressivity or regressivity of educational expenditures, obtained in various countries and institutional contexts. The "parental background" column specifies which parental social origin variable is used in the analysis (education level, occupation or income). The column "taxes taken into account" indicates whether or not the authors deduct the taxes paid by the parents (either partially or entirely) or not. The "higher education only" column specifies whether the analysis is devoted solely to higher education spending or to all education spending.

B.2 Variables, Data and Methods

B.2.1 Grouping of Parental Occupations

Table B2 below details the four SES categories and the corresponding occupations. The mother's occupation is missing for 4% of the observations and the father's for 9% of the observations.

Table B2: Grouping of Occupations

Socioeconomic statuses (SES)	Corresponding occupations
High SES	
23	Entrepreneurs with 10 or more employees
31	Liberal professions
33	Public service executives
34	Professors, scientific professions
35	Information, arts and entertainment professions
37	Administrative and commercial executives of companies
38	Engineers and technical company executives
42	Teachers and assimilated
73	Former executives
Upper-middle SES	
43	Intermediate professions in health and social work
44	Clergy, religious
45	Administrative intermediary professions of the public service
46	Administrative and commercial intermediary professions of companies
47	Technicians
48	Foremen, supervisors
74	Former intermediary professions
Lower-middle SES	
11	Smallholder farmers
12	Farmers on medium farm
13	Large-scale farmers
21	Craftsmen
22	Traders and assimilated
52	Civilian employees and civil servants
53	Police and military
54	Administrative employees of companies
55	Commercial employees
56	Staff in direct personal services
71	Former farmer operators
72	Former craftsmen, traders, business leaders
75	Former employees
Low SES	
62	Skilled industrial type workers
63	Skilled artisan type workers
64	Drivers
65	Skilled workers in handling, warehousing and transport
67	Unskilled industrial workers
68	Unskilled artisan type workers
69	Agricultural workers
76	Former workers
80	Inactive

Notes: This table details the occupations corresponding to the four socio-economic status used in our analyses. This grouping corresponds to the official grouping of the Department of Education's statistical service (*Direction de l'évaluation, de la prospective et de la performance (DEPP)*).

B.2.2 Data

B.2.2.1 Representativeness of the Sample

Table B3: Comparison of Income Distributions in ENRJ and ERFS Samples

	ENRJ (2014) (Parents of young adults)	ERFS (2014) (One member of the household between 43-62 years old)
Mean age	51.5 (5.8)	51.6 (6.9)
Pre-tax income		
Mean	41,904	43,022
Median	35,514	35,240
P10	9,955	9,470
P90	77,556	78,010
P99	162,021	188,190
Disposable income		
Mean	48,047	41,401
Median	42,849	34,690
Standard-of-living		
Mean	22,692	24,408
Median	19,712	20,915
Number of observations	3,947	20,293

Notes: This table compares the distribution of different income variables for parents in our database (ENRJ) and individuals aged 42 to 62 in another tax survey with a much larger sample (ERFS). 99% of parents of young adults aged 18-24 are in the age range 42-62 in our ENRJ data. The two samples are relatively close in terms of pre-tax income. Individuals in our sample (parents of young adults) have slightly higher disposable incomes and a slightly lower standard-of-living than individuals in the ERFS sample, due to the presence of children.

B.2.2.2 Comparison of Parental Income Distribution in France and the United States

Table B4: Parental Income Distribution in France and the United States

Income Distribution	United States	France
Mean	87,219	52,030
Std. Deviation	353,430	46,400
Median	60,129	44,580
Observations	9,867,736	3,947

Notes: This table compares the distribution of parental income in France and the United States. The U.S. data come from Table III in the online Appendix of [Chetty et al. \(2014\)](#). In both cases, family income is pre-tax household income, divided by two when both the father's and mother's household incomes are available. All amounts are in 2012 dollars. We do not include property and capital incomes in France because it is not possible to identify them independently of the incomes of all household members, thus also including the incomes of cohabiting young adults. In any case, taking property and capital incomes into account would mainly affect rankings within the top decile and only marginally those in the rest of the distribution. In the United States, family income is the average household income from 1996 to 2000 because [Chetty et al. \(2014\)](#) studies cohorts born between 1980 and 1982. In France, family income is 2014 because the survey we use was conducted in 2014.

B.2.2.3 Data on Public Spending on Higher Education in France

Cost of Studies by Track and Field of Study. In the French national accounts, higher education expenditures are generally classed in one of just three categories,³⁴ regardless of the track or field of study ([MESRI-SIES, 2021](#)). Our study draws additional data from a survey of higher education institutions, the "Cost Awareness" project (*Connaissance des coûts des activités des établissements d'enseignement supérieur et de recherche*, DGESIP 2016-2019 ([Boiteau and Jameux, 2019](#))) designed to assess the expenditures of different higher education institutions. This survey was conducted between 2016 and 2019 at 65 higher education institutions that enroll approximately one-third of all French students. Not all public institutions have been surveyed, but the sampled institutions are representative of all public higher education institutions under the Ministry of Higher Education ([Bennani et al. \(2021\)](#)). These data allow for a detailed breakdown of costs across various tracks and fields of study. They enable the determination of instructional costs in higher education, excluding research-related expenses, which are considered in more aggregated data. For all courses – including engineering schools, technical training (*IUT*), bachelor's degrees (professional or academic), and master's degrees – public expenditures are categorized into nine fields: Humanities, Arts, Languages; Markets and Organizations; Mathematics, Engineering, Computer Science; Law; Matter, Earth, and Universe Sciences; Social Sciences; Life Sciences; Medical; and Miscellaneous, which includes elements not classifiable in the preceding categories. The data thus allow a more accurate estimate of public spending on higher education for each individual. Annual public spending per student in higher education varies considerably by track and field of study, as shown in table B5. On average, undergraduate students cost €3,600 per year, graduate students €5,300, and engineering students €10,600. The scientific fields – except for medical studies – are much more expensive

³⁴In 2014-2015, on average, vocational programs cost €14,150 per student, preparatory courses €15,620 and university programs €10,980.

than the humanities (up to twice as much for a bachelor’s degree), because students have more tutorials and practical work, with a much lower student/teacher ratio.

Elite Graduate Schools and Variance in Spending Within Tracks and Fields of Study. Despite their quality, these new higher education cost data still have some limitations. We are not able to differentiate public spending among elite graduate schools.³⁵ We therefore attribute the average cost of engineering schools to the other public elite graduate schools, which might lead us to underestimate inequalities in public spending. Some of these schools indeed have very high per-student expenditures (for example, [Berné and Métivier \(2015\)](#) found that some specific elite graduate schools have expenditures of €60,000 per student per year) and an attendance rate that remains very uneven ([Bonneau et al. \(2021\)](#)). More generally, public spending still varies greatly within tracks and fields, which we do not take into account because we cannot link students to the exact university in which they are or were enrolled. We address these issues by simulating two variants of public spending on higher education to predict how a more uneven distribution of public spending within each program and field might alter this result (see Appendix C.3.3). Unlike university programs, we cannot break down the costs of vocational programs and preparatory courses by field because we do not have detailed expenditure data for these programs, which are located in specific high schools. Since both are national programs and the course load, student/teacher ratio, and teacher salaries are set by the state, we can assume that there is little disciplinary variation in these programs. In the same way that we remove the costs of research in university programs, here we consider only the costs of training: 85.3 percent of total costs for preparatory courses and 86.7 percent for vocational programs ([Bennani et al., 2021](#)).

Integration of Survey and Cost Data. Our study integrates two key datasets: cost data from the “Cost Awareness” survey and survey data on young adults (ENRJ survey). The cost data presents expenditures for each track and field within public programs. The survey data details individual registrations across these tracks and fields. To ensure a comprehensive analysis, we matched these datasets based on their respective track and field descriptors, creating a consolidated “track × field” data. For a specific breakdown of the cost data granularity used in our analysis, refer to Table B5.

Construction of Educational Spending Over the Entire Educational Trajectory. To study inequality along the higher education trajectory, we restrict ourselves to individuals aged 22 to 24, who are the most advanced in their studies in our sample. The length of study for 22- and 23-year-olds is extended by parental income decile based on the continuation rates observed in the sample. We retain the higher cost between the highest degree obtained, the highest level of education attained, or ongoing studies. We partially account for reorientations. For example, someone who is enrolled in a master’s program but has an engineering degree has the cost of the full engineering school program plus the cost of one year of a master’s degree in their field. In the absence of complete information on individual trajectories in the data, we do not consider individuals who repeat in the same program. It is likely that this approximation leads us to underestimate the cost of university students who repeat: 27 % of first-year students ([MESRI-SIES, 2020](#)) but also students in preparatory courses who often repeat the second year of the program

³⁵The survey is representative of institutions under the supervision of the Ministry of Higher Education and Research, although some institutions, notably certain engineering schools, are under the supervision of other ministries (Ministry of the Economy, Ministry of the Army, Ministry of Agriculture, etc.). Business schools are not included in the survey either. We therefore supplement this survey with specific data on the costs of business school students (<https://www.cefdg.fr/fr/ecoles-et-formations-visees>). On average, public funding covers about 5 percent of student costs for these private programs.

