World Inequality Lab – Working Paper N° 2022/01

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November 2022

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First version: January 2022
This version: November 2022

Abstract

In this paper, we present new stylized facts on inequality of access to higher education by parental income in France. On average, an increment of 10 percentiles in the parental income distribution is associated with a 5.6 percentage-point increase in the proportion of children accessing higher education. This overall degree of inequality is surprisingly close to that observed in the United States. We document how these income-based inequalities combine with those based on parental occupation or education. Finally, we assess the redistributivity of public spending on higher education and present a method to take account of the parents' tax contribution in measuring redistribution.

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. **Availibility 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 access to higher education due to mass schooling actually a sign of equal opportunity? In this paper, we reassert the persistence of marked inequality of access to higher education, observing it from an innovative perspective, namely according to parental income.

Although educational inequalities according to social origin (e.g. parents' education or occupation) have been widely documented 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 offers a continuous measure of the effect of social background, which is more suitable for international comparisons. However, access to 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 design[2] where young adults are surveyed regardless of housing status (parents' home, own apartment, student housing), and the findings are combined with administrative data on parental income. This produces novel descriptive estimates of inequalities in access to 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 access to 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 access to higher education by parental income in France. Following the literature, we use the percentile rank of parental pre-tax household income[3] to study relative access to higher education. We find large differences in access as a

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

[3]We 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).

function of parental income: at the bottom of the income distribution, under 35 percent of individuals aged 18-24 have access to higher education, compared with a bit less than 90 percent at the top. On average, a 10-percentile increase in the parental income rank is associated with a 5.6 percentage-point (p.p.) increase in participation in higher education. Access to master's degree and selective programs is even more unequal. In the bottom 50 percent of the income distribution, under 10 percent of children have access to master's degree programs and under 5 percent to selective programs, compared with about 45 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. However, the functional form is different: in the U.S. the effect of income on access to 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 4.5 p.p. increase in access to higher education in the lower half of the income distribution and 8.9 p.p. in the upper half.

In the second part of the paper, we characterize how these inequalities of income are related to other dimensions of inequality, namely parental occupation and education. We first decompose the higher education access gap using Oaxaca-Blinder decompositions (Oaxaca (1973), Blinder (1973)) and find that parents' educational degrees explain around half of the higher education access gap between top and bottom income deciles. We also observe complementarity between parental occupation or education and parental income in explaining access to higher education. For a given level of income, the more privileged the parents' occupation or the higher the parents' educational degree, the higher the proportion of individuals that access higher education. Conversely, for a given occupation and degree, the higher the percentile rank of parental income, the higher the proportion of children that gain access to higher education and selective programs. In other words, the share of parents' income that is unrelated to their occupation or education still matters in explaining access to higher education, master's degree and selective programs.

In the third section, we combine our estimates of inequality of access with new data on higher education spending to assess the redistributive profile of public and private spending in this area. 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, 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. We also examine how this redistribution through public spending changes when the taxes allocated to fund it are also taken into account. In this literature, taxes are often taken into account using simplifying assumptions. These assumptions may concern the scope of the taxes used, the share of taxes, or

the exact relationship between taxes and income at each point in the distribution. We adopt a new accounting method to better address these issues, estimating the share of taxes to be considered in a representative sample of all taxpayers and proposing an allocation of taxes by income decile based on results from distributed national accounts. This method can be used to assess the redistributive impact of any specific public expenditure, and in our case accounts for the fact that parents are not the only taxpayers who finance higher education and also that not all of their taxes are allocated to this particular expenditure. Public spending on higher education remains regressive even when parents' taxes to fund it are taken into account: the average net benefit remains twice as great in the top third of the parents' income distribution than in the bottom third. In a final specification, we also include public support for young adults and their parents – direct, in the form of family benefits, and indirect, through tax deductions – and intra-family transfers to build an overall measure of inequality in human capital investment, broadly defined, according to parental income.

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, the main variables and our methodology. In Section 5, we present the main results in terms of access to higher education according to parental income. Section 6 reports on the complementarity between the different aspects of inequality, those related to parental income and those related to parents' occupation or educational degree. Section 7 examines the redistribution that occurs through public spending on higher education, related to these inequalities in access to 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 access to 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. The lack of consensus on the degree of social mobility in France vis-à-vis other countries (Dherbécourt, 2020)[4] makes it all the more important to provide comparable evidence on the distribution of access to higher education by parental income with other countries, as higher education is known to be one important mechanisms of social mobility (Blau and Duncan (1967), Chetty et al. (2020)).

[4] According to Lefranc and Trannoy (2005), intergenerational correlation of earnings appears to be weaker in France than in the United States but stronger than in the Nordic countries – a middling level of social mobility. Alesina et al. (2018) find that French social mobility is strong, comparable to Swedish. On the contrary, Corak (2016) and Perez-Arce et al. (2016) show that social mobility is low in France compared with what one would expect given a relatively moderate level of income inequality. Consequently, the French situation does not seem to fit as expected into the "Gatsby curve", which shows a negative correlation between a country's level of social mobility and income inequality. More recently, Kenedi and Sirugue (2021) also find a strong persistence of income over generations in France, similar to that observed in the U.S. by Chetty et al. (2014).

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 access to 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 access has not been assessed. And yet, the magnitude of the effect could depend at least partly on country-specific institutional factors such as the amount of tuition fees, existing public aid or the relationship between students' academic performance and their parents' educational attainment. Second, our results span the entire distribution of parental income and apply to a representative sample of all young adults aged 18-24 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)). Some studies rely on identification strategies based on quasi-random assignment, but their findings are quite specific to a local population (Akee et al., 2010) or else relate to short-term impact at very young ages (Duflo, 2003).

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 access to 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. Our data include details on parental transfers and show substantial differences between students along the parental income distribution that could be a channel explaining part of the effect of parental income on persistence in higher education. 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 disentangle the causal mech-

[5]This 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.

[6]The importance of this transmission has been confirmed in France by recent studies (OECD (2018), 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.

anisms that explain the influence of parental income on educational attainment, the detailed structure of the survey permits a descriptive analysis of the different contributions of various parental background characteristics in explaining access to higher education (e.g. income, education and occupation).

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. (2022)). Table 1 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 US or Europe (Johnson (2006)). 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. It also improves the simplifying assumptions usually made in estimating the contribution of taxes by using the results of the distributive accounts and a new accounting method that can be used to assess the redistributive impact of any specific public expenditure. Lastly, it extends the analysis to all human capital expenditures in a broad sense, with novel data on transfers from parents to their children.

[place Table 1 here]

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,[7] non-selective academic (university) and selective academic, i.e. 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%

[7]Divided in turn into technical programs (*Institut Universitaire de Technologie* (*IUT*)) and vocational programs (*Sections de Technicien Supérieur* (*STS*)).

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*) ,[8] but access to the 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 take the exams. Access to these preparatory courses after high school is already selective.[9]

The elite graduate schools are fundamental in the training of elites in France. Historically, they were developed after the French Revolution to train a political, economic, scientific, military or academic elite, selected by "meritocratic" criteria. In the most recent cohorts, about 6% of a generation graduates from one of these schools (Bonneau et al., 2021), and these selective training programs are very often the premise for dominant positions in politics, business or engineering.

The Financing of Higher Education. Most French higher education institutions are publicly funded, with tuition set very low. 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.[10] The private sector accounted for just 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.

Public Support for Young Adults and Their Parents. In France, public support for students consists mainly of need-based scholarships (*Bourses sur critères sociaux*) and housing benefits (*Aide personnalisée au logement*).[11] Young adults in general are also eligible for housing benefits and other public support.[12] Parents whose child is a dependent for income tax purposes benefit from tax deductions until age 21 or, if a student, age 25. Family benefits go to parents on a means-tested basis, depending on the number of children and their age, until the child turns 21. For more details on these public support programs, see Appendix A.1.1.

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

[9] These students account for just 3 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).

[10] Order 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/).

[11] These programs represent 51% and 47% respectively of all public support received by students.

[12] Unemployment benefits, disability benefits, family benefits if they have children, guaranteed minimum income but with very restrictive conditions up to age 25, integration contract. Due to strict means testing, only 13% of non-student young adults receive housing benefits, for an average of €225 a month.

4 Data and Methodology

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. We then briefly present the methods used in our paper, namely Oaxaca-Blinder decompositions, Gupta decompositions, and a new accounting method to assess the redistributivity of a specific public expenditure, in our case, higher education spending, when considering also the taxes needed to fund it. See Appendix A.1.3 for a more detailed description of the methods.

4.1 The Data

Our primary source is the National Survey of Youth Resources,[13] conducted jointly 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*) in 2014. The survey interviewed a representative sample of young adults aged 18 to 24 and their 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 (specifically including transfers from parents), with the reliability of administrative data on parental income, on a representative sample of the young adult population.[14] Parental income is drawn from administrative tax data for the parents interviewed. Matched parental income is 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.[15] A total of 5,776 young adults and 6,304 parents responded, and in 5,197 cases both the young adult and at least one parent. The survey is weighted to assess nonresponse bias.

The last part of our analysis includes additional data on higher education spending and tax contributions. In the national accounts as well as in previous studies on France, higher education expenditures are usually classed in one of just three categories, regardless of the track or field of study (MESRI-SIES, 2021). Our study draws additional data from a survey of higher

[13] *Enquête Nationale sur les Ressources des Jeunes* 2014, (hereafter referred to as ENRJ).

[14] As Dodin et al. (2021) points out, while administrative data do give very large samples and allow linking parents to children, they suffer the disadvantage of having relatively few variables and generally lack information on other parental background factors, such as education or occupation. Census data, such as those used by Dodin et al. (2021) or Hilger (2015), mitigate some of these drawbacks and have the further advantage of very large samples. However, they are often limited in that they only observe children who still live with their parents; this is a potentially serious source of bias, especially as regards access to higher education, a pivotal moment when a significant proportion of children leave the parental home, these departures being likely to be correlated with parental income.

[15] We do not include property and capital incomes 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.

education institutions, the "Cost Awareness" project,[16] designed to assess the expenditures of different higher education institutions. This survey, conducted between 2016 and 2019 at 65 higher education institutions that enroll approximately one-third of all French students, allows us to break down the costs between the different programs and fields and to determine the cost of higher education net of research costs, which instead are included in the more aggregated data. The data thus allow a more accurate estimate of public spending on higher education for each individual.[17] 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.

Data on taxes paid by all taxpayers come from the Tax and Social Income Surveys,[18] which we use in conjunction with ENRJ data on the tax contribution of parents of young adults. To impute indirect and corporate taxes paid by each decile of parents, we rely on aggregate distributional account estimates (André et al. (2022)), which relaxes the assumption of an overall tax rate proportional to income.

4.2 Sample Definition

The main sample includes the young adult respondents to the survey for whom at least one parent was also interviewed (n=5,197). When the parents are still living together, only one was interviewed and answered questions about their partner.[19] When parents are separated (26% of our sample young adults), both were interviewed in 46% and only one in 54% of the cases. 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 for individuals aged 22 and 23.

4.3 Baseline Characteristics

Table 2 presents some descriptive statistics of our sample of young adults aged 18-24, by quintile of parental pre-tax income. On average, they are 20.9 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 €92,400 in the top quintile, with a mean of €42,400. The parents of students or former students are more affluent on average, with an annual pre-tax income of €51,300. A bit more than 10 percent of all the parents have a bachelor's or master's degree, compared with

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

[17] See Appendix A.1.2.3 for more details on these new higher education cost data and Table A6 for annual public spending per student, broken down by field of study and track.

[18] *Enquêtes Revenus fiscaux et sociaux* 2014, (hereafter referred to as ERFS). This survey on taxpayers is matched with administrative sources on income from the various administrations concerned (DGFiP-Cnaf-Cnav-CCMSA).

[19] Some 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.

about 20 percent of the parents of students or former students. The higher income quintiles tend to have a greater proportion of parents of high socioeconomic 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.[20] About two thirds of the parents are still living together and a quarter are separated. The father is unknown or deceased in 6 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 30 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, which would bias the estimate of inequality in access to 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 2 here]

4.4 Definitions of the Variables

In this section, we briefly define the key variables used to measure access to higher education by parental income. The Appendix A.1.1 provides more details.

Access to Higher Education. We define individuals (aged 18-24 in our sample) as having access to higher education if they are enrolled in higher education in the year of the survey, if they have already obtained a higher education degree, or if they have reached a higher education level without having obtained the corresponding degree. To be considered as accessing higher education, an individual must therefore have been enrolled for at least one year in higher education. Similarly, we define access to 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),[21] our preferred specification is the percentile of parental pre-tax income, defined as the sum of the father's pre-tax

[20] The overlap between these different dimensions of inequality is explored in greater detail in Section 6.

[21] The 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.

household income and the mother's pre-tax household income, divided by two when we have both parents' household income.[22] To further assess the representativeness of our sample, we compare the distribution of pre-tax incomes of parents in our 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 A3). We also observe how our parental income deciles compare with the income deciles of the general population. Our parents are slightly wealthier than households in the general population, as they are further along in their life cycle, but on the whole the two distributions are very similar, especially in terms of standard-of-living (Table A4 and Figure A1).

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 correlation coefficient of the two variables is only 0.67. The gap in access to 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 access rates at the top of the distribution.

Parents' Occupation. For occupations, we rely on the Department of Education's statistical service[23] classification, which classes them in four groups by socioeconomic 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 A1 in the Appendix details the four SES categories and the corresponding occupations.

Parents' Diploma. We have 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.

Place of Residence of Parents. In examining heterogeneity by parental residence, we define three categories: Paris metropolitan area, other urban centers with at least 100,000 inhabitants, and cities or towns with fewer than 100,000 inhabitants. When the parents live in two different cities, we use the larger one.

Financial Transfers Received From Parents. This comprises both direct monetary aid and indirect parental transfers (payment of rent, tuition, food, etc.). These transfers from parents are reported by the young adults in the survey. Since children who are students receive proportionally more from their parents than non-students, we construct a potential financial transfer

[22] In order not to include the income of cohabiting young adults, household income is defined as the sum of the individual income of the parent and that of his/her cohabiting spouse. This household measure of income increases with cohabitation, to ensure that this feature does not generate bias, we present in Appendix B.2.3 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.

[23] *Direction de l'évaluation, de la prospective et de la performance* (DEPP).

variable that estimates what a young adult would have received, if he or she were studying, based on his or her observable characteristics.[24]

4.5 Methods

Oaxaca-Blinder Decompositions. To decompose the higher education access gap by parental income, we rely on the Oaxaca-Blinder decomposition method (Blinder (1973), Oaxaca (1973)). This statistical approach, common in economic literature, breaks the observed gaps down into an "explained" part, deriving from the differences between the average observable characteristics of the two groups (in our case, parental diplomas) and an "unexplained" part not ascribable to these characteristics.[25]

Applied to our context of inequality in access to higher education between children whose parents are at the top of the income distribution (denoted by T) and those whose parents are at the bottom (denoted by B), the method consists first in estimating the effect of parental education[26] on access to higher education for the entire population and for our two subgroups. Then, these different estimations are combined to obtain:

$$\underbrace{\overline{Y}^T - \overline{Y}^B}_{\text{observed gap}} = \underbrace{(\overline{\boldsymbol{X}}^T - \overline{\boldsymbol{X}}^B)\hat{\boldsymbol{\beta}}^*}_{\text{"explained" gap}} + \underbrace{\overline{\boldsymbol{X}}^T(\hat{\boldsymbol{\beta}}^T - \hat{\boldsymbol{\beta}}^*) + \overline{\boldsymbol{X}}^B(\hat{\boldsymbol{\beta}}^* - \hat{\boldsymbol{\beta}}^B)}_{\text{"unexplained" gap}} \quad (1)$$

The first term of the equation, $(\overline{\boldsymbol{X}}^T - \overline{\boldsymbol{X}}^B)\hat{\boldsymbol{\beta}}^*$, measures the portion of the access rate gap between top-income and bottom-income children that is attributable to differences in their average observable characteristics – here, parental diplomas; the second term, $\overline{\boldsymbol{X}}^T(\hat{\boldsymbol{\beta}}^T - \hat{\boldsymbol{\beta}}^*) + \overline{\boldsymbol{X}}^B(\hat{\boldsymbol{\beta}}^* - \hat{\boldsymbol{\beta}}^B)$, measures the portion that cannot be explained by these characteristics.