– 9.1 % in economic preparatory courses, 20 % in humanities preparatory courses and 22.1 % in scientific preparatory courses.³⁶

Parents' Private Spending on Higher Education. We account for private investment in higher education through tuition paid by parents. We average tuition amounts declared by young adults and their parents to limit measurement error. Because our cost data represent the full training cost and not public spending, in cases where tuition paid is less than €650, we subtract the tuition paid by parents from the total cost to get the net public cost. When the tuition is above €7,500, we consider it to be private education and the net public cost is set at 5 % of the tuition paid. Between these two extreme limits, which we must set by convention, we consider the public cost data as the public cost and the tuition as the private cost. For individuals who have already graduated from college (16% of individuals in our sample and 29% of those aged 22-24), we cannot know whether they were enrolled in a public or private program because we do not have information on the tuition paid by their parents. We assume that all these individuals were enrolled in public programs, which represents the vast majority of programs in France. The private sector indeed accounted for 18% of total enrollment in higher education (?) in 2014.

³⁶*Bulletin officiel de l'éducation nationale n°18*, 3 May 2012 (https://www.education.gouv.fr/pid285/bulletin_officiel.html?pid_bo=26454)

Table B5: Per Student Annual Public Spending

Track	Field of study	Public cost over one year (in euros)
Vocational Track (<i>BTS</i>)		12,400
Preparatory Courses (<i>CPGE</i>)		13,400
Bachelor Degree (Non Vocational) (<i>Licence</i>)	Humanities, Arts, Languages	3,400
	Markets & Organizations	3,000
	Math, Engineering, Computer science	5,300
	Law	2,500
	Material, Earth and Universe Sciences	6,200
	Social Sciences	3,500
	Life Sciences	4,900
	Various	3,600
Bachelor Degree (Vocational) (<i>Licence professionnelle</i>)	Humanities, Arts, Languages	4,900
	Markets & Organizations	5,400
	Math, Engineering, Computer science	7,700
	Law	5,400
	Material, Earth and Universe Sciences	9,400
	Social Sciences	5,300
	Life Sciences	7,000
	Various	6,400
Technical Training (<i>IUT</i>)	Markets & Organizations	7,500
	Math, Engineering, Computer science	11,300
	Law	7,000
	Material, Earth and Universe Sciences	11,700
	Social Sciences	7,500
	Life Sciences	10,100
	Various	9,500
Master Degree	Humanities, Arts, Languages	5,400
	Markets & Organizations	4,800
	Math, Engineering, Computer science	7,300
	Law	4,000
	Material, Earth and Universe Sciences	8,900
	Social Sciences	4,700
	Life Sciences	6,500
	Various	5,300
Engineering Schools	Math, Engineering, Computer science	10,400
	Material, Earth and Universe Sciences	12,000
	Social Sciences	11,300
	Life Sciences	11,900
	Various	10,600
First Year of Medical Studies (<i>PACES</i>)	Medicine	2,400
Medical Studies (Except First Year)	Medicine	4,400
Paramedical Trainings	Medicine	2,700
Institute of Political Studies (<i>IEP</i>)		4,000
	Business Schools	400
Other Elite Graduate Schools (<i>Grande école</i>)		10,600

Notes: This table presents the annual spending on higher education, for different tracks, degrees and fields. These data come from MESRI-SIES (2021) for vocational programs and preparatory courses, from the *Commission d'évaluation des formations et diplômes de gestion* (CEFDG) for business schools (<https://www.cefdg.fr/fr/ecoles-et-formations-visees>) and calculated from the "Cost Awareness" project (DGESIP 2016-2019) for all other courses. In calculating the average annual cost per student, we weight each program surveyed by the number of students enrolled.

B.2.3 Gupta Decomposition Method

We decompose both the enrollment gap in higher education and the differences in the cost of public higher education between individuals from the top income decile (T) and those from the bottom decile (B) using a standard rate decomposition method developed by Das Gupta (Das Gupta, 1991). When the outcome is defined as a product of other variables of interest, the method defines a way to calculate the contribution of each of the latter to the total gap in the outcome variable between two subpopulations.

We denote the outcome variable of interest as r and the k explanatory factors as x_1, \dots, x_k such that

$$r(x_1, \dots, x_k) = \prod_{n=1}^k x_n.$$

When $k = 2$, the contribution of each factor $C(x_1)$ and $C(x_2)$ can be written as:

$$\begin{cases} C(x_1) = \frac{1}{2}(x_2^T + x_2^B)(x_1^T - x_1^B) \\ C(x_2) = \frac{1}{2}(x_1^T + x_1^B)(x_2^T - x_2^B) \end{cases} \quad (1)$$

In the general case where $k \geq 3$, the contribution of each factor $C(x_i)$ can be expressed as:

$$C(x_i) = \sum_{j=1}^{k-1} \frac{R(j-1, i)}{k \binom{k-1}{j-1}} (x_i^T - x_i^B) \quad (2)$$

where $R(j, i)$ is the sum of all possible values of the product of $k - 1$ factors (excluding x_i), of which j factors are from population T and all other factors from population B (Li, 2017).

For instance, when $k = 3$, the contribution of the first factor to inequalities between individuals from top (T) and bottom (B) income deciles is obtained with:

$$C_1 = \left(\frac{x_2^B \times x_3^B}{3} + \frac{x_2^B \times x_3^T + x_3^B \times x_2^T}{6} \right) \times (x_1^T - x_1^B)$$

In our framework, we initially break down the disparity in higher education participation between individuals whose parents are positioned at the top of the income distribution (denoted T) and those with parents at the income distribution's lower end (denoted B) by examining prior degree attainment. The rate of participation in higher education for each group G (where $G \in (B, T)$) is computed as:

$$HE^G = MSC^G \times HSC_{MSC}^G \times HE_{HSG}^G \quad (3)$$

Here, ' HE^G ' denotes the rate of higher education participation for individuals in group G . MSC^G represents the rate at which individuals in group G achieve the middle school certificate. Furthermore, HSC^G_{MSC} indicates the rate of obtaining a high school certificate among those in group G who have previously achieved the middle school certificate. Lastly, HE^G_{HSG} specifies the rate of higher education participation for those in group G who hold a high school certificate.. Refer to Table 3 for results derived from this decomposition technique.

Second, we decompose differences in public spending on higher education between individuals in the top (T) and bottom (B) income deciles based on differences in enrollment in higher education, duration of study, and spending on each year of higher education. Formally, public spending on higher education for individuals in the G group (with $G \in (B, T)$) can be defined as follows:

$$PS^G = HE^G \times LS_{student}^G \times AC_{student}^G$$

With PS^G public spending on higher education for individuals in the G group, HE^G participation rate in higher education of individuals in the G group, $LS_{student}^G$ average duration of study of students in the G group, and $AC_{student}^G$ average annual public cost of students in the G group. The results of the contribution of each of these factors to differences in higher education costs are presented in Table 4.