Gupta Decompositions. We decompose both the higher education access gap and higher education spending 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.[27]

In our setting, we first assess the contribution of prior credentials to the higher education access gap between top and bottom individuals (T and B) by decomposing this gap into a middle school graduation gap, a high school graduation gap, and a residual higher education access gap. Then we decompose the differences in public spending on higher education between individuals in T and B into a part relating to the access gap to higher education, a part relating to differences in duration of studies, and a part relating to differences in annual cost.

[24] 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.

[25] See Appendix A.1.3 for more details on the Oaxaca-Blinder estimation methods.

[26] Introduced in 14 dummies, 7 for the father's diploma and 7 for the mother's.

[27] See Appendix A.1.3 for more details on this method and its application to our particular setting.

Redistributivity of Public Spending for Young Adults. In the last part of the paper, we assess the effect of public higher education expenditure on income redistribution and develop a new accounting method to compute higher education spending net of the tax payments needed to fund it. Our estimation proposes a static closure of expenditures and revenues that draws on recent developments in distributed national accounts.[28] In our case, the way in which taxes are taken into account is complicated by the fact that, unlike the distributed national accounts literature, our study considers only one specific expenditure item: higher education. Our method is consistent with the fact that the parents of young adults are not the only taxpayers financing higher education and also that not all of their taxes, obviously, are allocated to higher education. This method can be used to assess the redistributive profile of any specific public expenditure, taking into account the taxes used to finance it.

We focus on a 6-year period corresponding to expenditures on students between 18 and 24.[29] For this method, we first need to estimate the share of taxes to be taken into account by computing the total amount of unallocated taxes (income tax, VAT, corporate tax and other indirect taxes) out-of-sample in a representative sample of all taxpayers.[30] We then compute the total amount of public spending on higher education in our representative sample of young adults aged 18 to 24, using much more highly detailed per-student cost data than those typically used for higher education in France. A total of 4 percent of all unallocated taxes must go to funding higher education.[31]

Then we calculate the mean net benefit for each parental income decile d as follows:

$$Net\_Benefit_d = \frac{1}{n_d} \sum_{i=1}^{n_d} \left(S_i^{HE} - (0.04 \times Taxes_i \times 6) \right) \tag{2}$$

Here $Net\_Benefit_d$ is the mean net benefit over 6 years for young adults whose parents belong to income decile d, S_i^{HE} denotes 6 years of cumulative higher education spending for young adults i, $Taxes_i$ the sum of unallocated taxes paid annually by parents of young adults i,[32] and n_d the number of young adults whose parents belong to income decile d.

[28] Although this analysis is the most appropriate for our data, other methodologies for analysing tax contributions are possible. A dynamic life-cycle approach, inspired by the contingent repayment loan model, might consider that young people finance their own education, ex post, as taxpayers.

[29] 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. That is, we do not consider the public expenditures associated with individuals who continue their education after age 24.

[30] We use the 2014 Tax and Social Income Surveys (*ERFS*) for this purpose.

[31] This proportion is consistent with official data from national accounts. The 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.

[32] Our database includes administrative data on parents' income tax payments. We impute the share of income devoted to VAT, corporate income tax, and other indirect taxes with results from distributed national accounts (André et al. (2022)). Table A7 shows, for each standard-of-living decile, the proportion of income dedicated to

5 Unequal Access to Higher Education According to Parental Income

This section sets out our main findings on income-related disparities in access to higher education and to different programs. We then compare the correlations between parental income and children's access to higher education in France and the United States.

5.1 Marked Inequalities in Access to Higher Education for Different Income Groups

The proportion of 18-24-year-olds who have access to 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 nearly three times as many – around 90 percent – in the top decile.

[place Figure 1 here]

Access to 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 8th for selective programs, under 10% of individuals access these studies. On the other side of the distribution, around 45 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 18 and 24. Figure C11 in the Appendix shows the access rate to law and medical school. Access to these specific fields is highly uneven. For medical school, the rate for individuals in the top 2 percentiles is around ten times that for individuals in the bottom 80 percentiles: 20 and 2 percent respectively. These results confirm the problem of a dual system of higher education in France, in which access to the most prestigious courses of study remains highly dependent on parental income.

[place Figure 2 here]

In Appendix C.3.1, we present the results on heterogeneity by gender and parents' place of residence. Female students have greater access than males to higher education in general for a given parental income, but less access than their male counterparts to selective programs. At the top income decile the proportion of female students accessing selective programs between 18 and 24 years of age is only slightly higher than half that of male students (Figure C6). This

each of these different taxes, as used for our imputations.

supports the thesis of early construction of gender inequalities, prior to labor market entry, and of strong gender stereotyping that influences educational choices (Carrell et al. (2010), Ceci and Williams (2011), Carlana (2019)). Geographical inequalities are also found. Young people whose parents are in the middle of the income distribution (P30-P70) access higher education at much higher rates when at least one parent lives in the Paris metropolitan area. At the top of the distribution (10th income decile), having a parent living in a large urban center (more than 100,000 inhabitants) significantly increases the chances of accessing selective higher education (Figure C7).

Linearity of the Income Effect. The literature on the impact of parental income on access to higher education has produced no consensus on the linearity of the effect. Chetty et al. (2014) and Chetty et al. (2020) show that, in the United States, access to education increases linearly with parental income. In Norway, Bütikofer et al. (2019) found strong non-linearities at the top and bottom of the income distribution[33] and Løken et al. (2012) find a concave relationship with larger marginal effects of household income on children's educational attainment at the lower end of the distribution.

In purely descriptive terms, we find that the relationship in France is non-linear: the effect of income on access to higher education is much stronger in the upper as in the lower half of the income distribution (Table 3). Having parents in the top as against the middle income quintile increases the likelihood of attending college by 28 percentage points, while having parents in the bottom quintile decreases that likelihood by 18 percentage points. For access to selective studies, the coefficient on income is rarely significant in the lower half of the income distribution – due to very low access rates to these programs – but is higher in the upper half of the distribution and even higher in the top fifth (Table C12 and Table C13). When no controls are included, having parents in the fifth income quintile relative to the third quintile increases the probability of entering a master's program or a selective program by 19 and 18 p.p. respectively, compared with just 6 and 4 p.p. for the fourth income quintile relative to the third.

[place Table 3 here]

The stronger income effect in the upper half of the distribution is somewhat counterintuitive. If the income effect were related to credit constraints, one would expect the impact to be larger at the bottom than at the top, among the more financially constrained households. This suggests that in France a significant part of the income effect does not derive from financial barriers as such but rather from other income-correlated characteristics, such as parental occupation and education. This issue is discussed in more detail in the following section of the paper.

[33] Owing to our small sample size, we cannot replicate the machine learning techniques used by Bütikofer et al. (2019), but we observe the coefficient of different parental income quintiles, relative to the third quintile, by successively adding controls for parental background (Table 3).

Robustness Checks. A first concern about our data is the possibility that individuals at the bottom of the income distribution might enter higher education later than those at the top, which would generate an overestimate of inequality of access. To address this issue, we perform robustness checks, removing individuals still in high school between the ages of 18 and 24 from the sample (Figure B2) and then considering only those aged 21-24 (Figure B3). These sample restrictions make very little difference in the access gap across income deciles – although standard errors are larger due to the smaller sample size.[34]

A second 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). Here the robustness check takes the parents' household taxable income, an administrative variable available in our sample at the household level, for years t and $t-2$ (Table B8). Higher education access 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.[35]

Finally, we 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 B.2.3. Figures B4, and B5 show that overall, the results in terms of access to higher education, selective programs, and master's degree are very close to our main specification. The non-linearity of the effect of parental income on access to higher education is, however, more marked with individual parental income.

Correlates of Higher Education Access Gap. The detailed questions posed in the survey allow us to identify variables correlated with parental income that are plausible mechanisms explaining the higher education access gap. Although they are only descriptive, these correlations could facilitate future research on causal mechanisms.

In the student subpopulation, nine out of ten parents financially support their children, paying expenses and providing in-kind support and/or regular monetary support.[36] But the total amounts received are very uneven. At the bottom of the income distribution, students get an average of €2,400 a year in direct and indirect transfers, compared with almost €10,000 in the top 5 percent of the income distribution (Figure C8(a)). These differences can be related to Fack and Grenet (2015) results showing that in France, the provision of 1,500 euros cash allowances

[34] A 10-p.p. increase in parental income is associated with a 5.6-p.p. increase in the proportion of children accessing higher education in the whole sample – 4.5 p.p. in the lower and 8.9 p.p. in the upper half of the income distribution – compared with a 5.8-p.p. increase for individuals not retained in high school – 4.9 p.p. in the lower and 8.6 p.p. in the upper half. For individuals aged 21-24, a 10-p.p. increase in parental income is associated with a 5.7-p.p. increase in the proportion of children accessing higher education – 4.6 p.p. in the lower half and 9.6 p.p. in the upper half. The differences between these coefficients and those obtained in our main specification are not statistically significant.

[35] See Figure III Panel B of Chetty et al. (2014).

[36] The financial transfers considered are regular direct financial aid, rent payments, weekly savings out of an allowance, expenses for gasoline, car maintenance, insurance, public transport passes, train tickets, telephone, internet, leisure expenses and complementary health insurance. These transfers from parents are reported by the young adults in the survey.

increases college enrollment rates by 5 to 7 percent for infra-marginal students. While direct public support – mainly need-based scholarships and student housing benefits – is somewhat more generous at the bottom of the income distribution, the amounts do not compensate for the significant differences in parental transfers (Figure C8). These substantial differences in parents' ability to finance their children's education certainly help explain why access to higher education can be much more difficult at the bottom of the income distribution, as students must find their own means of funding their education – either working while studying[37] or obtaining a loan (the latter, however, is very uncommon in France).[38] Table 3 shows, however, that the coefficient of the correlation between the percentile rank of parental income and the probability of accessing higher education is only marginally affected by taking account of potential parental transfers.[39] This suggests that credit constraints are less important in explaining the higher education access gap than other factors correlated with parental income, which we explore further in Section 6.

Educational aspirations also differ significantly along the parental income distribution. At the top, 18-19-year-olds[40] plan to study much longer than at the bottom (Figure C9): almost 80 percent of those in the top income decile want a graduate degree (master's or Ph.D.), compared with about 35 percent in the bottom quintile. These disparities according to parental income depend strongly, but not entirely, on parents' education: parental degree explains about three-quarters of the differential in educational aspirations across top and bottom income deciles (see Oaxaca-Blinder decompositions[41] in Table 4, column (4)).

Inequality in access to higher education is also related to differences in ability, which are correlated with parental income. Our data do not include measures of academic aptitude or performance but do provide information on previous degrees earned. Accordingly, we can quantify the portion of the higher education access gap due to middle school graduation gap and high school graduation gap.[42] We use Das Gupta's rate decomposition method (Das Gupta,

[37]In 2013, 46% of French students had jobs – defined as paid activity unrelated to studies, carried out at least half-time and more than 6 months per year – during the academic year, and for 13% this was highly detrimental to their studies (OVE, 2014). There is empirical evidence (Beffy et al., 2013) that regular part-time work has a significant adverse effect on the student's chances of graduating.

[38]In 2013, on average, less than 1% of French students' overall resources came from student loans (OVE, 2014).

[39]This variable is what a young adult would have received if studying, based on what students with similar characteristics get from their parents. See Appendix A.1.1 for more details on its construction.

[40]We restrict the sample to the youngest in order to avoid aspirations being influenced by completed years of schooling.

[41]See Section 4.5 and Appendix A.1.3 for more details on these decompositions methods and Section 6.2 for Oaxaca decompositions of the gap in access to higher education, master's degrees and selective programs.

[42]The gap in access to higher education is 55 p.p. between the richest 10 percent and the poorest 10 percent aged 20 or older – 90% vs. 35% –, but it narrows to 47 p.p among individuals with a middle school certificate and 24 p.p. for those with a high school certificate. In this analysis, we exclude 18- and 19-year-olds to avoid underestimating access to the high school graduation certificate among high school repeaters. The high school graduation gap in France can be compared to the situation of Germany, as observed Dodin et al. (2021) with census data. The authors find that a 10-percentile increase in parental income is associated with a 5.2-p.p. increase in the share of A-levels recipients, compared to a 4.9-p.p. increase in the share of individuals receiving the high school diploma in France, but with a 5.8-p.p. increase for just the academic high school diploma, which is more comparable to the German high school diploma (*Abitur*) in terms of the overall proportion of individuals receiving it (40%). Indeed, 80% of a cohort now earn a high school diploma (*Baccalauréat*) in France, but only 40% earn an academic high school

1991) to quantify the contribution of previous credentials to the higher education access gap between top and bottom income deciles (Table C11). The middle school certification gap accounts for 21 percent of the total higher education access gap, and the high school certification gap among middle school graduates more than two times that much, or 50 percent. These two steps do not fully account for the gap in access to higher education, 29 percent of which remains unexplained by previous credentials. These results confirm that the high school diploma remains a necessary, if not sufficient, condition for access to higher education. The contribution of the high school diploma to access to selective programs and masters' degrees is not negligible either (between a fifth and a quarter), but the bulk of the differential in access to these programs seems to surface subsequent to access to higher education: the residual contribution of access disparities among those who have entered higher education is about 50 to 60 percent.

5.2 Comparison With the United States

Very few works have studied access to 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 access between the years individuals turn 19 and when they turn 22, using extensive administrative data. In order to construct a sample as similar to these authors' as possible and to avoid the bias associated with individuals still in high school, we consider individuals aged 21-24 currently enrolled in or having graduated from higher education.[43]

Surprisingly, given the differences in institutional contexts, the inequality appears to be almost as pronounced in France as in the United States (Figure 3). 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 5.6 p.p. in France. We cannot reject that the coefficient in France is similar to the coefficient in the US.[44] 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. However, the functional form of the relationship differs. It is linear in the U.S. but much higher in the upper as in the lower half of the distribution in France, where an increase of one decile in parental income is associated with an increase of 4.5 p.p in the proportion of young people entering higher education in the lower half of the income distribution and 8.9 p.p. in the upper half. Although access rates are quite similar at the two extremes of the income distribution, these non-linearities imply that the access rate to higher education is lower in the middle of the income distribution in France than in the US.

[place Figure 3 here]

diploma.

[43]These individuals are most likely to have entered higher education between the ages of 19 and 22. We exclude the youngest from our sample in order to limit the minor bias stemming from the fact that some are still in high school.

[44]The 95% confidence interval for the coefficient of parent's income percentile rank on access to higher education in France is [5.2 ; 6.1].

The quite similar magnitude of the income effect in these two countries may seem surprising at first. One would expect the linkage between parental income and access to higher education to be stronger in the United States for at least three reasons. 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 severe in the United States, which means that there is a greater income disparity between the top and bottom deciles than in France.[45] Third, the return to higher education is greater in the United States – about 14% as against 10% in France (Psacharopoulos and Patrinos, 2018). Given the strong correlation between parents' and children's education, when considering the overall impact of parental income without controlling for parental education, one would expect the country with the highest return to education to have a stronger correlation between parents' income and children's educational attainment.