C.3 Robustness Checks

C.3.1 Using Multiple Years of Parental Income

Table C6: Sensitivity of Results to Using Multiple Years of Parental Income

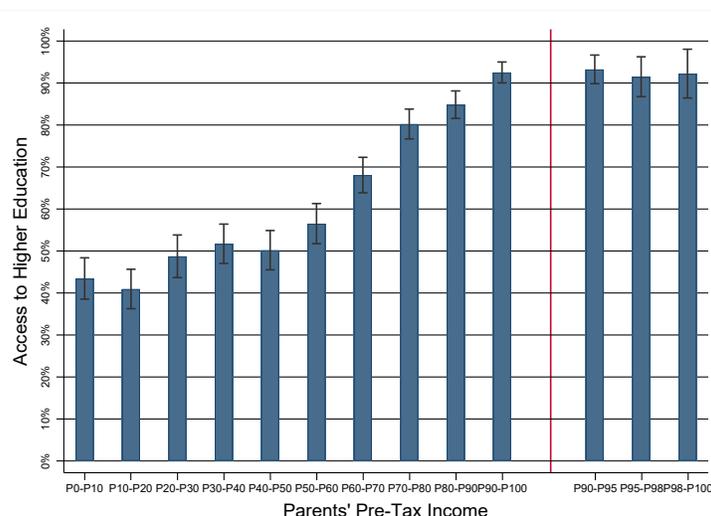
Access rate to higher education			
<i>Parental income variable used:</i>			
	Household taxable income in year t	Household taxable income in year t-2	Average of household taxable incomes in years t and t-2
<i>Panel B. Parental income decile</i>			
P0-P10	0.40 (0.49)	0.48 (0.50)	0.42 (0.49)
P10-P20	0.42 (0.49)	0.35 (0.48)	0.40 (0.49)
P20-P30	0.43 (0.50)	0.43 (0.50)	0.43 (0.50)
P30-P40	0.52 (0.50)	0.55 (0.50)	0.53 (0.50)
P40-P50	0.53 (0.50)	0.48 (0.50)	0.53 (0.50)
P50-P60	0.57 (0.50)	0.54 (0.50)	0.50 (0.50)
P60-P70	0.61 (0.49)	0.62 (0.49)	0.64 (0.48)
P70-P80	0.65 (0.48)	0.65 (0.48)	0.66 (0.47)
P80-P90	0.76 (0.43)	0.80 (0.40)	0.77 (0.42)
P90-P100	0.85 (0.36)	0.86 (0.35)	0.86 (0.35)
<i>Panel B. Regression coefficients</i>			
Full sample	0.46 (0.03)	0.46 (0.03)	0.48 (0.03)
Lower half	0.31 (0.07)	0.16 (0.07)	0.32 (0.07)
Upper half	0.72 (0.07)	0.81 (0.07)	0.85 (0.07)

Notes: Our main analyses are based on a single year of parental income: the survey year (2014). In this table we present the sensitivity of our results to using multiple years of parental income. The parental income used in our main specification is the sum of the father's household and the mother's household pre-tax income, divided by two when two parental households are identified. To perform this robustness check between year t and t-2, we use a slightly different concept of income, parents' household taxable income that is available for both year t and t-2. The regression coefficients part reports estimates of a regression of parental income percentile on enrollment in higher education. They should be interpreted as the average change in the participation rate in higher education for an increase of 10 percentile ranks (i.e., one decile) in the parental income distribution. The differences in estimation between our main concept of parental income and this taxable income concept are due to better imputation of missing responses in our main concept and the fact that some types of income (alimony, retirement savings, and special allowances) are deducted from taxable income. Standard deviations (Panel A) and standard errors (Panel B) in parentheses.

C.3.2 Using Parents' Individual Income Instead of Parents' Household Income

The parental income variable used in our main analysis is the sum of the father's household and the mother's household pre-tax income, divided by two when two parental households are identified. In this Appendix, we present the main results of our analysis with respect to a slightly different concept of parental income, the sum of the father's pre-tax income and the mother's pre-tax income, regardless of marital status. This variant differs from our main specification in that it does not take into account the incomes of the spouses of separated and reunited parents, consistent with the fact that income pooling is less frequent in re-partnered couples (Burgoyne and Morison (1997), Ponthieux (2012)). When parents are separated (concerning 26% of our sample of young adults), both were interviewed in 46% and only one in 54% of the cases. To prevent this nonresponse from biasing our income variable, we impute the income of the nonresponding parent using the responses of the separated parents who both responded to the survey, controlling for the gender and income decile of the responding parent.

Figure C1: Proportion of Individuals Enrolled in Higher Education, by the Sum of Individual Pre-Tax Income of Both Parents



Notes: This figure displays the proportion of individuals aged 19 -24 who are currently enrolled, have enrolled in higher education without necessarily obtaining a degree, or already hold a higher education degree, by parental individual pre-tax income. The parental income used is the sum of the father's pre-tax individual income and the mother's pre-tax individual income, regardless of marital status. Deciles are based on this definition. We further decompose the top 10 percent of the distribution (x-axis). The black line represents the standard errors.

C.3.3 Matching Richer Individuals to Better-Endowed Programs

There is still variance in within-field and within-track spending that we cannot account for because we are not able to link students to the exact university in which they are enrolled. This could lead to a downward bias in the observation of the redistribution occurring through higher education spending if wealthier individuals are able to attend better-endowed programs.

We thus perform a robustness check by assigning, for each combination of tracks and fields, the 10th (respectively 25th) percentile of the distribution of student-weighted costs – or the nearest higher per-

centile when we do not have enough observations to observe the 10th or 25th percentile – to individuals whose parents are in the bottom 10 percent (respectively 25 percent) of the income distribution and the 75th percentile (respectively 90th percentile) – or the nearest lower percentile – to those whose parents are in the top 25 percent (respectively 10 percent) of the income distribution. Our main results are relatively close to those found with this assumption of extreme concentration of wealthier individuals in more expansive programs, meaning that there is not much variation in costs within programs enrolling a large portion of the student body. In our main specification, individuals in the top decile of the income distribution receive 2.7 more public investment in higher education than those in the bottom decile (Table C7). When richer programs are associated with richer individuals, individuals in the top 10 percent of the income distribution benefit 3.7 times more than those in the bottom decile.

One of the other limitations of the cost data used is that we are not able to differentiate public spending among the most selective elite graduate schools, which could lead us to underestimate inequities in public spending. Indeed, some of these schools have very high per-student expenditures – for example, [Berné and Métivier \(2015\)](#) found that specific elite graduate schools have expenditures of €60,000 per student per year – and an participation rate that remains very unequal ([Bonneau et al., 2021](#)). In a final specification, we assume both that wealthier individuals attend better-endowed university programs, as previously and that individuals from the top decile of the income distribution, when they enter elite graduate schools (engineering schools, institutes of political studies, or other specialized schools), attend better endowed schools. Individuals in the top decile of the income distribution account for about 30 percent of elite graduate school enrollment in our sample. We assume that individuals in the top 5 percent of the income distribution attend schools with endowments three times the typical endowment and that those in the next 5 percent of the income distribution enroll in schools with endowments twice the typical endowment. In this latter specification, which is the most comprehensive and included in the main body of the paper, we find that individuals at the top of the income distribution benefit from 4.5 times as much as individuals at the bottom of the income distribution.

In our main specification, enrollment inequality explains about 70 percent of the inequality in public spending on higher education between individuals in the top and bottom income deciles. When we allocate better-endowed programs to wealthier individuals, the contribution of enrollment inequality to public spending inequality decreases mechanically but remains equal to about half of total spending differences (Table C8).

Table C7: Sensitivity of Results to the Student-Program Matching

		(1)	(2)	(3)
Decile of parental household income		Main specification	Association of wealthier individuals to better-endowed programs	Assumption (2) + assumptions on the cost of elite graduate schools
All individuals	D1	7,800	6,200	6,200
	D2	7,600	6,400	6,400
	D3	8,800	7,800	7,900
	D4	9,100	8,500	8,600
	D5	10,000	9,400	9,500
	D6	12,500	11,200	11,400
	D7	12,200	11,200	11,300
	D8	16,800	16,200	16,700
	D9	21,300	21,700	22,200
	D10	21,400	22,900	27,900
D10/D1 Ratio		2.7	3.7	4.5
Students or former students	D1	22,200	17,500	17,600
	D2	19,200	16,100	16,200
	D3	18,900	16,700	16,900
	D4	19,900	18,600	18,700
	D5	18,500	17,300	17,400
	D6	21,300	19,000	19,400
	D7	23,200	21,300	21,500
	D8	21,300	20,600	21,200
	D9	26,700	27,200	27,800
	D10	23,500	25,100	30,500
D10/D1 Ratio		1.1	1.4	1.7

Notes: This table presents public spending on higher education by parental income decile under different assumptions. The parental income used is the sum of the pre-tax income of the father's household and the mother's household, divided by two when there are two different households. Deciles are based on this definition. For a complete analysis of educational pathways up to age 24, we restrict the sample to 22- to 24-year-olds and the length of study for 22- and 23-year-olds is extended by parental income decile based on the continuation rates observed in the sample. Column (1) represents our main specification. Column (2) represents the results obtained by assigning wealthier individuals to programs that are better endowed in their track and field of study. In this simulation, we assign for each combination of programs and fields, the 10th (respectively 25th) percentile of the distribution of student-weighted costs – or the nearest higher percentile when we do not have enough observations to observe the 10th or 25th percentile – to individuals whose parents are in the bottom 10 percent (respectively 25 percent) of the income distribution and the 75th percentile (respectively 90th percentile) – or the nearest lower percentile – to those whose parents are in the top 25 percent (respectively 10 percent) of the income distribution. Column (3) represents the same simulation as in column (2) with additional assumptions about the cost of highly selective elite graduate schools. We assume that individuals from the top decile of the income distribution, when they enter elite graduate schools (engineering schools, institutes of political studies, or other specialized schools), enroll in better endowed schools. We assume that individuals in the top 5 percent of the income distribution attend schools with endowments three times the typical endowment and that those in the next 5 percent of the income distribution enroll in schools with endowments twice the typical endowment.