However, there are several reasons for this greater than expected inequality in the French context. First, the French system is characterized by a strong effect of social origin on academic performance even before higher education.[46] Moreover, the absence of a unified high school system entails earlier orientation, which tends to track students of lower socioeconomic status into less valued vocational schools, some of which make access to higher education more difficult. Second, some programs in the U.S. offer larger and more numerous scholarships than in France, in which the cost of student life is only partially covered by scholarships (Fack and Grenet, 2015). Third, in addition to the cost of education and student life, the opportunity cost of studying is likely to be high in both countries, and may explain why some of the inequalities remain regardless of the amount of university tuition.

This result extends the scope of Landersø and Heckman (2017)'s finding of a similar influence of family background on educational outcomes between the U.S. and Denmark, despite the fact that the latter country offers free university education and has significantly higher social mobility. This proximity between the French and American cases also confirms the French singularity on the "Great Gatsby" curve, namely the paradox of less social mobility than might be expected given a relatively moderate level of income inequality. Further comparisons between countries would be useful to better understand the causes of similar educational inequalities in countries with different institutions.

In this section we have set out novel estimates of inequality in access to 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. The next section ex-

[45] Table A5 compares the distribution of parental income in France and the United States. In 2012 dollars, the standard deviation of parental household income is $353,430 in the U.S. and $45,640 in France. In 2014, the shares of the top income decile were 46% and 33% respectively (https://wid.world/data/).

[46] According to the 2015 PISA survey, 20 percent of the variation in science performance is explained by socioeconomic status in France, as against only 11 percent in the United States and an OECD average of 13 percent (OECD, 2018).

amines the interactions between parental income, parental education, and parental occupation in explaining inequality in access to higher education.

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

Inequality in access to higher education is usually studied in terms of social background (parents' educational degree or occupation) and only rarely from the more strictly economic standpoint. In this section, we thus examine the complementarity between inequalities in access to higher education related to parental income, educational degree, and occupation. Compared with administrative data, surveys usually offer much more detailed parental background variables, particularly concerning parental education and occupation. The question is whether these different dimensions of inequality overlap or combine to explain the overall higher education access gap.[47] We first present the Oaxaca-Blinder decompositions, which allow us to quantify the share of higher education access gap that can be ascribed to parents' educational degree and the share not explained by this characteristic. We then observe how the coefficient on income changes with the introduction of various controls for parental background. Although they are only descriptive, these estimates nevertheless show that the impact of income on access to higher education cannot be entirely attributed to educational and occupational factors. In other words, there is complementarity among the various dimensions of inequality.

6.1 Correlation of Parental Background Variables

Income may provide no information beyond that furnished by parental occupation or education. We first verify that this is not the case by computing correlations between pre-tax income and parental occupation and educational degree. The results are presented in Table A2 in the Appendix. The pre-tax income variables are weakly correlated with occupation and degree, especially as regards fathers (for whom the correlation coefficients are 0.38 and 0.41 respectively as against 0.51 and 0.47 for mothers). This means that the results from a logit model using these other social origin variables as predictors of pre-tax income deciles are poor indeed: only about 28% of the observations are classified in the correct decile when the covariate is occupation (39 categories), 22% when it is educational degree (6 categories), and 28% when both are used simultaneously. When the prediction is for mothers and fathers separately, the results are very similar.

[47] Parental occupations are grouped into four categories – high SES, upper-middle SES, lower-middle SES and low SES (see Section 3, Appendix A.1.1 and Table A1 for more details on the construction of this variable). We measure parental education with six categories – primary school or less, middle school diploma, high school diploma, two-year degree, Bachelor's or master's degree, and M.D. or Ph.D.

6.2 Oaxaca-Blinder Decompositions

We first decompose the income effect on access to higher education into a part related to parental education and a part not explained by this factor, applying Oaxaca-Blinder decompositions.

Applied to inequality in access to higher education, master's degree and selective programs, these decompositions show that while parental education explains some of the gap according to parental income, about half of the observed gap is due to other factors. The detailed results of these decompositions are reported in Table 4. Among individuals whose parents are in the bottom decile of the income distribution, 34 percent had access to higher education between the ages of 18 and 24, compared to 89 percent of those whose parents are in the top decile. Of these 54 percentage points of difference in access, 26 p.p. (48% of the gross difference) are "explained" by parental degrees.[48] The residual difference of 28 p.p. (52% of the gross difference) cannot be explained by this factor. The application of this decomposition method to inequalities in access to master's degrees and selective programs yields conclusions in line with those for higher education in general: the differences in educational background explain about 35 percent of the unequal probability of accessing a master's degree between individuals from low- and high-income families and about half of the difference in access to selective programs. The decompositions for other income groups – top 20 and bottom 20 percentiles, top 50 and bottom 50 – produce quite similar results, with parental degree still explaining between 50 percent and 65 percent of the gap to higher education generally and to master's degrees and selective programs.

[place Table 4 here]

The Oaxaca-Blinder decompositions confirm that the differences in access to higher education according to parental income are only partially related to differences in parental education: about half of the access gap cannot be attributed to this characteristic.

6.3 Complementarity of Several Dimensions of Inequalities

We further explore the complementarity of the different dimensions of inequality by observing the evolution of the regression coefficient of parental income on access to higher education, master's degree and selective programs by successively adding various parental background controls.

Table 5 presents the coefficients of a regression of access to higher education on the percentile rank of parents' income, father's and mother's degree (6 categories for each parent), father's and mother's occupation (4 categories for each parent), potential financial transfers from

[48] Father's degree accounts for 12 p.p., mother's degree for 14 p.p.

parents,[49] marital status of parents and size of urban center. These regressions show complementarity between the inequalities deriving 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 young people accessing 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 35 percent rate of access to higher education between the ages of 18 and 24 when their parents are in the bottom income quintile and 72 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 accessing higher education. With respect to parental occupation, for a given income level, the more selective the program, the higher the occupational group that is determinant in explaining access to it: the largest gap in access to overall higher education is between individuals whose father is from "lower-middle SES" and "low SES," while for selective programs it is between "high SES" and "upper-middle SES" individuals (Table 5 and Table C15). With respect to parental education, having parents who have had higher education or obtained a certain degree significantly increases the probability of accessing higher education or obtaining that specific degree: a form of educational reproduction appears to be at work here. For instance, 84 percent of individuals whose mother has a higher educational degree (14 years of education or more) have access to higher education between the ages of 18 and 24, as against 45 percent of those whose mother does not. For all levels of parental education except the Ph.D., having a mother with rather than without the degree has a significantly greater effect on access to higher education than the same degree for the father. This result, which suggests strong transmission of education from mother to child, is consistent with some previous findings in the literature (Currie and Moretti (2003), Sacerdote (2007), Chevalier et al. (2013), Lundborg et al. (2021)).

The coefficient on the percentile rank of parental income is 0.56 without controls. It is sharply reduced when controls are added – reduced by half by controls for parental occupation, by a factor of almost three by controls for parental education, and by a factor of four by simultaneous controls for occupation and degree – but it remains significant at the 1% level in all specifications. When parental degree and occupation are included as controls, a 10-p.p. increase in parental income is still associated with a 1.3-p.p. increase in access to higher education.[50] We cannot give a specific interpretation of this residual effect of income, because it might be related to unobservable parental characteristics correlated with income. However, this residual effect of parental income demonstrates a complementarity between the inequalities stemming from occupation and education and the more strictly economic dimension of inequality, i.e. parental income. In other words, the share of parents' income that is unrelated

[49] That is, what a young adult would have received from their parents if they were studying, based on observable characteristics.

[50] Including all the controls, the coefficient of income on access to higher education is about one sixth of the original coefficient (0.09 vs. 0.56). This provides an upper bound on the causal effect of parental income. For the U.S., Hilger (2016) also finds that about 10-15% of the correlation is causal.

to occupation or education still matters in explaining access to higher education, master's degree and selective programs.

[place Table 5 here]

Overall, the results concerning access to master's degree and selective programs (tables C14 and C15) are very similar, indicating complementarity between "economic," "social," and "educational" factors that is very comparable to that relating to access to higher education in general.

We have examined in this section how the differences in access to higher education according to parental income, observed in the first section, may compound the inequalities due to other factors, such as parental education and occupation. The existence of a residual effect of income demonstrates a complementarity between the dimensions of inequality usually considered – those relating to parents' occupation and education – and the more strictly economic dimension of parental income. In the final section of the paper, we show how inequality in access to higher education creates a regressive pattern of public higher education spending, even after accounting for the differences in households' taxes that go to fund it.

7 Unequal Public Expenditure for Young Adults

In this last section, we further analyse the implications of the inequality of access to higher education according to parental income by assessing the redistributive profile of higher education expenditures and then of all expenditures dedicated to young adults in France.

Table 1 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 also shows that the results depend heavily on methodological choices. When taxes are not taken into account, the authors generally find that higher education spending is regressive. 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.

After a brief presentation of the data, we present the distribution of public and private spending on higher education. We take into account the parental tax contributions needed to finance public higher education in a specification measuring the redistribution occurring through these expenditures. We then extend the redistribution analysis to all public spending on young adults and their parents – including social and family benefits as well as tax deductions – and finally to all public and private spending, including all parental financial transfers.

7.1 Public and Private Spending on Higher Education

In the literature on the redistributivity of education spending, higher education spending is generally considered in just one (Albouy et al., 2002) or at most three categories (Allègre et al., 2012). We rely on more comprehensive data, breaking student costs down according to field and program. Table A6 shows the considerable per-student cost disparities in this disaggregation. To study inequality throughout the higher education trajectory, we restrict the sample to individuals aged 22-24 and length of study for 22- and 23-year-olds is extended by parental income decile based on the continuation rates observed in the sample.[51]

We first observe the distribution of public higher education spending among all individuals, regardless of parents' income. About 40 percent – those who never enter higher education – receive zero spending; only 10 percent receive more than €30,000 worth of investment in higher education during their studies between the ages of 18 and 24 (Figure C14). The top 1 percent receive some €71,000 over 6 years of study. This is 2.4 times as much as individuals at the 90th percentile and 9 times as much as those at the median (€7,800). Gender differences in access to selective programs (Figure C6 (b)) translate mechanically into differences in public investment for male and female students (Figure C16). Spending on male students is significantly greater than spending on female students from the 2nd decile of the spending distribution, computed by gender. At the top of the distribution this disparity is even more pronounced.

7.2 Inequality in Public Spending on Higher Education by Parental Income

Inequalities in access to higher education by parental income lead to differences in public spending on higher education (Figure 4). Those in the bottom 50 percent receive €8,000 to €11,000 worth of investment in higher education between the ages of 18 and 24, compared with €32,000 – of which €21,000 in public funds – for those in the top 10 percent (Figure 4a). 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.

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 C15). 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.

[51] Appendix A.1.2.3 provide more detail on these new cost data and the method used to calculate the total cost of educational trajectories from the information available.

[place Figure 4 here]

Decomposition of Inequalities in Spending Between the Extensive and the Intensive Margins. These inequalities in public spending appear to derive primarily from differences in access: inequality is much less pronounced when only higher education students are considered (Figure 4b). 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 €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 – access to higher education – and an intensive margin related to the duration of studies and differences in annual cost.[52] Inequalities in access account for about 67 percent of the disparity in spending between the top and bottom income deciles (Table 6 and Figure C12). 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 C13). 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 A6).

[place Table 6 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 access disparities to inequality in public spending would then be overestimated.

We simulate 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 (Table 6). Positing that within a particular field of study and track, the most affluent consistently benefit from the most expensive programs (column 2), and if we also account for the

[52] See Section 4.5 and Appendix A.1.3 for more details on this decomposition method.

most expensive elite graduate schools (column 3),[53] the contribution of the access 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.

7.3 Net Benefit for Parents Taking Into Account Taxes To Fund Higher Education

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. We consider a static framework in which young adults' higher education is funded by a contribution from all taxpayers, including their parents. 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. Overall, 4% of all taxes over six years go for public expenditure on higher education. The net benefit to parents of students or former students is therefore calculated as the public funding of their young adult's higher education minus 4% of their unallocated taxes paid over six years.[54]

The average net benefit to parents is €9,600 over six years (Table 7). Parents of young adults benefit from horizontal solidarity, in that their children's higher education is largely financed – 76 percent according to our data – by the taxes of taxpayers without young adults. This average, however, conceals heterogeneity between the households whose young adults have access to higher education and those who do not: for the former the average net benefit is almost twice as great (€18,100), while for the latter it is negative (-€1,900).

Taking into account the taxes needed to fund higher education does not change the fact that this spending is regressive, but it does change the situation at the very top of the income distribution. The net benefit is still twice as high in the top third of the distribution as in the bottom third (€13,900 versus €6,900). It increases with parental income in the upper half of the distribution (from P50 to P90), up to around €17,000 (Table 7 and Figure 5). However, owing to higher taxation – and despite more frequent access to higher education – the net benefit for the top decile is around two third that of the ninth decile (€11,600 as against €17,000). This is nevertheless more than net benefit accruing to the bottom decile (€6,800).

[place Table 7 here]

[53] See Appendix B.2.4 for more details on the assumptions made in these counterfactual scenarios associating the wealthiest individuals with the best-endowed programs.

[54] See Section 4.5 and Appendix A.1.3 for more details.

These results should not be seen as legitimizing or minimizing the inequalities in access to higher education, because the payment of a tax – unlike, say, social security contributions – is not expected to provide privileged access to the public services that it funds. The large disparities in permanent income due to returns to higher education are much larger than the differences in funding for public higher education (Allègre et al., 2012). The main challenge, therefore, is not so much to reform the funding of higher education[55] but to ensure more equal access to it over the parental income distribution.

7.4 Distribution of Public and Private Spending for Young Adults by Parental Income

This final section extends the analysis of the redistributivity of higher education spending to all public spending on young adults and their parents. To conclude, we add parental transfers to young adults, to obtain a complete picture of inequality in human capital investment, in the broadest sense.[56]

Total Public Spending Benefiting Young Adults and Their Parents.[57] The means-testing of scholarships produces a progressive distribution of public support (Figures C17a and C17b in the Appendix), but this is offset by the regressive tax deductions. The sum of tax deductions and public support is thus marginally lower around the median parental income, creating a slightly U-shaped pattern, and is only somewhat progressive among students. This U-shaped curve of young adult public supports as a function of parental income may be a mechanism for explaining why access to higher education is lower in France than in the U.S. in the middle of the income distribution, while it is very similar at the top and bottom of the distribution.

Given regressive public spending on higher education and roughly constant public support across the income distribution, total public spending on young adults and their parents remains regressive. The top 10 percent of the income distribution receive 60% more in total public spending than those in the bottom 10 percent (Table 7 and Figure 5).

Total Inequality in Public and Private Spending on Young Adults. The combination of these regressive public expenditures with even more unequal private expenditures, which our data allow us to quantify here in a novel way, results in considerable inequality of opportunity. Cumulated over a six-year period, private spending on young adults is sharply unequal: while

[55] Such as by imposing much higher tuition proportionate to parental income, which might distort higher education enrollment decisions in the middle of the income distribution. It could also accentuate the dualism of French higher education, counterposing well-endowed institutions that welcome highly privileged students with much less well-endowed institutions for the more disadvantaged.

[56] Table C16 shows the distribution of parents' annual financial transfers and annual public spending for young adults and their parents, regardless of parental income. There are marked disparities in parents' transfers, public support and tax deductions for parents. The top 5 percent of recipients of financial transfers from parents get nearly 10 times the median. The top 5 percent of parents in terms of tax deductions receive nearly 30 times the median tax deduction.