Table C8: Decomposition of Differences in Public Spending on Higher Education: Three Variants of Spending

	(1) Main specification	(2) Association of wealthier individuals with better-endowed programs	(3) Assumption (2) + wealthier individuals attend more costly elite graduate schools
Enrollment in higher education	67	52	49
Duration of study	23	18	17
Annual public spending	10	30	33

Notes: This table shows the contribution of different factors – enrollment in higher education, differences in duration of study for students, differences in annual public spending for students – to the total difference in public higher education spending between individuals in the top 10 percent and the bottom 10 percent of the income distribution (in percent). Parental income used is the sum of the pre-tax income of the father’s household and the mother’s household, divided by two when there are two different households. Deciles are based on this definition. For a complete analysis of educational pathways up to age 24, we restrict the sample to 22- to 24-year-olds and the length of study for 22- and 23-year-olds is extended by parental income decile based on the continuation rates observed in the sample. To decompose the contribution of different factors, we rely on [Das Gupta \(1991\)](#) decomposition method. See Appendix B.2.3 for more details on this decomposition method. Column (1) represents our main specification. Column (2) represents the results obtained by assigning wealthier individuals to programs that are better endowed in their track and field of study. In this simulation, for each combination of tracks and fields, we assign the 10th (or 25th) percentile of the distribution of student-weighted costs – or the next higher percentile when we do not have enough observations for the 10th or 25th percentile – to individuals whose parents are in the bottom 10 percent (or 25 percent) of the income distribution and the 75th percentile (or 90th percentile) – or the next lower percentile – to those whose parents are in the top 25 percent (or 10 percent) of the income distribution. Column (3) represents the same simulation as in column (2) with additional assumptions about the cost of highly selective elite graduate schools. We assume that individuals from the top decile of the income distribution, when they enter elite graduate schools (engineering, institutes of political studies, or other specialized schools), enroll in better endowed schools. More specifically, individuals in the top 5 percent of the income distribution are assumed to enroll in schools with endowments three times the typical endowment and those in the next 5 percent to enroll in schools with endowments twice the typical endowment.

D.4 Additional Results

D.4.1 Parental Income, Education, and Occupation: Patterns in Higher Education Enrollment

Table D9: Enrollment in Higher Education Based on Parents' Income, Occupation and Diploma

	(1)	(2)	(3)	(4)	(5)	(6)
Parent's income percentile rank	0.58***	0.55***	0.22***	0.27***	0.14***	0.100**
Log of potential financial transfers		0.0097***				0.0028
Father Primary school			–		–	–
Father Middle School			0.00035		-0.027	-0.029
Father High School			0.051**		0.032	0.040*
Father Two-year degree			0.19***		0.13***	0.13***
Father Bachelor or Master degree			0.23***		0.16***	0.15***
Father M.D. or Ph.D.			0.26***		0.18***	0.19***
Mother Primary school			–		–	–
Mother Middle School			0.14***		0.12***	0.13***
Mother High School			0.16***		0.13***	0.14***
Mother Two-year degree			0.37***		0.30***	0.31***
Mother Bachelor or Master degree			0.31***		0.20***	0.21***
Mother M.D. or Ph.D.			0.35***		0.22***	0.21***
Father Low SES				–	–	–
Father Lower-middle SES				0.13***	0.099***	0.095***
Father Upper-middle SES				0.16***	0.11***	0.11***
Father High SES				0.24***	0.14***	0.15***
Mother Low SES				–	–	–
Mother Lower-middle SES				0.095***	0.061***	0.062***
Mother Upper-middle SES				0.24***	0.13***	0.14***
Mother High SES				0.28***	0.17***	0.18***
Parents live together						–
Separated parents						-0.077***
Parisian area						–
Urban unit of more than 100,000 inhabitants						-0.032
Urban unit of less than 100,000 inhabitants						-0.055**
Observations	3,947	3,947	3,066	3,329	3,046	3,013
R ²	0.114	0.116	0.196	0.176	0.214	0.221

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: This table reports the estimates of the effect of parental income percentile, potential financial transfers, parents' education, parents' occupation, family status and urban center size on enrollment in higher education. Parental income used is the percentile rank calculated from the sum of the father's household and the mother's household pre-tax income, divided by two when two parental households are identified. The potential financial transfer variable represents what young adults would have received from their parents, if they were studying, based on their characteristics (indicators for parents' income decile, number of siblings, father's degree, mother's degree, father's occupation, mother's occupation, parents' marital status, and size of urban center where the young adult lives). For parent's education we define six categories: elementary school certificate or less, middle school certificate, high school diploma or equivalent, two-year degree, bachelor's or master's degree, and M.D. or Ph.D. The mother's degree is missing for 4 percent of observations and the father's for 17 percent. For occupations, we rely on the Department of Education's statistical service grouping into four socio-economic statuses (SES). High SES includes professionals, managers, CEOs, teachers, professionals and artists. Upper-middle SES corresponds to intermediate occupations, technicians, foremen and supervisors. Lower-middle SES refers to farmers, artisans, shopkeepers and employees. Low SES is defined as blue-collar workers and non-working people. Table B2 details the four SES categories and the corresponding occupations. The mother's occupation is missing for 4% of the observations and the father's for 9%. When the two parents do not live in the same city, we use the larger of the two.

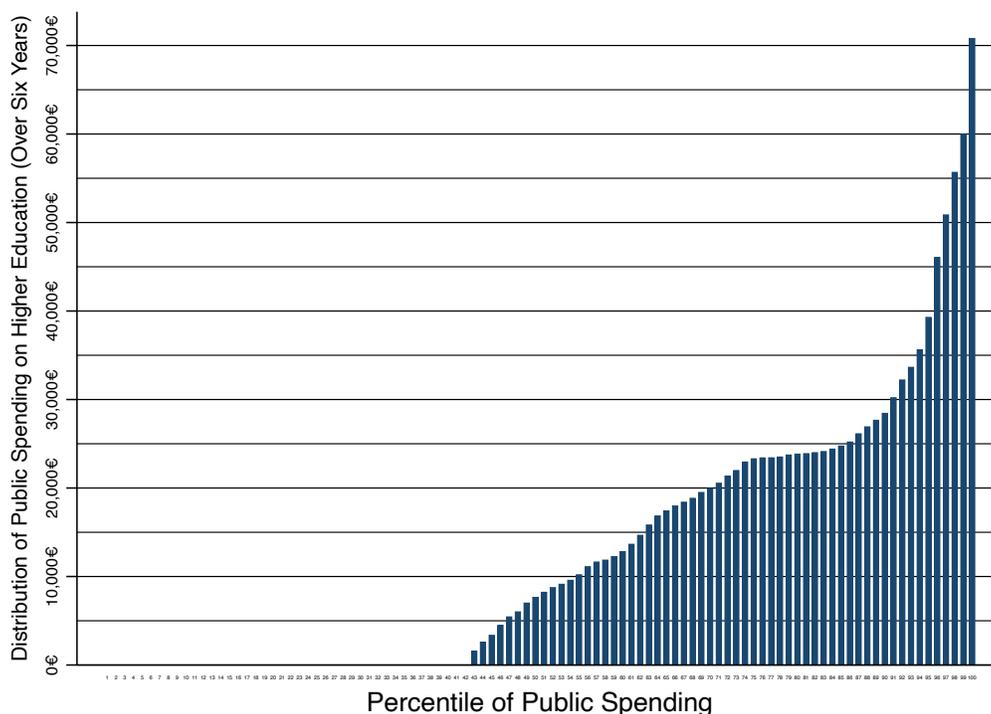
D.4.2 Distribution of Higher Education Public Spending on Young Adults

In this section we present the distribution of public expenditures dedicated to young adults and their parents, regardless of parental income.

Figure D2 shows the distribution of public spending on higher education aggregated over studies (until 24). About 40% of individuals have zero spending because they did not enter higher education. Only 10% of individuals receive more than €30,000 of investment in higher education during their education. The 1% of individuals with the highest public expenditure on higher education receive on average €70,500 over 6 years of study. They receive 2.4 times more spending than individuals at the 90th percentile of higher education spending and 8.5 times more spending than individuals at the median of public spending on higher education (€70,500 versus €8,300 on average).

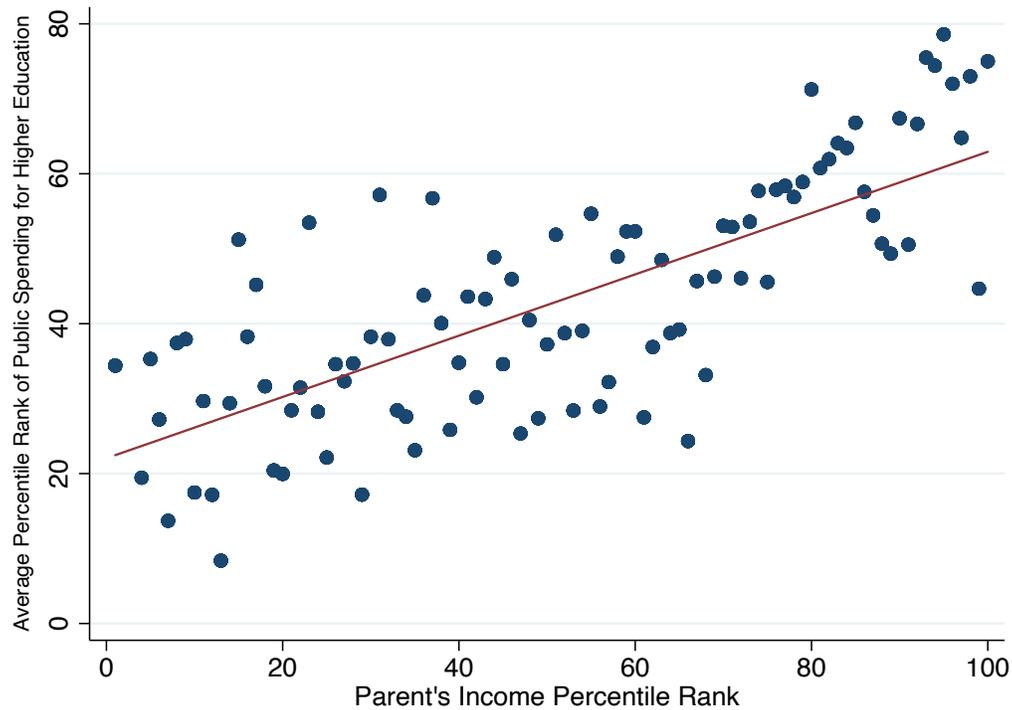
Figure D3 shows the correlation between the percentile rank of parental income and the percentile rank of public spending on higher education. A significant correlation between parental income and public spending on higher education is observed. On average, a one percentile increase in parental income is correlated with a 0.4-percentile increase in the distribution of public spending on higher education. On average, individuals whose parents are in the lowest decile of pre-tax income are in the 30th percentile of public spending on higher education, while those whose parents are in the highest decile are in the 68th percentile of public spending.

Figure D2: Distribution of Public Spending for Higher Education



Notes: This figure shows the average public spending on higher education over 6 years (until 24), by public spending percentile. 42% of 22-24 year olds have zero spending because they did not enter higher education. Unlike the rest of our analyses, we do not consider parental income in calculating this distribution. For a complete analysis of educational pathways up to age 24, we restrict the sample to 22- to 24-year-olds and the length of study for 22- and 23-year-olds is extended by parental income decile based on the continuation rates observed in the sample.

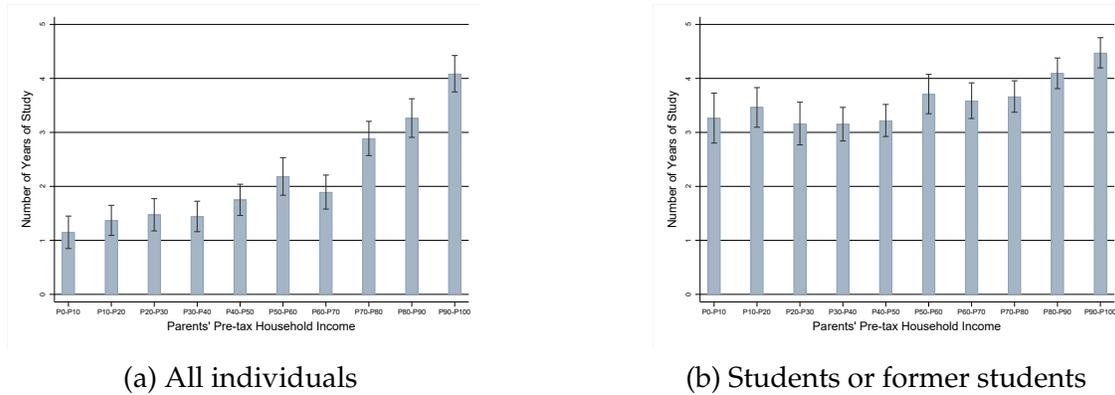
Figure D3: Rank-Rank Correlation



Notes: This figure plots the correlation between the percentile rank of parental income and the percentile rank of public spending on higher education. The red line is the linear regression of the percentile rank of parental income on the percentile rank of public spending on higher education. The parental income used is the sum of the pre-tax income of the father's household and the mother's household, divided by two when there are two different households. The percentiles are calculated based on this definition. For a complete analysis of educational pathways up to age 24, we restrict the sample to 22- to 24-year-olds and the length of study for 22- and 23-year-olds is extended by parental income decile based on the continuation rates observed in the sample.

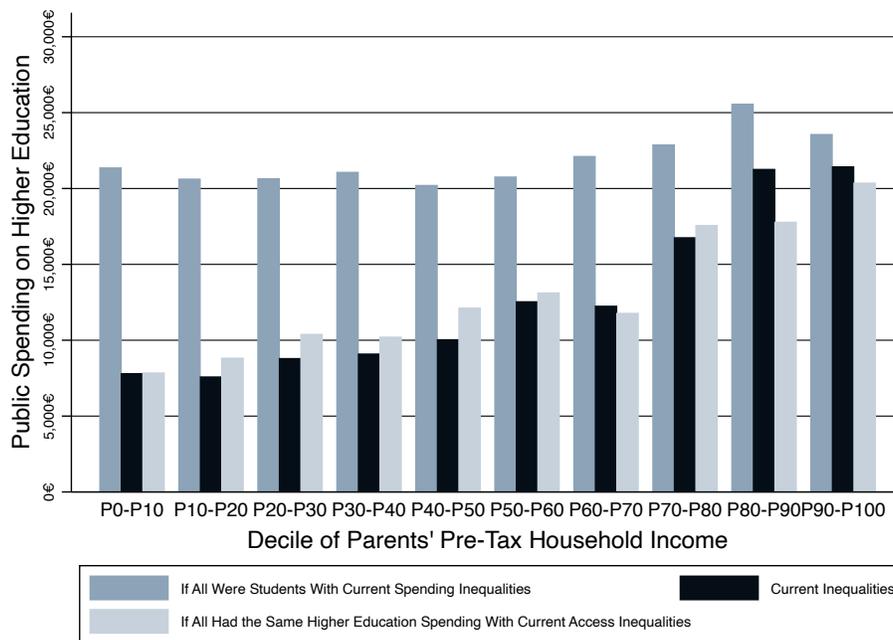
D.4.3 Decompositions of Inequalities in Public Spending on Higher Education

Figure D4: Duration of Study



Notes: These figures represent the duration of studies for all individuals (Panel (a)) and individuals entering higher education between the ages of 18 and 24 (Panel (b)), as a function of parental income. We restrict the sample to 22- to 24-year-olds and the length of study for 22- and 23-year-olds is extended by parental income decile based on the continuation rates observed in the sample. The parental income used is the sum of the pre-tax income of the father's household and the mother's household, divided by two when there are two different households. Deciles are calculated based on this definition. The black line represents standard errors.

Figure D5: Extensive and Intensive Margins



Notes: This figure shows the decomposition of inequality in public spending on higher education between an extensive margin – differences in enrollment in higher education – and an intensive margin – differences in spending on higher education for those who enroll, related to both inequality in duration of study and inequality in annual spending. We restrict the sample to 22- to 24-year-olds and the length of study for 22- and 23-year-olds is extended by parental income decile based on the continuation rates observed in the sample. The dark curve represents the current level of inequality in public spending on higher education (corresponding to Figure 8a). The left curve represents the level of inequality that would result if all individuals enrolled in higher education with the current level of spending inequality. The right-hand curve represents the level of inequality that would result if all individuals had the same expenditure on higher education with the current level of inequality in participation. The parental income used is the sum of the pre-tax income of the father's household and the mother's household, divided by two when there are two different households. Deciles are calculated based on this definition (x-axis).