[57] See Section 3 and Appendix A.1.1 for a description of the public support and tax deductions benefiting young adults and their parents and Table C16 for the distribution of public support, tax deductions and family benefits among the population.

those whose parents are among the poorest 10 percent receive about €7,000 in parental transfers, the richest 10 percent receive six times as much, or €42,000 (Table 7). Thus, total public and private spending is 2.6 times more for young adults whose parents are in the top decile than for those whose parents are in bottom decile (darkest line in Figure 5). Although only part of this expenditure can be defined as educational investment strictly speaking, all of it certainly contributes to the youth's empowerment and well-being. It can affect young people's educational and job market choices, as well as their level of human capital in the broader sense.

[place Figure 5 here]

8 Conclusion

Using a detailed survey of young adults together with administrative data on their parents' income, this study examines inequality of access to higher education and selective programs according to parental income. On average, a 10-percentile increase within the parental income distribution is associated with a 5.6-percentage-point increase in the proportion of children accessing higher education. The level of access inequality according to parental income in France is very similar to that in the United States despite much lower tuition fees in France. This is a new result that we interpret by the importance of intergenerational transmission of educational outcomes in France, the limited amount of means-based scholarships, and the high opportunity cost of studying. Economic inequalities created by income combine but do not fully overlap with those created by social origins (occupational status or educational degree) meaning that the share of parents' income that is unrelated to their occupation or education still matters in explaining access to higher education, master's degree and selective programs. Spending on higher education is regressive, even after accounting for the taxes paid by parents to fund it.

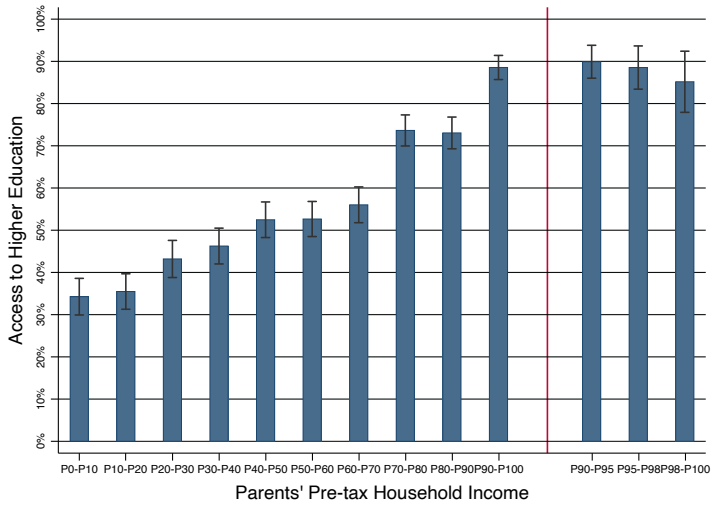
Our analysis documents, using novel data, the existence of marked differences in parental transfers among students, which suggests the need for more generous need-based scholarships to better cover the costs associated with higher education, particularly in the middle of the income distribution, where individuals benefit the least from the combination of public support and tax deductions. Moreover, the gap in access to previous credentials conditioning access to higher education calls for earlier and stronger skills support for low-income students. The pronounced differences in access to selective programs, even among those who have passed the high school graduation exam, point to the need to provide disadvantaged students with targeted, transparent, and clear information about different higher education programs.

As income inequality and inequality related to parental socioeconomic status do not fully overlap, our results further suggest that educational data should be enriched with reliable data on parental income. This would also allow for better international comparison of inequality in

access to higher education, in different institutional contexts. This is all the more necessary if, as our results suggest, similar levels of inequality can occur through different channels depending on the country. Detailed data on spending differentials in higher education, especially for selective programs, would contribute to the public debate by allowing more systematic estimation of the redistribution occurring through higher education public spending.

Figures

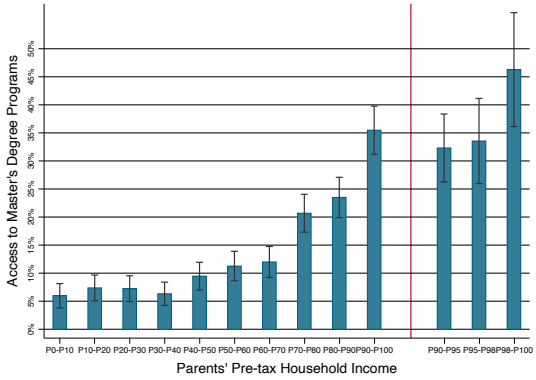
Figure 1: Proportion of Individuals Accessing Higher Education, by Parents' Pre-Tax Income



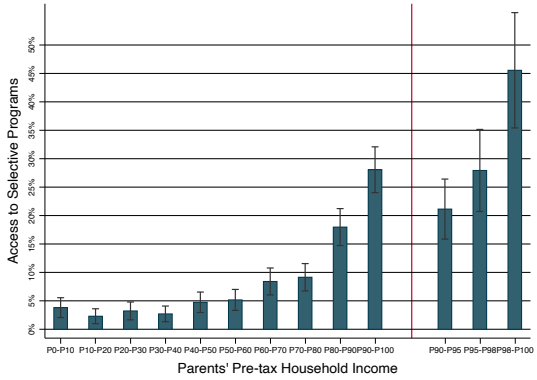
Notes: This figure displays the proportion of individuals aged 18-24 who are currently enrolled, have had access to higher education without necessarily obtaining a degree, or already hold a higher education degree, by parental income. The parental income used is the sum of the pre-tax income of the 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 Accessing Master's Degree or Selective Programs, by Parents' Pre-Tax Income

(a) Master or Higher Degree

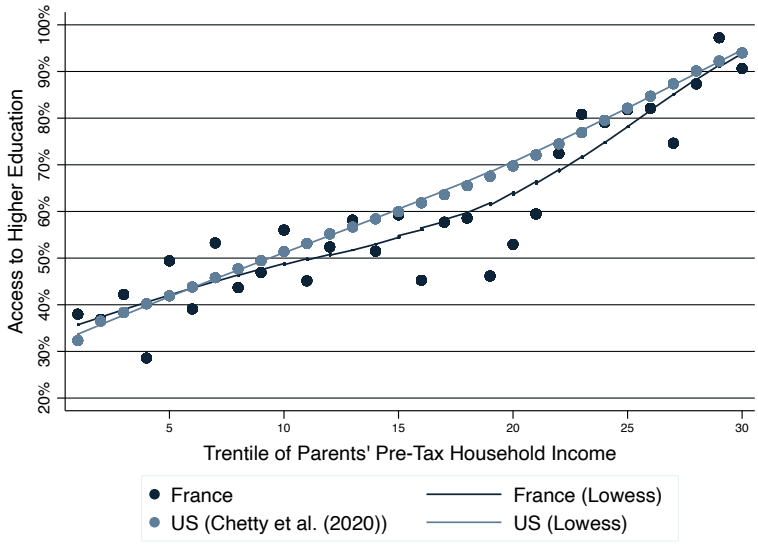


(b) Selective Programs



Notes: These figures show the proportion of individuals entering master's degree programs or selective programs between the ages of 18 and 24, according to parental income. Panel (a) displays the proportion of individuals aged 18-24 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 18-24 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.

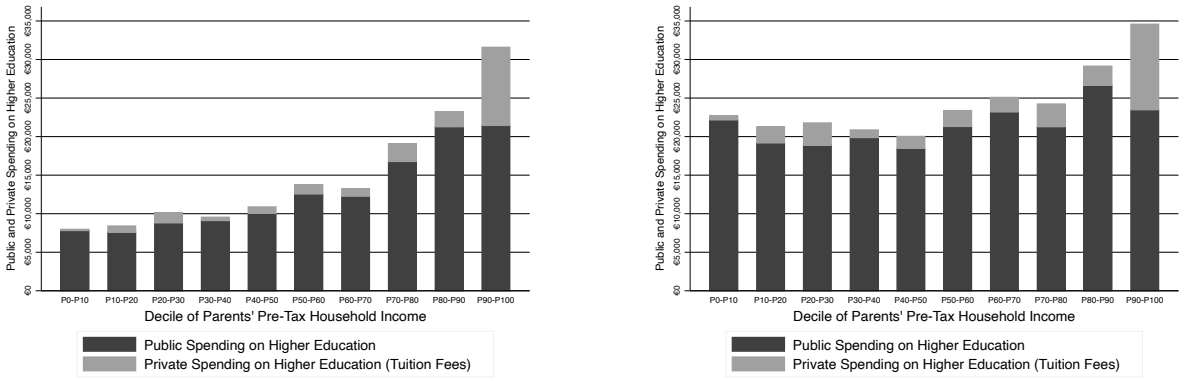
Figure 3: Access to Higher Education in France and the United States, by Parents' Pre-Tax Income



Notes: This figure shows the proportion of individuals accessing higher education between the ages of 18 and 21 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 France, we consider individuals aged 21-24 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 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.[58]

[58] A 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 access by parental income in France and the United States even more similar.

Figure 4: Inequalities in Public and Private Spending on Higher Education

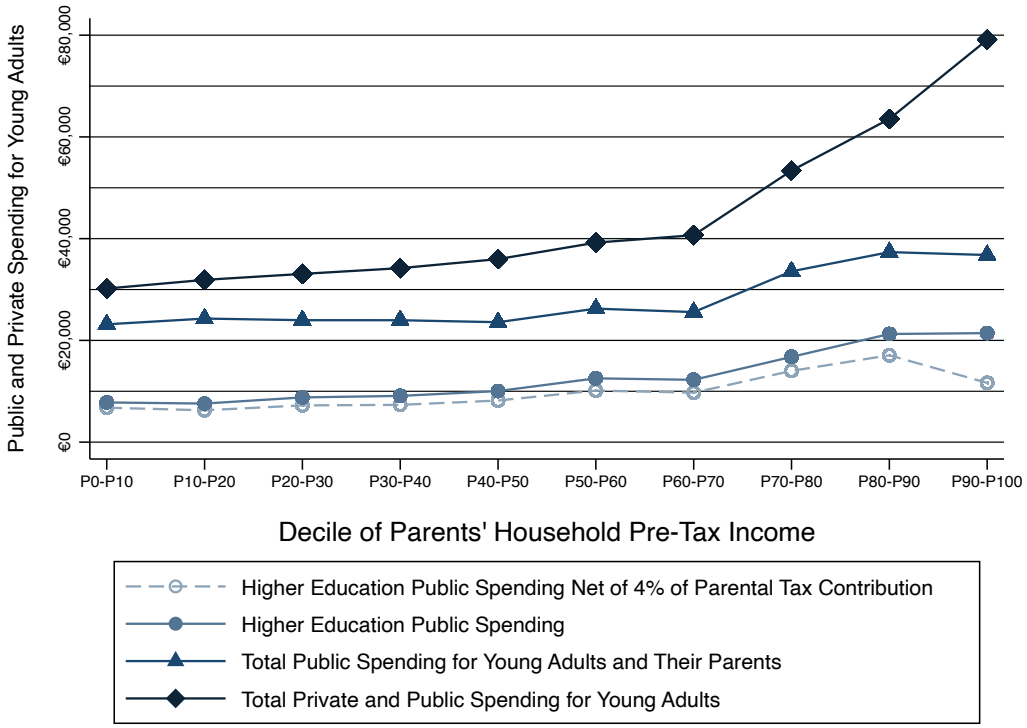


(a) All Individuals (22-24)

(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 from age 18 to 24, as a function of parental income. Panel (b) shows total public and private investment in higher education for students or former students from age 18 to 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.

Figure 5: Total Public and Private Expenditure Received by Young Adults Over 6-Year Period, by Parents' Pre-Tax Income



Notes: This figure plots the total public and private spending on young adults and public spending dedicated to their parents over six years. 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. The solid line with dots shows public expenditure for higher education received by young adults over a 6-year period (age 18-24). This corresponds to the dark grey bars in Figure 4. 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. The line with triangles shows the total public expenditure, i.e. public spending on higher education, public support for young adults and their parents, and tax deductions for parents (see Figure C17 in the Appendix for more details on the distribution of public support for young adults and their parents). The line with diamond is total public spending and total private spending received by young adults over the period. Private spending consists of financial transfers from parents and extended over a 6-year period. 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: 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 & 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 (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
Antoninis & Tsakloglou (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 (2002)	European Union	Standard of living	Yes	No	Progressive
Barbaro (2003)	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.

Table 2: Baseline Characteristics

Quintile of income	P0-P20	P20-P40	P40-P60	P60-P80	P80-P100	Total	Students or former students
	n= 966	n= 1,026	n= 1,100	n= 1,085	n= 1,020	n= 5,197	n= 2,963
Age of young adults	21.0 (2.0)	21.0 (2.0)	20.9 (2.0)	20.9 (2.0)	20.7 (2.0)	20.9 (2.0)	21.0 (2.0)
Age of fathers	55.1 (6.9)	53.8 (6.9)	52.9 (5.6)	52.6 (5.7)	53.1 (6.0)	53.4 (6.3)	53.6 (6.0)
Age of mothers	50.0 (6.3)	49.5 (5.7)	49.4 (5.2)	49.8 (4.7)	50.5 (4.5)	49.8 (5.4)	50.5 (5.1)
Female	0.53	0.47	0.49	0.50	0.47	0.49	0.53
Pre-tax household income of parents	9,430 (6,270)	24,110 (3,310)	36,150 (3,520)	49,800 (4,800)	92,390 (58,200)	42,372 (38,693)	51,266 (45,291)
Father's occupation							
Low SES	0.33	0.40	0.40	0.27	0.07	0.29	0.20
Lower-middle SES	0.35	0.28	0.24	0.21	0.14	0.24	0.24
Upper-middle SES	0.05	0.11	0.20	0.29	0.20	0.17	0.20
High SES	0.03	0.04	0.07	0.19	0.56	0.18	0.27
Mothers's occupation							
Low SES	0.28	0.21	0.18	0.12	0.04	0.17	0.10
Lower-middle SES	0.57	0.60	0.57	0.47	0.27	0.50	0.44
Upper-middle SES	0.05	0.11	0.13	0.26	0.30	0.17	0.23
High SES	0.02	0.04	0.07	0.12	0.37	0.12	0.19
Father's dipoma							
Primary School or less	0.21	0.22	0.19	0.08	0.02	0.15	0.09
Middle School degree	0.03	0.04	0.04	0.06	0.04	0.04	0.04
High-School degree	0.23	0.44	0.51	0.53	0.29	0.40	0.38
Two-year degree	0.04	0.04	0.07	0.13	0.18	0.09	0.13
Bachelor or Master degree	0.03	0.02	0.04	0.12	0.34	0.11	0.17
M.D. or Ph.D.	0.00	0.01	0.01	0.01	0.09	0.02	0.04
Mother's dipoma							
Primary School or less	0.42	0.29	0.19	0.09	0.03	0.20	0.11
Middle School degree	0.08	0.10	0.08	0.07	0.03	0.07	0.06
High-School degree	0.34	0.44	0.51	0.49	0.30	0.41	0.38
Two-year degree	0.04	0.08	0.09	0.19	0.24	0.13	0.19
Bachelor or Master degree	0.04	0.05	0.09	0.12	0.32	0.12	0.19
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	0.56	0.71	0.81	0.87	0.66	0.71
Parents are separated	0.44	0.34	0.23	0.16	0.11	0.26	0.23
Father unknown or deceased	0.16	0.08	0.04	0.01	0.01	0.06	0.05
Mother unknown or deceased	0.03	0.02	0.02	0.01	0.01	0.02	0.01
Parents unknown or deceased	0.01	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	0.29	0.17	0.20
More than 100,000 inhabitants	0.34	0.29	0.28	0.27	0.30	0.30	0.30
Less than 100,000 inhabitants	0.51	0.57	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 deciles because in creating the deciles 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 3: Access to Higher Education, by Parents' Pre-Tax Income Quintile