D.4.4 Accounting for Parental Taxes in Higher Education Spending Distribution

One common objection to the finding of regressive government spending is that wealthier parents contribute more to the funding of higher education through their taxes. We thus estimate a net benefit measuring the degree of redistribution of public spending on higher education, net of the share of the taxes paid by parents that must be allocated to finance this expenditure. Given our data, we consider a static framework in which young adults' higher education is funded by a contribution from all taxpayers, including their parents. Alternative methods might adopt a lifecycle approach, wherein individuals repay through taxes the benefits they received during their studies. We first outline the accounting method devised to incorporate parents' taxes into the evaluation of higher education spending's redistributivity, followed by a presentation of our findings.

D.4.4.1 Methodology

We assess the redistribution that takes place through public spending on higher education and propose a method of accounting for the taxes paid by parents and used to finance this particular public expenditure. This section details and motivates the assumptions concerning the scope of higher education spending, the duration of study or the taxes considered that underlie our calculation of the degree of redistribution of public spending on higher education, once parental tax contributions are taken into account.

Scope of Public Spending on Higher Education. We restrict our analysis to higher education expenditures only. We draw upon data from the "Cost Awareness" project³⁷, designed to assess the expenditures of various higher education institutions. Conducted between 2016 and 2019 at 65 institutions enrolling roughly one-third of all French students, this survey enables us to segregate costs by program and field of study and to discern the cost of higher education net of research costs, which are included in more aggregated data. We use the main survey's (*ENRJ*) information on individual studies to match the two data sources at the level of each track and field of study.³⁸ Consequently, this data facilitates a more precise estimation of public spending on higher education per individual compared to highly aggregated data. For all programs, we focus solely on instructional expenditure.

Period Considered. Our main sample comprises young adults aged 19 to 24, spanning a 6-year period. This range encapsulates the majority of student trajectories. However, expenditures on those continuing their education post-24 are omitted. We also project fiscal contributions over a 6-year timeframe by multiplying the annual parental contribution by 6. For the purpose of assessing public spending on higher education, our focus is on individuals aged 22 to 24, representing the most advanced in their academic journey within our dataset. The study duration for individuals aged 22 and 23 is extended based on continuation rates observed in the sample, stratified by parental income decile.

³⁷*Connaissance des coûts des activités des établissements d'enseignement supérieur et de recherche*, DGESIP 2016-2019 (Boiteau and Jameux (2019)).

³⁸Refer to Appendix B.2.2.3 for more details on these new higher education cost data and Table B5 for annual public spending per student, divided by field of study and track, the level of disaggregation we use.

The aggregate public spending on higher education is given by:

$$S_{all}^{HE} = \sum_{j=1}^y (S_j^{HE} \times Weight_j) \quad (4)$$

Where:

- y represents the total number of young adults in our sample;
- S_j^{HE} denotes the expenditures on completed higher education over 6-year period for the j^{th} young adult;
- $Weight_j$ is the sampling weight allocated to the j^{th} young adult in the ENRJ survey;
- $\sum_{j=1}^n Weight_j = Y$ ensures that Y corresponds to the total number of young adults in the broader population

Taxes Financing Higher Education. The literature on distributed national accounting takes into account all taxes and redistribution that occurs through direct public support and indirect in-kind transfers (e.g., public financing of education or health). In our case, the way in which taxes are taken into account to study the redistribution of the public financing system of higher education is complicated by the fact that we are only interested in one specific expenditure item, higher education expenditure. In contrast to what has generally been done previously in the literature, where taxes are considered as a whole, we decide to consider only unallocated taxes (those that participate in the financing of higher education) and only to the extent that they finance higher education. Deducting only the taxes needed to cover the expenditures under consideration, but extending the contributors to all taxpayers, is more consistent with the fact that: (i) parents of young adults are not the only taxpayers funding higher education, and that (ii) not all of their taxes are allocated to higher education. In contrast to life-cycle approaches focused on an individual, we consider a state that balances its higher education budget annually with unallocated tax funds.

We assume that higher education is funded by households through direct and indirect taxation and by firms through corporate taxes but not through direct contributions (as is the case, for example, with apprenticeships); nor is it funded by public debt. The taxes most likely to contribute to the financing of higher education are income tax, VAT, corporate taxes that are allocated to households, and other indirect taxes – tax on energy products (*TICPE*) and excise duties. We do not take into account social contributions, nor taxes dedicated to the financing of social security (*CGS* and *CRDS*). We also do not take into account local taxes, which contribute only marginally to the financing of higher education.

Our sample consists of parents of young adults. Since these individuals are not the only ones involved in financing higher education, we need to estimate the share of taxes to be considered out of sample. We use the 2014 Tax and Social Income Survey,³⁹ a representative sample of all taxpayers in France, for this purpose.

³⁹*Enquête sur les revenus fiscaux et sociaux* (ERFS), 2014

We calculate the total amount of unallocated taxes paid over six years by French taxpayers as follows:

$$Taxes_{all} = 6 \times \sum_{i=1}^n [(IT_i + VAT_i + CT_i + E_i) \times Weight_i] \quad (5)$$

Where:

- $Taxes_{all}$ represents the total amount of unallocated taxes paid by all taxpayers over a six-year period, that will be contributing to the financing of 6-years of higher education;
- n is the total number of observations in the survey;
- IT_i is the income taxes paid by i ;
- VAT_i the value added taxes paid by i ;
- CT_i the corporate taxes paid by i ;
- E_i the energy and excise taxes paid by i ;
- $Weight_i$ the weight assigned to individual i in the ERFS survey;
- $\sum_{i=1}^n Weight_i = N$ ensures that N corresponds to the total number of taxpayers in the general population.

The total unallocated taxes paid by all French taxpayers over six years amounts to €1.50 trillion.

Proportion Needed To Fund Higher Education Expenditures. We calculate the share of unallocated taxes needed to fund public spending on higher education with the following ratio:

$$Share_Taxes^{HE} = \frac{S_{all}^{HE}}{Taxes_{all}} \quad (6)$$

Where:

- $Share_Taxes^{HE}$ represents the share of taxes devoted to public spending on higher education for young adults;
- S_{all}^{HE} is the sum of total public spending on higher education devoted to individuals until 24 as derived in equation 4;
- $Taxes_{all}$ is the sum of all unallocated taxes paid by all taxpayers over six years as derived in equation 5.

In total, 4% of all unallocated taxes paid by taxpayers must be devoted to funding the cost of higher education. This proportion is consistent with official data from national accounts.⁴⁰

⁴⁰The 2021 Finance Bill indicates an amount of €220 billion for the sum of the taxes we are considering here (VAT, income tax, corporate tax and domestic consumption tax on petroleum and energy products) and €10 billion (4.5% of the tax revenue considered) for higher education excluding university research (see <https://www.budget.gouv.fr/budget-etat/> for unallocated tax amounts and https://www.budget.gouv.fr/budget-etat/ministere?annee=118&loi_finances=50&type_budget=all&ministere=34726&programme=30340&type_donnee_budget=ae&op=Valider for higher education spending). We cannot report these figures for 2014, the year of the survey, because government spending was not displayed broken down by spending item at that time.

Taxes Paid by Parents. Our database incorporates administrative records of parents' income tax payments. We calculate the proportion of income allocated to VAT, corporate income tax, and other indirect taxes for each standard-of-living decile based on results from national accounts (André et al. (2023)). We use standard-of-living deciles to match the figures in the referenced study. This is a deviation from the rest of the article, where the deciles pertain to the pre-tax household income of parents. The derived tax rates for each standard-of-living decile, presented in Table D10, are subsequently applied to the pre-tax income of parents in our database, based on the respective standard-of-living decile to which they belong.

Table D10: Taxes as a Proportion of Pre-Tax Income, by Overall Population Standard-of-Living

	Distributional national accounts at the macro level			ENRJ administrative data
	VAT	Energy and excise taxes	Corporate tax	Income tax
D1	0,17	0,06	0,02	0,01
D2	0,14	0,05	0,01	0,03
D3	0,12	0,04	0,01	0,02
D4	0,12	0,04	0,01	0,03
D5	0,11	0,04	0,01	0,03
D6	0,11	0,03	0,01	0,04
D7	0,11	0,03	0,01	0,04
D8	0,10	0,03	0,02	0,05
D9	0,10	0,03	0,02	0,08
D10	0,08	0,01	0,11	0,13
Total	0,11	0,03	0,04	0,04
Public support included in pre-tax parental income	Yes	Yes	No	/

Notes: This table presents the proportion of pre-tax income that is allocated to various taxes (VAT, energy and excise taxes, corporate taxes, and income taxes) based on the standard-of-living decile of the entire population. For instance, households in the first standard-of-living decile expend 17% of their total pre-tax income (which includes public support) on VAT. The percentage of income allocated to VAT, corporate income tax, and other indirect taxes for each decile is determined by dividing the tax revenue sourced from that decile by its collective income, inclusive of public support for VAT and excise duties computation. The results are derived from the distributed national accounts (André et al. (2023)). It's important to note that the table's standard-of-living deciles pertain to the broader population to maintain consistency with the figures in the referenced studies. This approach differs from the rest of the article where the deciles are based on pre-tax parental income. For the income tax data, we rely on the administrative variable provided in our survey.