Access to higher education	(1)	(2)	(3)	(4)	(5)
Baseline proba. of access	0.57	0.57	0.57	0.57	0.57
Parents' income quintile					
Parents' income quintile=1	-0.18***	-0.17***	-0.15***	-0.045*	-0.091***
Parents' income quintile=2	-0.078***	-0.072***	-0.070***	-0.037*	-0.048**
Parents' income quintile=3	0	0	0	0	0
Parents' income quintile=4	0.12***	0.12***	0.056***	0.067***	0.041*
Parents' income quintile=5	0.28***	0.27***	0.072***	0.099***	0.016
Control variables included					
Log of potential financial transfers		X			X
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	5,197	5,197	4,801	4,094	4,035

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

Notes: This table presents the estimates of the effect of parental income on access to higher education (1), successively adding controls for potential financial transfers (2), parental occupation (3), parental education (4), and all these controls simultaneously with family status and urban center size (5). 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 access 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 A1), 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 4: Oaxaca-Blinder Decompositions

	Higher education		Master's degrees		Selective programs		Aspiration higher than master degree	
Access rate of top decile (%)	88.5		35.5		28.1		77.4	
Access rate of bottom decile (%)	34.3		6.0		3.8		33.7	
Gross difference	54.3	100.0%	29.5	100.0%	24.3	100.0%	43.7	100.0%
"Explained" part (%)	26.1	48.1%	10.3	34.9%	11.8	48.6%	32.6	74.6%
Degree (father)	12.0	22.1%	8.1	27.5%	8.4	34.6%	16.5	37.8%
Degree (mother)	14.1	26.0%	2.2	7.5%	3.5	14.4%	16.2	37.1%
"Unexplained" part (%)	28.2	51.9%	19.2	65.1%	12.4	51.0%	11.1	25.4%
Access rate of top quintile (%)	80.8		29.5		23.0		67.8	
Access rate of bottom quintile (%)	34.9		6.7		3.0		33.6	
Gross difference	45.9	100.0%	22.8	100.0%	20.0	100.0%	34.2	100.0%
"Explained" part (%)	28.5	62.1%	12.9	56.6%	10.4	52.0%	21.9	64.0%
Degree (father)	12.6	27.5%	6.1	26.8%	4.2	21.0%	14.0	40.9%
Degree (mother)	15.9	34.6%	6.8	29.8%	6.2	31.0%	7.9	23.1%
"Unexplained" part (%)	17.4	37.9%	9.9	43.4%	9.6	48.0%	12.4	36.3%
Access rate of top half (%)	68.8		20.6		13.7		52.9	
Access rate of bottom half (%)	42.3		7.3		3.4		37.8	
Gross difference	26.5	100.0%	13.3	100.0%	10.4	100.0%	15.1	100.0%
"Explained" part (%)	17.2	64.9%	6.9	51.9%	6.1	58.7%	13.3	88.1%
Degree (father)	6.7	25.3%	2.5	18.8%	2.7	26.0%	7.4	49.0%
Degree (mother)	10.5	39.6%	4.4	33.1%	3.4	32.7%	5.9	39.1%
"Unexplained" part (%)	9.2	34.7%	6.4	48.1%	4.3	41.3%	1.8	11.9%

Notes: This table shows the results of the Oaxaca-Blinder decomposition of access to higher education, master's degrees, selective programs, and educational aspirations for different income groups (top decile vs. bottom decile; top quintile vs. bottom quintile; upper half vs. lower half). 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. Deciles and quintiles are based on this definition. The explanatory variables included in the decomposition are father's education and mother's education. Separate dummy variables are included for father's degree and mother's degree in 7 items (elementary school certificate or less, middle school certificate, high school diploma or equivalent, two-year degree, bachelor's or master's degree, M.D. or Ph.D., and missing). In column (4), we restrict the sample to individuals aged 18-19 to avoid educational aspirations being influenced by completed years of schooling.

Table 5: Access to Higher Education Based on Parents' Income, Occupation and Diploma

	(1)	(2)	(3)	(4)	(5)	(6)
Parent's income percentile rank	0.56***	0.52***	0.21***	0.27***	0.13***	0.090**
Log of potential financial transfers		0.016***				0.0073*
Father Primary school			0		0	0
Father Middle School			0.012		-0.017	-0.019
Father High School			0.048**		0.030	0.036*
Father Two-year degree			0.18***		0.12***	0.13***
Father Bachelor or Master degree			0.21***		0.14***	0.13***
Father M.D. or Ph.D.			0.25***		0.18***	0.19***
Mother Primary school			0		0	0
Mother Middle School			0.13***		0.11***	0.12***
Mother High School			0.16***		0.13***	0.14***
Mother Two-year degree			0.36***		0.29***	0.29***
Mother Bachelor or Master degree			0.32***		0.23***	0.23***
Mother M.D. or Ph.D.			0.33***		0.22***	0.21***
Father Low SES				0	0	0
Father Lower-middle SES				0.13***	0.11***	0.10***
Father Upper-middle SES				0.14***	0.099***	0.10***
Father High SES				0.23***	0.14***	0.14***
Mother Low SES				0	0	0
Mother Lower-middle SES				0.085***	0.056***	0.056***
Mother Upper-middle SES				0.24***	0.14***	0.14***
Mother High SES				0.27***	0.16***	0.16***
Parents live together						0
Separated parents						-0.062***
Parisian area						0
Urban unit of more than 100,000 inhabitants						-0.031
Urban unit of less than 100,000 inhabitants						-0.041**
Observations	5,197	5,197	4,094	4,427	4,065	4,022
R^2	0.107	0.110	0.184	0.166	0.201	0.205

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

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 access to 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 socioeconomic 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 A1 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.

Table 6: Decomposition of Differences in Public Spending on Higher Education

	(1) Main specification	(2) Association of wealthier individuals with better-endowed programs	(3) Assumption (2) + wealthier individuals attend more costly elite graduate schools
Access to 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 – access to 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). See Section 4.5 and Appendix A.1.3 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), have access to better endowed schools. More specifically, individuals in the top 5 percent of the income distribution are assumed to have access to schools with endowments three times the typical endowment and those in the next 5 percent to have access to schools with endowments twice the typical endowment. See Appendix B.2.4 for more details on these simulations.

Table 7: Average Public and Private Spending 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)	(4) Fiscal deductions and public support received (C)	(5) Total public spending received (A)+(C)	(6) Parental financial transfers (D)	(7) Total public and private spending (A)+(C)+(D)
P0-P10	7,800	1,000	6,800	15,400	23,200	7,000	30,200
P10-P20	7,600	1,300	6,300	16,700	24,300	7,600	31,900
P20-P30	8,800	1,600	7,200	15,200	24,000	9,100	33,100
P30-P40	9,100	1,800	7,300	14,900	24,000	10,200	34,200
P40-P50	10,000	1,900	8,200	13,500	23,600	12,400	36,000
P50-P60	12,500	2,400	10,100	13,700	26,200	13,000	39,200
P60-P70	12,200	2,500	9,700	13,300	25,600	15,100	40,700
P70-P80	16,800	2,800	14,000	16,800	33,600	19,800	53,400
P80-P90	21,300	4,200	17,100	16,100	37,400	26,200	63,500
P90-P100	21,400	9,800	11,600	15,400	36,800	42,300	79,100
Average	12,500	2,800	9,600	15,100	27,500	15,800	43,300

Notes: This table shows the distribution of various public and private expenditures on young adults and their parents, according to parents' pre-tax 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. Amounts are rounded to the nearest 100 euros. Column (1) reports public spending on higher education received between the ages of 18 and 24. 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 (2) shows the amounts corresponding to 4 percent of taxes paid by parents over six years (when their young adult is 18 to 24 years old). This 4 percent corresponds to the share of all taxpayers' unallocated taxes needed to fund public higher education. This figure is calculated out of sample, in a representative sample of all taxpayers (ERFS). The indirect and corporate tax imputation is estimated from distributed national account André et al. (2022). Column (3) shows the net benefit from higher education, which we define as total public spending on higher education less parents' taxes needed to fund public higher education – 4 percent of parents' taxes. Column (4) reports other public expenditures dedicated to young adults and their parents: public support for young adults (need-based scholarships, housing benefits, unemployment benefits, guaranteed minimum income, disability benefits, integration contract, and family benefits), and direct and indirect public support for their parents (family benefits and tax deductions). Column (5) shows the total public spending on young adults and their parents over six years, i.e. the sum of public expenditure on higher education and other public support. Column (6) indicates the amount of parents' financial transfers to their child over six years. These transfers from parents are reported by the young adults in the survey and extended over 6 years taking into account the number of years in higher education. Column (7) corresponds to the sum of public expenditures and financial transfers from parents over six years. This can be thought of as total investment in human capital, broadly defined.

Acknowledgements

This work was supported by the French National Research Agency Grant ANR-17-EURE-0001. We would like to thank Gabrielle Fack for most helpful and relevant feedback throughout this project, as well as Jérôme Gautié, Julien Grenet, Thomas Piketty and François-Charles Wolff for valuable comments. This paper also benefited from useful suggestions from Guillaume Allègre, Mathias André, Elvire Guillaud, Gustave Kenedi, Chloé Lallemand, David Margolis, Michaël Sicsic, Louis Sirugue and Sander Wagner. We would also like to thank participants in the Applied Economics Lunch Seminar and PSIPSE Seminar at PSE, INSEE Internal Seminar, INED Coffee Seminar, IPP Internal Seminar as well as participants in the 69th Congress of the French Economic Association, the World Inequality Lab Conference #2, the 2022 LESE Conference, the 2022 Doctorissime Conference, the 2022 JMA Conference and the 2022 LAGV Conference for useful remarks. Lastly, we thank the French Council of Economic Analysis and the Ministry of Higher Education and Research for giving us access to data on higher education spending, and in particular Madeleine Péron, Hamza Bennani and Gabriele Dabbaghian for formatting the data and helping to interpret them.

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Appendix

A.1 Variables, Data and Methods

A.1.1 Variables Definitions

A.1.1.1 Study

Access to Higher Education. We define individuals (aged 18-24 in our sample) as having access to higher education if they are enrolled in higher education in the year of the survey, if they have already obtained a higher education degree, or if they have reached a higher education level without having obtained the corresponding degree. Similarly, we define access to 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 rank of non-medical students in university is 50.2, that of students in medical studies is 68.1, that of students in preparatory courses is 84.9, and that of students in elite graduate schools is 72.8 (Bonneau et al., 2021).

A.1.1.2 Income

Parent Income. Following Chetty et al. (2020),[59] our preferred specification is the percentile of parental pre-tax income. Unless otherwise noted, we keep the definition of these ranks fixed by the positions in the overall distribution, even when analyzing subgroups. We add the pre-tax income of the father's household to that of the mother's household, divided by two when there are two distinct households. This household measure of income increases with cohabitation, to ensure that this feature does not generate bias, we present in Appendix B.2.3 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. We replace negative income with zero. We cannot rely on multiple-year data on parental income, so our income measure is susceptible to transitory fluctuations (Solon, 1992). This could lead us to underestimate the true level of inequality due to measurement error attenuation bias.[60] We perform a robustness check with a slightly different measure of parental income for which we have data for year t and $t-2$ (Table B8). We do not include property and capital incomes 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.

Another concern could be that the top deciles of the distribution concentrate the oldest parents and accordingly also the oldest young adults, which would bias the estimate of inequality in access to 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 (Table 2).

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

[60] However, Chetty et al. (2014) report in their study that the results in terms of intergenerational income mobility do not depend on the number of years used to measure parental income (Figure III.B. of Chetty et al. (2014)).

To further assess the representativeness of our sample, we compare the distribution of pre-tax income of parents in our sample and individuals aged 42-62 – 99% of parents of young adults aged 18-24 are in this age range in our data – in the ERFS, another survey with a much larger sample (n=50,096) where income data are taken from tax sources as well. Table A3 shows the comparison between the income distribution in the two surveys. Overall, pre-tax income is quite similar in the two samples. On average, parents in our data have €42,372 of pre-tax income and those in the ERFS have €42,845 per year. Parents in our sample have slightly higher disposable income and lower standard-of-living than individuals aged 42-62 in the ERFS, due to the presence of children. Since we are considering income deciles among parents of young adults and not deciles in the general population, it is also of interest to know where our income categories fall in relation to the general population income distribution. Table A4 compares the values of the deciles in the two distributions, and Figure A1 provides descriptive statistics on these income categories. Overall, parents are slightly wealthier than households in the general population, but the two distributions are very close, if not nearly identical, in terms of standard-of-living (Figure A1c).

Parent Tax Income Versus Self-Reported Income. Parental income from administrative tax sources is rarely available in databases for young adults, and surveys most often contain self-reported income. Our data show that self-reported income is correlated quite weakly with parental income obtained from administrative sources of tax data, including in terms of rank. The deciles obtained with the two datasets coincide for only 34 percent of the youths, and the correlation coefficient of the two variables is only 0.67. This confirms the importance of using administrative data for the income variables. The gap in access to 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 access rates at the top of the distribution.

A.1.1.3 Other Parental Background Variables

Parents' Occupation. For occupations, we rely on the Department of Education's statistical service (DEPP), which classes them in four groups by socioeconomic 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 A1 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.

Parents' Diploma. We have 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. The mother's degree is missing for 4% of observations and the father's degree for 17% of observations.

Correlation of Parental Background Variables. Table A2 presents the correlations between pre-tax income and parental occupation or degree. The pre-tax income variables are weakly correlated with occupation and degree, especially as regards fathers (for whom the correlation coefficients are 0.38 and 0.41 respectively as against 0.51 and 0.47 for mothers).

Table A1: 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 SES grouping 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*)).

Table A2: Correlation of Parental Background Variables

	Father pre-tax income	Mother pre-tax income	Father occupation (4 categories)	Mother occupation (4 categories)	Father diploma (6 categories)	Mother diploma (6 categories)
Father pre-tax income	1.00					
Mother pre-tax income	0.13	1.00				
Father occupation (4 categories)	0.38	0.27	1.00			
Mother occupation (4 categories)	0.24	0.51	0.46	1.00		
Father diploma (6 categories)	0.41	0.26	0.60	0.42	1.00	
Mother diploma (6 categories)	0.29	0.47	0.47	0.62	0.58	1.00
Sample size	5,197					

Notes: This table presents the correlation between the different parental control variables included in our analysis. For parental occupations, we rely on the Department of Education's statistical service grouping into four socioeconomic statuses (SES). Table A1 details the four SES categories and their corresponding occupations. The mother's occupation is missing for 4 percent of the observations and the father's for 9 percent of the observations. For parental education, 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. The mother's degree is missing for 4 percent of observations and the father's degree for 17 percent of observations.

Place of Residence of Parents. In examining heterogeneity by parental residence, we define three categories: Paris metropolitan area, other urban centers with at least 100,000 inhabitants, and cities or towns with fewer than 100,000 inhabitants. When the parents live in two different cities, we use the larger of the two, as access to higher education is potentially easier if at least one parent lives in a city with a university, presumably enabling the student to avoid paying rent.

A.1.1.4 Parental Financial Transfers

Financial Transfers Received From Parents. This comprises both direct monetary aid and indirect parental transfers (the amount paid for housing, weekly savings out of allowances, expenses for gasoline, car maintenance, insurance, public transport passes, train tickets, telephone, internet, leisure expenses and complementary health insurance). These transfers from parents are reported by the young adults in the survey.