Net Benefit From Public Spending on Higher Education. We then apply the predetermined share of taxes calculated above, which amounts to 4%, dedicated to the public funding of higher education, to the unallocated taxes paid by parents. This calculation yields the estimated portion of taxes from parents that is allocated to higher education. To ascertain their net benefit, we subtract this tax amount from the higher education spending received by their child. This net benefit can be understood as the advantage parents gain from the public funding of higher education after accounting for the taxes they have paid and dedicated to such funding.

The mean net benefit for each parental income decile d is therefore calculated as follows:

$$Net_Benefit_d = \frac{1}{n_d} \sum_{i=1}^{n_d} (S_i^{HE} - (0.04 \times Taxes_i \times 6)) \quad (7)$$

Where:

- $Net_Benefit_d$ denotes the average net benefit for the d^{th} parental income decile;
- n_d represents the number of individuals in decile d ;
- S_j^{HE} is the higher education spending over a 6-year period for the i^{th} individual;
- $Taxes_i$ refers to the taxes paid by the i^{th} individual's parents;
- The factor of 0.04 represents the 4% share of taxes dedicated to higher education, defined above as $Share_Taxes^{HE}$;
- Multiplication by 6 adjusts the tax amount over the relevant period under study for higher education expenses.

This equation does not need to account for the number of children parents have. This is due to the specifics of our survey data. We establish deciles based on the parents' income of surveyed young adults, who are representative of individuals aged 18 to 24. In cases where a demographic group has a larger number of children on average, these offspring will naturally cover a broader spectrum of the parental income distribution. While it's not universally accurate that one child aged 18-24 equates to one parent's observation, this assumption is valid in our survey data, given the sampling method (1 young adult = 1 parental household (or 2 in case of separated parents)). Therefore, in the equation for computing the redistribution of higher education public spending, net of parental tax contributions, we can assume that 1 parental household accounts for 1 young adult, with the survey weights adjusting for any overrepresentation or underrepresentation of certain demographics. This approach would be different in comprehensive administrative data, where all young individuals and their parents are accounted for, allowing multiple young adults in the 18-24 age bracket to be linked to the same parents.

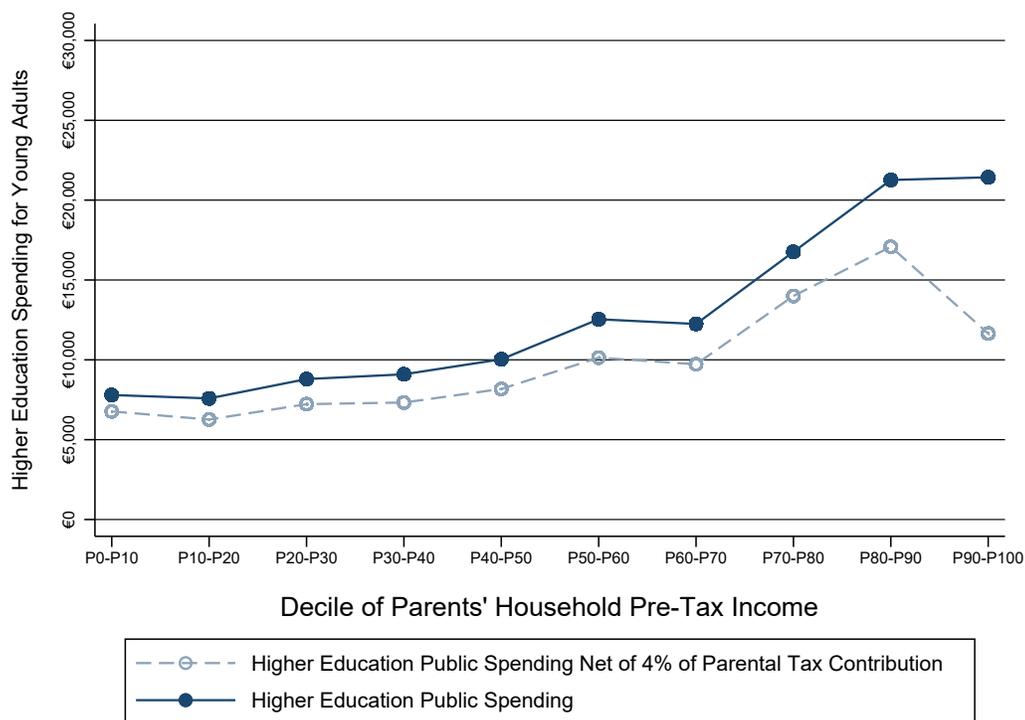
D.4.4.2 Results

In this section, we discuss the redistributive effects of public funding for higher education, considering the taxes paid by parents specifically for this purpose, as elaborated in the preceding methodology section.

The data reveals that, on average, parents receive a net benefit of €9,600 over a six-year period, as depicted in Figure D6 and Table D11. Interestingly, parents benefit from horizontal solidarity since 76% of the higher education expenses for their young adults are funded by taxpayers who do not have young adults. However, this average masks variations among households. Households with young adults enrolled in higher education experience a net benefit that is nearly double at €18,100, while those without young adults in higher education see a negative value of €1,900, as they participate in higher education funding without benefiting from it.

When examining the impact of taxes used to fund higher education, it becomes apparent that while this spending remains regressive, there is a noteworthy shift at the top of the income distribution. Specifically, the net benefit is roughly twice as high in the upper third of the distribution compared to the lower third (€13,900 versus €6,900). This benefit rises with parental income, particularly in the upper half of the distribution (from P50 to P90), peaking at about €17,000, as evidenced in Table D11 and Figure D6. Yet, the top decile, due to higher taxation and even with their increased enrollment in higher education, has a net benefit of only two-thirds that of the ninth decile (€11,600 compared to €17,000). Nonetheless, this figure exceeds the net benefit seen in the bottom decile (€6,800).

Figure D6: Spending for Higher Education, Net of Parental Taxes Funding Higher Education



Notes: This figure plots the distribution of higher education public expenditures on young adults over a 6-year period, by pre-tax parental income, taking into account parents taxes funding higher education. The solid line shows public spending on higher education until 24. Analysis for educational pathways up to age 24 targets the 22-24 age bracket, extending study periods for 22- and 23-year-olds based on observed continuation rates by parental income deciles in the sample. This corresponds to the dark grey bars in Figure 8. The dash line with empty dots shows the same variable, net of 4 percent of parental tax contribution – corresponding to the share of all taxpayers’ unallocated taxes needed to fund public higher education. Parental income used is the sum of the pre-tax income of the father’s household and the mother’s household, divided by two when there are two different households. Deciles are based on this definition (x-axis). We use the "Cost Awareness" project and [MESRI-SIES \(2021\)](#) data for higher education spending.

Table D11: Average Public Spending and Fiscal Contribution on Young Adults Over 6-Year Period, by Parents' Pre-Tax Household Income (in Euros)

	(1) Public spending for higher education (A)	(2) 4% of fiscal contribution of parents over 6 years (B)	(3) Net benefit for higher education (A)-(B)
P0-P10	7,800	1,000	6,800
P10-P20	7,600	1,300	6,300
P20-P30	8,800	1,600	7,200
P30-P40	9,100	1,800	7,300
P40-P50	10,000	1,900	8,200
P50-P60	12,500	2,400	10,100
P60-P70	12,200	2,500	9,700
P70-P80	16,800	2,800	14,000
P80-P90	21,300	4,200	17,100
P90-P100	21,400	9,800	11,600
Average	12,500	2,800	9,600

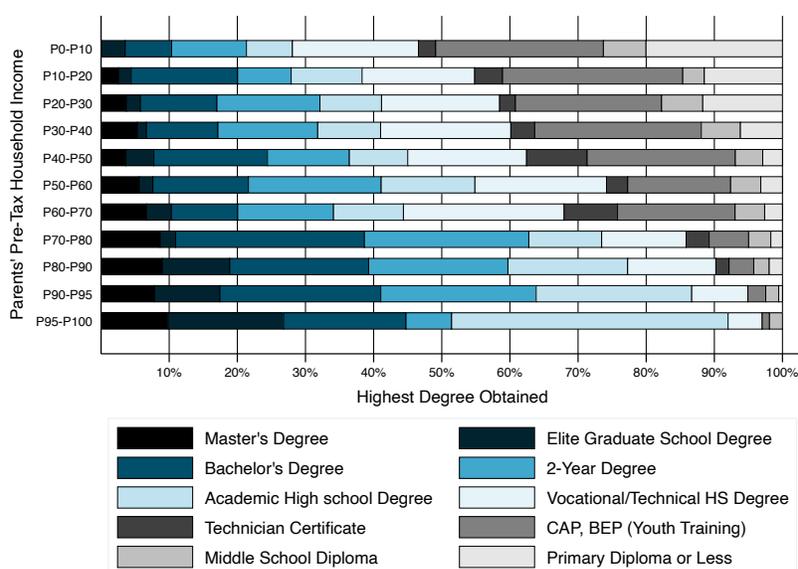
Notes: This table outlines the distribution of higher education public expenditures on young adults against the fiscal contributions of their parents, categorized by pre-tax parental income. Parental income used is the sum of the pre-tax income of the father's household and the mother's household, divided by two when there are two different households. Deciles are based on this definition (x-axis). We use the "Cost Awareness" project and [MESRI-SIES \(2021\)](#) data for higher education spending. Values are rounded to the nearest 100 euros. Column (1) details public spending on higher education until 24. Analysis for educational pathways up to age 24 targets the 22-24 age bracket, extending study periods for 22- and 23-year-olds based on observed continuation rates by parental income deciles in the sample. Column (2) represents 4% of taxes contributed by parents over six years, reflecting the portion of unallocated taxes from all taxpayers needed to finance public higher education. This figure is derived from a representative dataset of all taxpayers (ERFS), with imputations for indirect and corporate tax sourced from the distributed national account ([André et al. \(2023\)](#)). Column (3) displays the net benefit from higher education, calculated by subtracting the parental tax contribution from the total public expenditure on higher education.

D.4.5 Predicted Lifetime Earnings

Disparities in higher education enrollment based on parental income lead to differences in educational attainment. These educational achievements, in turn, result in disparities in lifetime income, which likely contribute to the relatively low social mobility observed in France (Kenedi and Sirugue (2023)). This Appendix offers a descriptive analysis, specifically examining the implications of our main findings in terms of predicted lifetime earnings.

Educational Attainment Disparities. The disparities in higher education attendance, highlighted in this study, directly lead to significant disparities in educational achievement. For instance, around 45% of 22- to 24-year-olds⁴¹ whose parents are within the top 5% of the income distribution have obtained a bachelor's degree. In stark contrast, only about 10% of individuals from the bottom 10% income bracket have achieved this level of education. This pronounced disparity is further illustrated in Figure D7.

Figure D7: Highest Degree Earned by Parents' Pre-Tax Income



Notes: This figure depicts the highest diploma obtained by individuals aged 22 to 24, by parental income. The parental income used is the sum of the pre-tax income of the father's household and the mother's household, divided by two when there are two different households. Deciles are based on this definition.

Prediction of Lifetime Earnings Based on Educational Attainment. To predict lifetime earnings, we combine the educational attainment of 22-24 year-olds observed in our sample with the first empirical measure of lifetime earnings for France, recently produced by Garbinti et al. (2023).⁴² In their estimation of lifetime earnings, they use a granularity of six distinct educational levels. Lifetime earnings, as defined in the study, represent the average earnings across 31 working years, from age 25 to 55, focusing on the cohort born in 1962.⁴³ Additionally, we included a differential in lifetime earnings between Master's degree holders and elite graduate school graduates, as calculated by ? using self-reported earnings data.

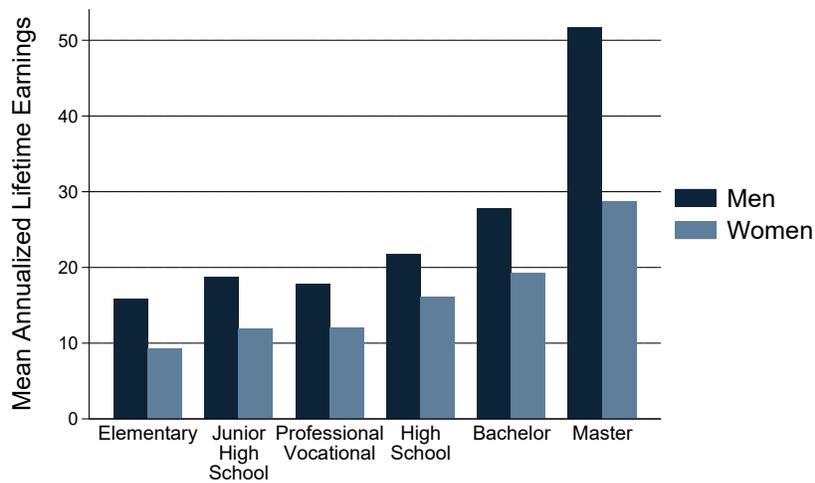
⁴¹For this analysis, we restrict our sample to individuals aged 22 to 24, who are the most advanced in their studies within our sample.

⁴²We would like to thank Bertrand Garbinti and Vladimir Pecheu for sending us custom data on lifetime earnings by gender and educational attainment.

⁴³This older cohort was selected for its complete labor market trajectory, providing a comprehensive view of lifetime earnings, a perspective not yet available for our younger cohort (aged 19-24 in 2014).

Estimated lifetime earnings by gender and education level, which form the basis of our analysis, are depicted in Figure D8.

Figure D8: Lifetime Earnings by Gender and Educational Level



Notes: This figure displays annualized lifetime earnings in thousands of euros 2015, as estimated by [Garbinti et al. \(2023\)](#). It is defined as the mean income earned during the 31 potential working years from ages 25 to 55. This calculation pertains to the latest cohort who completed their careers, born in 1962 and who turned 25 years old in 1987.

Underlying Hypothesis. In our analysis, we correlate the educational attainment of individuals aged 22 or older with their corresponding average lifetime earnings. This approach allows us to explore how differences in educational achievement relate to variations in lifetime incomes, under specific conditions outlined below. First, these estimates are based purely on educational attainment levels, ignoring individual variations in earnings within each attainment level. Secondly, these estimates draw on data from much earlier cohorts who have completed their careers. Thirdly, we do not account for variations in educational returns influenced by parents’ socio-economic backgrounds, due to the lack of substantial evidence for such effects in France ([Courtioux \(2011\)](#)). Lastly, the ambition of this analysis is purely descriptive. We describe variations in predicted lifetime earnings among young adults with certain characteristics, rather than attempting to ascertain causal relationships.

Lifetime Earnings Gap According to Higher Education Participation and Parental Income. Based on the assumptions previously outlined, we find that young adults who have enrolled in higher education are predicted to have lifetime earnings approximately 33% higher than their counterparts who did not pursue higher education. This figure considers both the direct causal effect of higher education and the selection factors involved into higher education attendance. The disparities in enrollment in higher education outlined in our study suggest a discrepancy of 1.27 between predicted lifetime earnings of young adults whose parents are in the bottom 10% income bracket and those whose parents are in the top 10%. Additionally, there is a disparity of 1.19 in predicted lifetime earnings between the lowest 30% and the highest 30%.

Bridging the Gap Between the Bottom and the Middle of Parental Distribution. As highlighted in our main analysis, there is a notable disparity in higher education participation based on parental income. Specifically, participation rates for young adults from the bottom 30% of the parent income distribution are, on average, 15 percentage points lower than those from the middle income bracket (P50-P60). Considering the varying lengths of study correlating with parental income among those enrolled

in higher education, the participation rate for the bottom third would need to increase by an additional 19 percentage points to achieve a level of public spending on higher education equivalent to that for the middle income group.

We descriptively simulate the extent to which increasing higher education participation among the most disadvantaged would affect our lifetime earnings prediction. This simulation operates under the significant assumption that individuals from the most disadvantaged group, upon increased participation, would achieve the same level of educational attainment as current students from the bottom 30% of the income distribution.⁴⁴ Under this assumption, our findings suggest that the predicted lifetime incomes for this disadvantaged group would increase by 5.7%, and by 1.6% for young adults as a whole. Consequently, the earnings gap between the wealthiest 30% and the least well-off 30% would decrease from a factor of 1.19 to 1.12. It is important to note that this estimate does not account for general equilibrium effects and assumes that the financial return to higher education would remain constant even with expanded participation.

⁴⁴Expanding access through a shift in early orientation could make this hypothesis more plausible. [Ichou and Vallet \(2012\)](#) found that students from less privileged backgrounds would have a 21 percentage point higher enrollment rate in academic and technical high school tracks if they had the same inclination to choose these tracks as upper-class students, after controlling for prior academic ability.

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