Potential Financial Transfers. Parents of students give proportionately more to their child than they would if he or she did not go to college. When we examine the links between financial transfers and access to higher education, we construct a potential financial transfer variable that estimates what a young adult would have received, if he or she were studying, as a function of his or her 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 the size of the urban center where the young adult lives).

A.1.1.5 Public Support for Students, Young Adults and Their Parents

Public Support for Students. In France, student financial aid consists of two main programs. First, need-based scholarships (*Bourses sur critères sociaux*) are awarded to approximately 35% of students for an amount varying from €100.7 to €553.9 per month (over 10 months) depending on parental income. Second, housing benefits (*Aide personnalisée au logement*) is granted to tenants whose income is below a certain threshold, regardless of their educational status. There is no requirement for parental income, so many non-cohabiting students receive housing subsidies, the amount of which depends on the rent, the location of the housing and the composition of the household. For students, most public aid comes from need-based scholarships and housing benefits, which account for 51.4% and 46.6% of all public aid received by students, respectively.

Public Support for All Young Adults. Public support includes need-based scholarships, housing benefits, unemployment benefits, disability benefits, family benefits if they have children, guaranteed minimum income but with very restrictive conditions up to age 25, integration contract, and family allowances. Due to strict means testing, only 13% of non-student young adults receive housing benefits, for an average amount of €225 per month. Only 9 percent of the individuals in our sample receive at least one of the following benefits (unemployment benefits, disability benefits, family benefits, guaranteed minimum income, integration contract) for an average amount of about €650 per month. The tax credit on earned income (*Prime d'activité*) and the youth guarantee (*Garantie Jeune*), which were introduced after the survey date, are not included here.

Tax Deductions for Parents of Young Adults and Students. Parents whose child is a dependent for income tax purposes benefit from tax deductions until age 21 or, if a student, age 25. They are part of a system of tax splitting that ensures a proportional reduction of the taxes paid depending on the number of children – the first two children each count for half a share and from the third child onwards, each child counts for a full share in the calculation of the tax share. These deductions are granted only to parents whose young adult is still part of their tax household. When the young adult is no longer part of the tax household, the parents can deduct from their taxable income the pension they pay to their child, without age limit, up to €3,542 if the child lives with his or her parents and €5,959 otherwise. We use information from the survey on the attachment of the young adult to the tax household to take into account one or the other of the tax deduction situations.

Family Benefits for Parents of Young Adults. Family benefits go to parents on a means-tested basis, depending on the number of children and their age, until the child turns 21. Family allowances are paid from two dependent children under 20 years of age and the family complement from three dependent children from 4 to 20 years of age.[61] We only take into account the share of family benefits related to the young adult himself or herself and not to his or her siblings (for example, if there are three dependent

[61] Family allowances and family complement scales used for our computation can be found at the following links: https://www.ipp.eu/baremes-ipp/prestations-sociales/0/3/prestations_generales/af_cm/ and https://www.ipp.eu/baremes-ipp/prestations-sociales/0/3/prestations_generales/cf_cm/.

children, we divide the total amount of family benefits received by three).

A.1.2 Data

A.1.2.1 Representativeness of the Sample

Table A3: Comparison of Income Distributions in ENRJ and ERFS Samples

	ENRJ (2014) (Parents of young adults)	**ERFS (2014)** (One member of the household between) 42-62 years old)	**t-test**
Mean age	51.0 (5.9)	51.1 (7.2)	-9.78
Pre-tax income			
Mean	42,372	42,845	-1.45
Median	35,922	35,210	
P10	10,542	9,440	
P90	77,288	77,780	
P99	166,062	186,070	
Disposable income			
Mean	48,226	41,337	9.60
Median	42,948	34,710	
Standard-of-living			
Mean	22,439	24,285	-5.98
Median	19,528	20,831	
Number of observations	5,197	21,169	

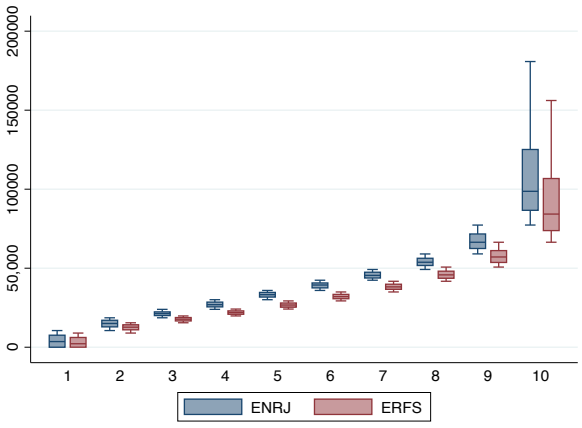
Notes: This table compares the distribution of different income variables for parents in our database (ENRJ) and individuals aged 42 to 62 in another tax survey with a much larger sample (ERFS). 99% of parents of young adults aged 18-24 are in the age range 42-62 in our ENRJ data. The two samples are 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.

Table A4: Comparison of Pre-Tax Income Deciles of Parents and Pre-Tax Income Deciles of All Households

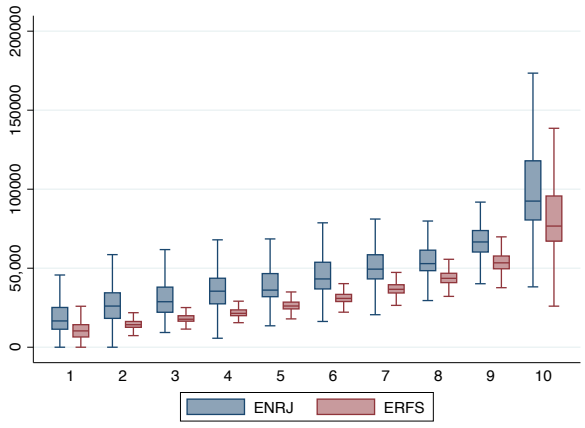
	ENRJ (2014)	ERFS (2014)
P10	10,542	8,950
P20	18,610	15,470
P30	23,956	19,790
P40	30,065	24,150
P50	35,922	29,300
P60	42,392	34,960
P70	49,187	41,730
P80	59,020	50,710
P90	77,288	66,420
P95	98,411	84,240
P97	115,353	100,380
P99	166,062	154,080
Number of observations	5,197	50,096

Notes: This table compares the distribution of pre-tax parental income in our database (ENRJ) with that of households in another tax survey with a much larger sample (ERFS). For ENRJ, the income variable 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. For the ERFS it is more directly the pre-tax income of surveyed households. Our parents are slightly wealthier than households in the general population, as they are further along in their life cycle.

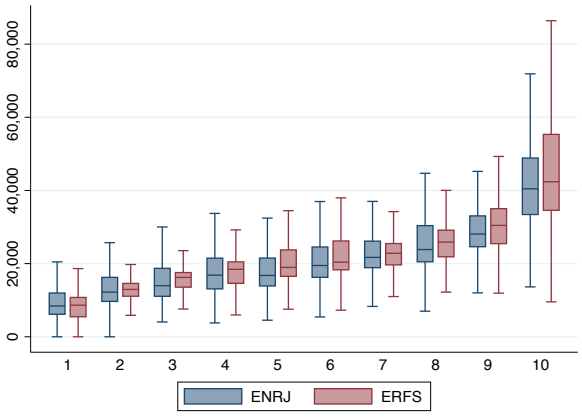
Figure A1: Comparison of the Income Distribution of Parents and the Income Distribution of the General Population



(a) Pre-Tax Household Income



(b) Disposable Income



(c) Standard-of-Living

Notes: This figure shows the comparison of various income variables (pre-tax income, disposable income, standard-of-living) between our sample of parents of young adults (ENRJ) and the general population (ERFS). For ENRJ, the income variable 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. For the ERFS it is more directly the pre-tax income of surveyed households. Our parents are slightly wealthier than households in the general population, as they are further along in their life cycle, but on the whole the two distributions are very similar, especially in terms of standard-of-living. Each boxplot graph displays the first quartile (P25), the median (P50), the last quartile (P75), as well as the lower adjacent value, and the upper adjacent value.

A.1.2.2 Comparison of Parental Income Distribution in France and the United States

Table A5: Comparison of Parental Income Distribution in France and the United States

Income Distribution	United States	France
Mean	87,219	53,030
Std. Deviation	353,430	45,640
Median	60,129	45,530
Observations	9,867,736	5,197

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.

A.1.2.3 Public Spending on Higher Education

Cost of Studies by Track and Field of Study. In the national accounts, higher education expenditures are generally classed in one of just three categories,[62] 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 waves of the survey have been conducted yet, but the sampled institutions are representative of all public higher education institutions under the Ministry of Higher Education. These data make it possible to break down the costs between the different tracks and fields of study and to determine the cost of higher education without taking into account the costs associated with research, which are taken into account in the more aggregated data. 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 A6. 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 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. For engineering schools, technical training (*IUT*), bachelor's degrees (professional or academic), and master's degrees, public expenditures are divided into 9 fields: Humanities, Arts, Languages; Markets and Organizations; Mathematics, Engineering, Computer Science; Law; Matter, Earth, and Universe Sciences; Social Sciences; Life Sciences; Medical; and Miscellaneous containing what cannot be classed in one of the preceding categories.

Elite Graduate Schools and Variance in Spending Within Tracks and Fields of Study. Despite their quality, these new data still have some limitations. We are not able to differentiate public spending among elite graduate schools.[63] 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 access 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 B.2.4). Unlike university programs, we cannot break down the costs of vocational programs and preparatory

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

[63] The 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.

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).

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 – 9.1 % in economic preparatory courses, 20 % in humanities preparatory courses and 22.1 % in scientific preparatory courses.[64]

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 deduct this from the tuition paid by individuals currently in college in the same parental income decile). We assume that all these individuals were enrolled in public programs, which represents the vast majority of programs in France.

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

Table A6: Per Student Annual Public Spending

Track	Field of study	Public cost over one year (in euros)
Vocational Track (*BTS*)		12,400
Preparatory Courses (*CPGE*)		13,400
Bachelor Degree (Non Vocational) (*Licence*)	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) (*Licence professionnelle*)	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 (*IUT*)	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 (*PACES*)	Medicine	2,400
Medical Studies (Except First Year)	Medicine	4,400
Paramedical Trainings	Medicine	2,700
Institute of Political Studies (*IEP*)		4,000
Business Schools		400
Other Elite Graduate Schools (*Grande école*)		10,600

Notes: This table presents the annual training 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.

A.1.3 Methods

A.1.3.1 Oaxaca Decompositions

The decomposition method developed by Blinder (1973) and Oaxaca (1973) is commonly used in the economics literature to explain observed average differences between two groups of individuals based on a set of observable characteristics of the members of those groups. Originally developed to analyze wage differentials between women and men and between whites and blacks in the United States, this statistical approach breaks the observed gaps down into an "explained" part, deriving from the differences between the average observable characteristics of the two groups (e.g., education or work experience), and an "unexplained" part not ascribable to these characteristics.

Applied to our context of inequalities in access to higher education and selective programs between children whose parents are at the top of the income distribution (denoted by T) and children whose parents are at the bottom of the distribution (denoted by B), the method consists in estimating the following equation for the entire population studied:

$$Y_i = \boldsymbol{X}_i \boldsymbol{\beta}^* + \epsilon_i \tag{3}$$

In this equation, the dependent variable Y_i takes the value 1 if student i has accessed higher education and 0 otherwise $\boldsymbol{X}_i$ is the vector of covariates considered (in our case, the parents' diplomas, introduced in 14 dummies, 7 for the father's diploma and 7 for the mother's diploma); $\boldsymbol{\beta}^*$ is a vector of coefficients measuring the average effect of each of these explanatory variables on the probability of access to higher education; ϵ_i denotes the error term capturing the influence of all unobservable characteristics (i.e. those not included in the vector $\boldsymbol{X}_i$) on the variable of interest Y_i.

Then, the preceding equation is estimated separately for each of the two groups considered: children whose parents are at the top (T) of the income distribution (equation 4) and children whose parents are at the bottom (B) (equation 5):

$$Y_i^T = \boldsymbol{X}_i^T \boldsymbol{\beta}^T + \epsilon_i^T \tag{4}$$

$$Y_i^B = \boldsymbol{X}_i^B \boldsymbol{\beta}^B + \epsilon_i^B \tag{5}$$

The coefficients estimated using these three equations are denoted $\boldsymbol{\beta}^*$, $\boldsymbol{\beta}^T$and $\boldsymbol{\beta}^B$ respectively. These three equations (3, 4, and 5) are then combined to decompose the access rate gap between the two groups as follows:

$$\underbrace{\overline{Y}^T - \overline{Y}^B}_{\text{observed gap}} = \underbrace{(\overline{\boldsymbol{X}}^T - \overline{\boldsymbol{X}}^B)\hat{\boldsymbol{\beta}}^*}_{\text{"explained" gap}} + \underbrace{\overline{\boldsymbol{X}}^T(\hat{\boldsymbol{\beta}}^T - \hat{\boldsymbol{\beta}}^*) + \overline{\boldsymbol{X}}^B(\hat{\boldsymbol{\beta}}^* - \hat{\boldsymbol{\beta}}^B)}_{\text{"unexplained" gap}} \tag{6}$$

The first term, $(\overline{\boldsymbol{X}}^T - \overline{\boldsymbol{X}}^B)\hat{\boldsymbol{\beta}}^*$, measures how much of the difference in access rates between the highest and lowest income children is attributable to differences in the average observable characteristics (in our case parental education) of these two groups of individuals; the second term, $\overline{\boldsymbol{X}}^T(\hat{\boldsymbol{\beta}}^T -$

$\hat{\boldsymbol{\beta}}^*) + \overline{\boldsymbol{X}}^B(\hat{\boldsymbol{\beta}}^* - \hat{\boldsymbol{\beta}}^B)$, measures the share of this gap that cannot be explained by these characteristics. In our setting, the vector $\boldsymbol{X}_i$ includes indicators of mother's degree and father's degree, the first term of the equation ("explained" gap) will measure the share of differences in access rates related to the fact that children at the bottom of the income distribution tend to have less educated parents than those at the top of the distribution, and that having more educated parents increases the likelihood of accessing higher education. The second term of the equation ("unexplained" gap) will measure the residual part of the differences in access rates, which refers to factors other than average parental education. These factors could include, for example, the role of financial constraints or unequal access to information about higher education programs across income groups, as these dimensions are likely to influence educational choices independently of parental degrees. In our study, this statistical method is used to decompose differences in access rates to higher education, master's degrees, selective programs (preparatory courses, elite graduate school, medical school, doctorate), and differential aspirations between the top and lower half, the top and bottom quintile, and the top and bottom decile of the income distribution (Table 4).

A.1.3.2 Gupta Decompositions

We decompose both gap in access to 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 $x_1, \ldots, x_k$ such that $r(x_1, \ldots, x_k) = \prod_{n=1}^{k} x_i$.

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

$$\begin{cases} C(x_1) = \frac{1}{2}(x_2^T + x_2^B)(x_1^T - x_1^B) \\ C(x_2) = \frac{1}{2}(x_1^T + x_1^B)(x_2^T - x_2^B) \end{cases} \tag{7}$$

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

$$C(x_i) = \sum_{j=1}^{k-1} \frac{R(j-1, i)}{k\binom{k-1}{j-1}}(x_i^T - x_i^B) \tag{8}$$

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 setting, we first decompose the higher education access gap between individuals whose parents are at the top of the income distribution (denoted T) and individuals whose parents are at the bottom of the income distribution (denoted B) based on access to prior degrees. The access rate to higher

education for each group G (with $G \in (B, T)$) can be defined as follows:

$$HE^G = MSC^G \times HSC^G_{MSC} \times HE^G_{HSG}$$

With HE^G the access rate to higher education for individuals in the G group, MSC^G the access rate to the middle school certificate for individuals in the G group, HSC^G_{MSC} the high school certificate access rate for individuals in the G group who had access to the middle school certificate and HE^G_{HSG} the higher education access rate for individuals in the G group who had access to the high school certificate. See Table C11 for results obtained with this decomposition method.

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 access to 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:

$$PS^G = HE^G \times LS^G_{student} \times AC^G_{student}$$

With PS^G public spending on higher education for individuals in the G group, HE^G access rate to higher education of individuals in the G group, $LS^G_{student}$ average duration of study of students in the G group, and $AC^G_{student}$ 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 6.

A.1.3.3 Redistributivity of Public Spending on Higher Education

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. As we can see in Table 1, the results on the redistributive effect depend very much on the methodological choices made. When taxes are not taken into account, authors generally find that higher education spending is anti-redistributive. Conversely, when all taxes paid by households are taken into account, the authors generally conclude that higher education spending is redistributive because the wealthy pay more in taxes than they receive in subsidies for public higher education. 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. These results should not be seen as legitimizing or minimizing the inequalities in access to higher education, because the payment of a tax – unlike, say, social security contributions – is not expected to provide privileged access to the public services that it funds.

Scope of Public Spending on Higher Education. We propose to restrict our analysis to higher education expenditures only. A broader scope of public spending could have been considered, including public support for students as well as tax deductions and family benefits for their parents. In practice, it is complicated to separate public spending on students from overall public spending on young adults. Some expenditures are exclusively dedicated to students: funding for higher education, need-based scholarships, tax deductions for parents of students aged 21-25. For other expenses, it is difficult to know whether the expense is related to student status or not. All young people are theoretically eli-

gible for housing benefits, but because these subsidies are dependent on the resources of young adults (not their parents), they benefit students who have left their parents' household and less so young adults who are employed. Similarly, the tax deductions linked to the attachment of a child to the tax household between the ages of 18 and 21 are not conditional on the child being a student, but *de facto* they benefit parents of students more because young adults in employment have a greater interest in filling out their own tax returns.

Period Considered. Our sample includes young adults between the ages of 18 and 24 and thus covers a 6-year period. This period covers the vast majority of student pathways. However, expenditures on individuals who continue their education after age 24 are not included. Similarly, we consider fiscal contributions over 6-year period by multiplying the annual parental contribution by 6. To calculate public spending on higher education, 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.

Total public spending on higher education for 18-24 year olds thus amounts to:

$$S_{all}^{HE} = \sum_{j=1}^{y} (S_j^{HE} \times Weight_j) \tag{9}$$

With y the total number of young adults in our sample, S_j^{HE} the expenditures on completed higher education over 6 years for young adult j, and $Weight_j$ the weight assigned to young adult j in the survey such that $\sum_{j=1}^{n} Weight_j = Y$ with Y the total number of young adults in the general 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 is more consistent with the fact that parents of young adults are not the only taxpayers funding higher education and that not all of their taxes are allocated to higher education.

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,[65] a representative sample of all taxpayers in France, for this purpose.

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

$$Taxes_{all} = 6 \times \sum_{i=1}^{n} [(IT_i + VAT_i + CT_i + E_i) \times Weight_i] \tag{10}$$

With $Taxes_{all}$ the total amount of unallocated taxes paid by all taxpayers over a six-year period; n the total number of observations in the survey, IT_i 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, and $Weight_i$ the weight assigned to individual i such that $\sum_{i=1}^{n} Weight_i = N$ with N 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:

$$Share\_Taxes^{HE} = \frac{S_{all}^{HE}}{Taxes_{all}} \tag{11}$$

With $Share\_Taxes^{HE}$ the share of taxes devoted to public spending on higher education for young adults; S_{all}^{HE} the sum of total public spending on higher education devoted to individuals between the ages of 18 and 24; and $Taxes_{all}$ the sum of all unallocated taxes paid by all taxpayers over six years. 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.[66]

Taxes Paid by Parents. Our database includes administrative data on parents' income tax payments. We impute the share of income devoted to VAT, corporate income tax, and other indirect taxes in each standard-of-living decile of the general population (i.e. not only parents of young adults) as the overall tax revenue from that decile over their overall pre-tax income (including public support received for VAT and excise duties) in national accounts (André et al. (2022)). Standard-of-living deciles of the whole population are used to be consistent with the figures in these studies – unlike the rest of the article, where the deciles correspond to household parental income before taxes. The proportion of income devoted to these different taxes by each standard-of-living decile, shown in the Table A7 below, is then applied to the pre-tax income of each parent in our database, considering the standard-of-living decile to which they belong.

Net Benefit From Public Spending on Higher Education. We then apply the share of taxes devoted to public funding of higher education (4%) to the taxes paid by parents. This gives us the amount of taxes paid by parents that is likely to be allocated to higher education. We then subtract this amount

[65] *Enquête sur les revenus fiscaux et sociaux* (ERFS), 2014

[66] The 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 petro-leum 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.

Table A7: 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 shows the share of pre-tax income spent on different taxes (VAT, energy and excise taxes, corporate taxes and income taxes), by standard-of-living decile of the general population. For example, the total amount of VAT paid by households in the first standard-of-living decile corresponds to 17% of their total pre-tax income (including public support). The share of income spent on VAT, corporate income tax and other indirect taxes in each standard-of-living decile is obtained by dividing the tax revenue from that decile by their total income (including public support received for VAT and excise duties). We use the results of the distributed national accounts (André et al. (2022)) for this purpose, and the standard-of-living deciles for the whole population are used in this table for consistency with the figures in these studies – unlike the rest of the article, where the deciles correspond to parental income before taxes. For income tax, we use the administrative variable available in our survey.

from the higher education spending received by their child to get their net benefit (i.e., the benefit of public funding of higher education net of the taxes paid by parents and devoted to that spending).

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

$$Net\_Benefit_d = \frac{1}{n_d} \sum_{i=1}^{n_d} \left(S_i^{HE} - (0.04 \times Taxes_i \times 6) \right) \tag{12}$$

Here $Net\_Benefit_d$ is the mean net benefit of public spending on higher education for young adults whose parents belong to income decile d, S_j^{HE} denotes 6 years of cumulative higher education spending for young adult j whose parents belong to decile d, $Taxes_j$ the sum of unallocated taxes paid annually by the parents of young adult j belonging to decile d, n_d the sample size of young adults whose parents belong to income decile d.

Total Public Support for Young Adults and Their Parents. In the last part, we extend the analysis of redistribution to all public spending on young adults and their parents, whereas the previous section was limited to spending on higher education. We include public support for young adults and their

parents (in the form of family benefits and tax deductions).

The method for calculating public spending on higher education was presented above. Tax deductions and public support are first calculated for the survey year: the public support considered are either already available in the survey or imputed from official scales (for family benefits and tax deductions). In the absence of panel data, we extend these annual amounts to a six-year period using the average amounts for each income decile, separately for the years in which the individual is studying or not among the six years considered:

$$PS_j = [PS_{student_d} \times Years_{HE_j}] + [PS_{non\_student_d} \times (6 - Years_{HE_j})] \tag{13}$$

$$TD_j = [TD_{student_d} \times Years_{HE_j}] + [TD_{non\_student_d} \times (6 - Years_{HE_j})] \tag{14}$$

With PS_j the total amount of public support for the young adult j over 6 years; TD_j the total amount of tax deductions for parents of j over 6 years; $PS_{student_d}$ the average amount of annual public support received by students in the income decile of j; $PS_{non\_student_d}$ the average amount of annual public support received by non-students in the income decile of j ; $TD_{student_d}$ the average amount of annual tax deductions received by parents of students in j's income decile; $TD_{non\_student_d}$ the average amount of annual tax deductions received by parents of non-students in j's income decile, and $Years_{HE_j}$ the number of years j is in higher education between 18 and 24.

Family benefits are imputed on the basis of official scales and information available in the survey on the age of the youth and his or her siblings (on a two-year basis for family allowances, and three years for the family complement[67]). The total amounts for which the family is eligible are divided by the number of children to obtain the amount received for the youth we are considering.

We then compute the average total public expenditures for young adults and their parents:

$$S_d^{public} = \frac{1}{n_d} \sum_{j=1}^{n_d} \left(S_j^{HE} + S_j^{soc\_fisc}) \right) \tag{15}$$

$$S_j^{soc\_fisc} = PS_j + FB_j + TD_j \tag{16}$$

With S_d^{public} the average total public expenditure for young adults and their parents in income decile d, S_j^{HE} the expenditure on higher education for j between 18 and 24 years old, $S_j^{soc\_fisc}$ the total expenditure on public support and tax deductions over six years defined as $S_j^{soc\_fisc} = PS_j + FB_j + TD_j$ with PS_j public support for the young adult j between 18 and 24, FB_j family benefits paid to parents of young adult j between 18 and 20, TD_j tax deductions for parents of j over six years.

Total Public and Private Investment in Human Capital. Finally, we present total spending – both public and private through parental transfers – on young adults. Although only part of this expenditure can be defined as educational investment strictly speaking, all of it certainly contributes to the youth's empowerment and well-being. It can affect young people's educational and job market choices, as well as their level of human capital in the broader sense. Average total spending on young adults by income decile is defined as follows:

[67] Family benefits scales can be found at the following links: https://www.ipp.eu/baremes-ipp/prestations-sociales/0/3/prestations_generales/af_cm/ and https://www.ipp.eu/baremes-ipp/prestations-sociales/0/3/prestations_generales/cf_cm/.

$$S_d^{total} = \frac{1}{n_d} \sum_{j=1}^{n_d} \left(S_j^{HE} + S_j^{soc\_fisc} + T_j \right) \tag{17}$$

With S_d^{total} the average total public and private investment for individuals in income decile d; n_d, S_j^{HE}, and $S_j^{soc\_fisc}$ defined as before, and T_j the total amount of parental transfers for young adult j. The financial transfers considered are regular direct financial aid, the amount paid for housing, weekly savings out of allowances, expenses for gasoline, car maintenance, insurance, public transport passes, train tickets, telephone, internet, leisure expenses and complementary health insurance. These transfers received from parents are reported by young adults in the survey.

T_j is computed for each individual j as such:

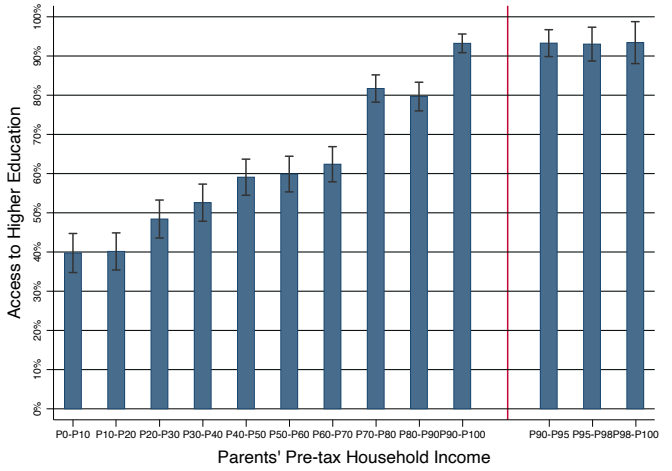
$$T_j = [T_{student_d} \times Years_{HE_j}] + [T_{non\_student_d} \times (6 - Years_{HE_j})] \tag{18}$$

With $T_{student_d}$ the average amount of annual parental transfers received by students in j's income decile; and $T_{non-student_d}$ the average amount of annual parental transfers received by non-students in j's income decile, and $Years_{HE_j}$ the number of years that j spends in higher education between 18 and 24.

B.2 Robustness Checks

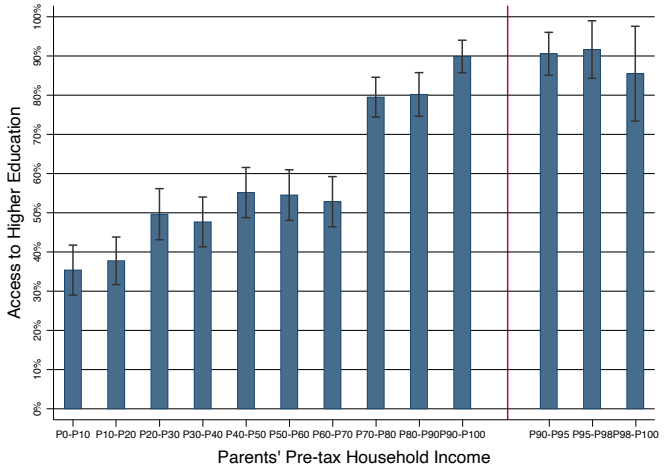
B.2.1 Sensitivity of Results to Age Restrictions

Figure B2: **Robustness Check 1:** Proportion of Individuals Accessing Higher Education Among Those Not Retained in High School, by Parents' Pre-Tax Income



Notes: This figure plots the proportion of individuals aged 18-24 not retained in high school who are currently enrolled, have had access to 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 calculated based on this definition. We further decompose the distribution into the top 10 percent of the income distribution (x-axis). The black line represents the standard errors.

Figure B3: **Robustness Check 2:** Proportion of Individuals Aged 21 to 24 Accessing Higher Education, by Parents' Pre-Tax Income



Notes: This figure displays the proportion of individuals aged 21-24 who are currently enrolled, have had access to 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 calculated based on this definition. We further decompose the distribution into the top 10 percent of the income distribution (x-axis). The black line represents the standard errors.

B.2.2 Sensitivity of Results to Using Multiple Years of Parental Income

Table B8: **Robustness Check 3:** Sensitivity of Results to Using Multiple Years of Parental Income

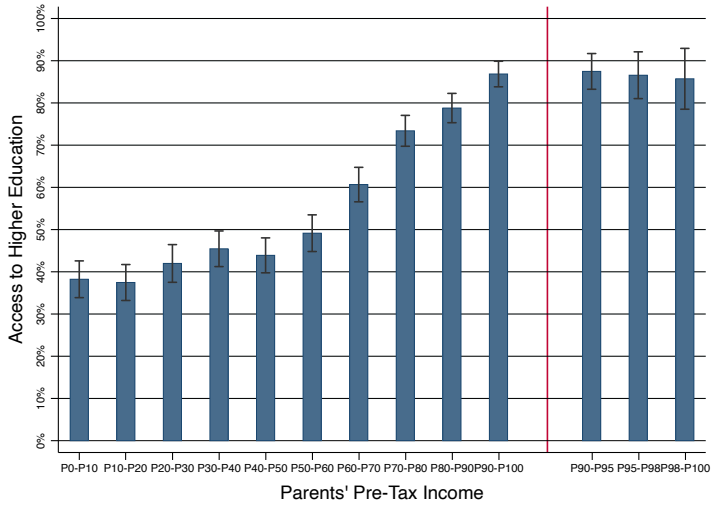
	Access rate to higher education		
	Parental income variable used:		
	Household taxable income in year t	Household taxable income in year $t-2$	Average of household taxable incomes in years t and $t-2$
Parental income decile			
P0-P10	0.38	0.45	0.40
	(0.34, 0.43)	(0.41, 0.50)	(0.36, 0.44)
P10-P20	0.41	0.34	0.39
	(0.37,0.45)	(0.30, 0.38)	(0.31, 0.40)
P20-P30	0.41	0.42	0.42
	(0.37,0.46)	(0.37, 0.46)	(0.38, 0.46)
P30-P40	0.48	0.51	0.50
	(0.43,0.52)	(0.47, 0.56)	(0.45, 0.54)
P40-P50	0.52	0.48	0.51
	(0.47,0.56)	(0.43, 0.52)	(0.47, 0.55)
P50-P60	0.55	0.51	0.48
	(0.51,0.59)	(0.47, 0.55)	(0.44, 0.52)
P60-P70	0.60	0.59	0.64
	(0.56,0.65)	(0.55, 0.64)	(0.60, 0.68)
P70-P80	0.64	0.64	0.64
	(0.59,0.68)	(0.60, 0.68)	(0.60, 0.68)
P80-P90	0.73	0.78	0.75
	(0.69,0.77)	(0.75, 0.82)	(0.71, 0.79)
P90-P100	0.84	0.83	0.84
	(0.80,0.87)	(0.80, 0.86)	(0.81, 0.87)
Regression coefficients			
Full sample	4.7	4.6	4.8
	(4.2, 5.1)	(4.2, 5.1)	(4.4, 5.3)
Lower half	2.9	1.9	3.1
	(1.6, 4.2)	(0.7, 3.1)	(1.9, 4.4)
Upper half	6.8	8.0	8.3
	(5.6, 8.1)	(6,8, 9.2)	(7.1, 9.5)

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 access to higher education. They should be interpreted as the average change in the access rate to 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 errors in parentheses.

B.2.3 Sensitivity of Results to the Use of 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.

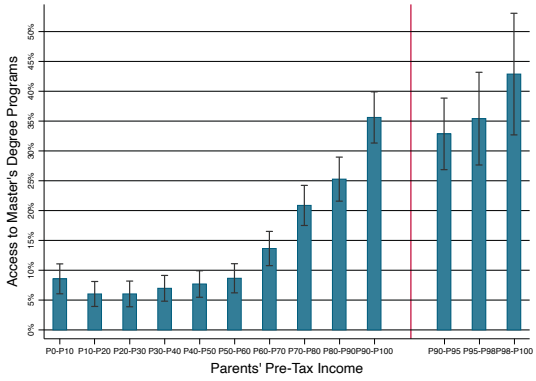
Figure B4: **Robustness Check 4:** Proportion of Individuals Accessing Higher Education, by the Sum of Individual Pre-Tax Income of Both Parents



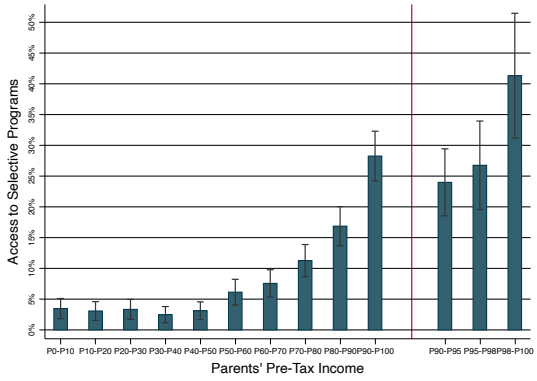
Notes: This figure displays the proportion of individuals aged 18-24 who are currently enrolled, have had access to higher education without necessarily obtaining a degree, or already hold a higher education degree, by parental individual pre-tax income. The parental income used is the sum of the father's 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.

Figure B5: **Robustness Check 4:** Proportion of Individuals Accessing Master's Degree or Selective Programs, by the Sum of Individual Pre-Tax Income of Both Parents

(a) Master or Higher Degree



(b) Selective Programs



Notes: These figures show the proportion of individuals entering master's degree programs or selective programs between the ages of 18 and 24, by the sum of individual pre-tax income of both parents. Panel (a) displays the proportion of individuals aged 18-24 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. Panel (b) shows the proportion of 18-24 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. We define selective programs as preparatory courses, elite graduate schools, medical school and Ph.D. The parental income used is the sum of the father's pre-tax individual income and the mother's individual pre-tax income, regardless of marital status. 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.

Table B9: **Robustness Check 4:** Average Public and Private Spending on Young Adults Over a 6-Year Period, by the Sum of Individual Pre-Tax Income of Both Parents (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)	(4) Fiscal deductions and public support received (C)	(5) Total public spending received (A)+(C)	(6) Parental financial transfers (D)	(7) Total public and private spending (A)+(C)+(D)
P0-P10	8,800	1,100	7,700	15,400	24,200	8,000	32,100
P10-P20	7,300	1,400	5,900	14,900	22,200	8,300	30,600
P20-P30	8,900	1,600	7,300	15,300	24,200	9,000	33,300
P30-P40	8,900	1,800	7,100	13,400	22,300	11,300	33,600
P40-P50	8,200	1,700	6,500	14,200	22,400	10,900	33,400
P50-P60	12,400	2,200	10,100	14,000	26,300	13,000	39,400
P60-P70	11,400	2,500	8,800	14,800	26,100	15,600	41,700
P70-P80	18,100	2,800	15,200	16,300	34,400	19,500	53,900
P80-P90	22,500	4,100	18,300	16,700	39,200	25,500	64,700
P90-P100	21,000	9,600	11,400	16,100	37,100	40,400	77,500
Average	12,500	2,800	9,600	15,100	27,500	15,800	43,300

Notes: This table shows the distribution of various public and private expenditures on young adults and their parents, according to parents' pre-tax income. The parental income used is the sum of the father's pre-tax individual income and the mother's individual pre-tax income, regardless of marital status. Deciles are based on this definition. Amounts are rounded to the nearest 100 euros. Column (1) reports public spending on higher education received between the ages of 18 and 24. 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 (2) shows the amounts corresponding to 4 percent of taxes paid by parents over six years (when their young adult is 18 to 24 years old). This 4 percent corresponds to the share of all taxpayers' unallocated taxes needed to fund public higher education. This figure is calculated out of sample, in a representative sample of all taxpayers (ERFS). The indirect and corporate tax imputation is estimated from distributed national account André et al. (2022). Column (3) shows the net benefit from higher education, which we define as total public spending on higher education less parents' taxes needed to fund public higher education – 4 percent of parents' taxes. Column (4) reports other public expenditures dedicated to young adults and their parents: public support for young adults (need-based scholarships, housing benefits, unemployment benefits, guaranteed minimum income, disability benefits, integration contract, and family benefits), and direct and indirect public support for their parents (family benefits and tax deductions). Column (5) shows the total public spending and tax deductions on young adults and their parents over six years, i.e. the sum of public expenditure on higher education and other public support. Column (6) indicates the amount of parents' financial transfers to their child over six years. These transfers from parents are reported by the young adults in the survey and extended over 6 years taking into account the number of years in higher education. Column (7) corresponds to the sum of public expenditures and financial transfers from parents over six years. This can be thought of as total investment in human capital, broadly defined.

B.2.4 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 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. 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 B10). 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 access rate that remains very unequal (Bonneau et al., 2021). In a final specification, we assume both that wealthier individuals have access to 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), have access to 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 have access to schools with endowments three times the typical endowment and that those in the next 5 percent of the income distribution have access to schools with endowments twice the typical endowment. In this latter specification, 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, access 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 access inequality to public spending inequality decreases mechanically but remains equal to about half of total spending differences (Table 6).

Table B10: **Robustness Check 5**: Sensitivity of Results to the Student-Program Matching

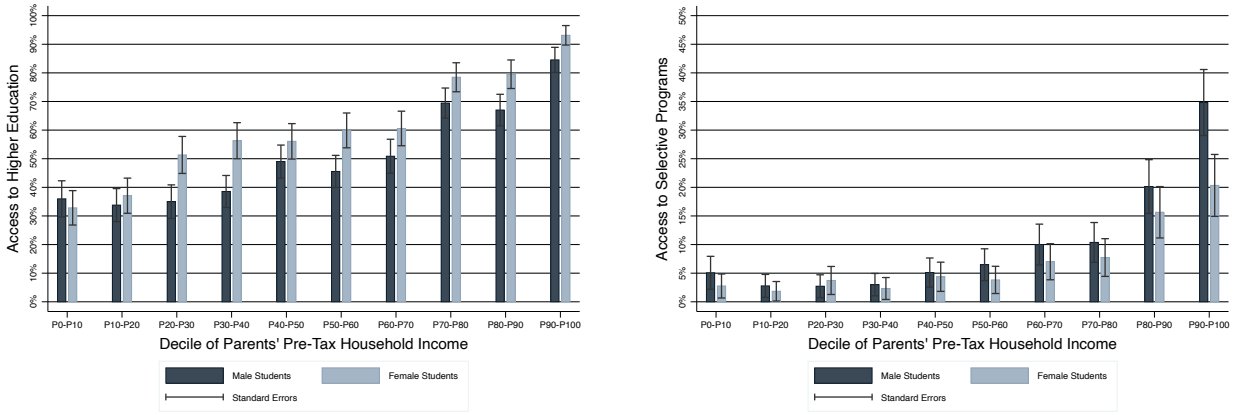
	Decile of parental household income	(1) Main specification	(2) Association of wealthier individuals to better-endowed programs	(3) Assumption (2) + assumptions on the cost of elite graduate schools
All individuals	D1	7,800	6,200	6,200
	D2	7,600	6,400	6,400
	D3	8,800	7,800	7,900
	D4	9,100	8,500	8,600
	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), have access to better endowed schools. We assume that individuals in the top 5 percent of the income distribution have access to schools with endowments three times the typical endowment and that those in the next 5 percent of the income distribution have access to schools with endowments twice the typical endowment.

C.3 Additional Results

C.3.1 Heterogeneity Results

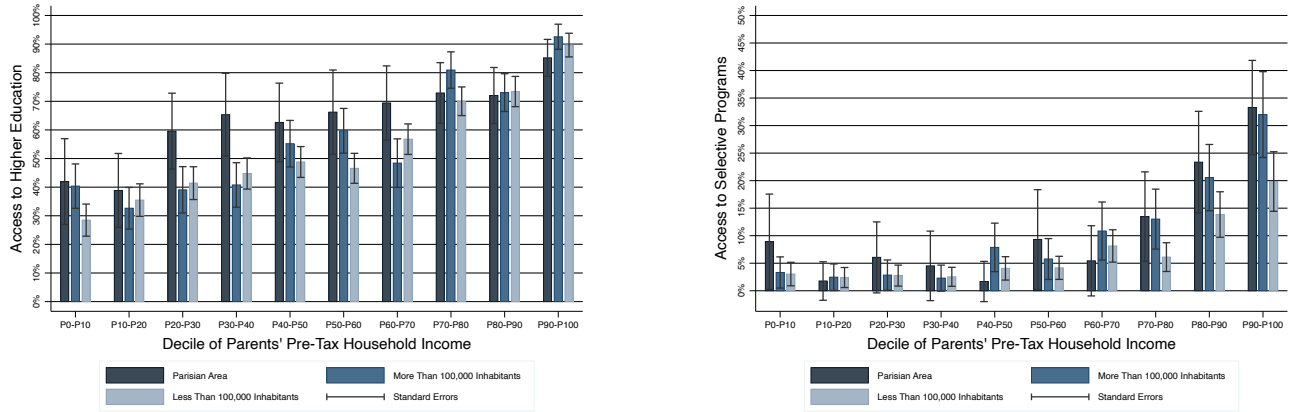
Figure C6: Access to Higher Education and Selective Programs, by Gender and Parents' Pre-Tax Income



(a) Higher Education (b) Selective Programs

Notes: These figures show the access rate between the ages of 18 and 24 to higher education (Panel (a)) and to selective programs (Panel (b)) by gender and parents' pre-tax income. Individuals are considered to have access to higher education (resp. to selective programs) if they are currently enrolled in higher education (resp. in selective programs) have obtained a higher education degree (resp. a degree from a selective program) or have reached a certain level of higher education (resp. a certain level in a selective program) without necessarily obtaining the corresponding degree. We define selective programs as preparatory courses, elite graduate schools, medical school, and doctoral programs. 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 the standard errors.

Figure C7: Access to Higher Education and Selective Programs, by Urban Area Size and Parents' Pre-Tax Income

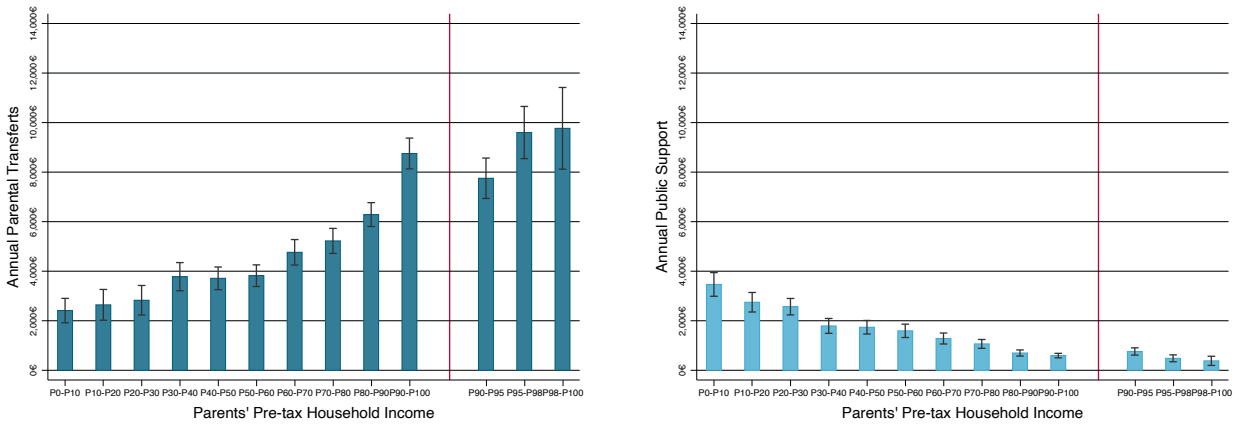


(a) Higher Education (b) Selective Programs

Notes: These figures show the access rate between 18 and 24 years of age to higher education (Panel (a)) and to selective programs (Panel (b)) by size of urban area and parents' pre-tax income. Individuals are considered to have access to higher education (resp. to selective programs) if they are currently enrolled in higher education (resp. in selective programs) have obtained a higher education degree (resp. a degree from a selective program) or have reached a certain level of higher education (resp. a certain level in a selective program) without necessarily obtaining the corresponding degree. We define selective programs as preparatory courses, elite graduate schools, medical school, and doctoral programs. When both parents do not live in the same city, we retain the larger one. 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 the standard errors.

C.3.2 Correlates of Higher Education Access Gap

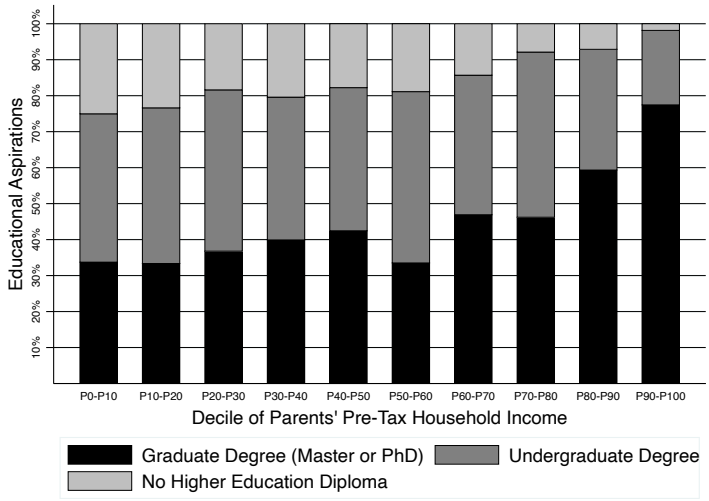
Figure C8: Annual Public Support and Parental Transfers for Students, by Parents' Pre-Tax Income



(a) Parental Transfers (b) Public Support

Notes: These figures represent the annual amounts of parental transfers and public support received by students, by parental income. We limit the sample to young adults who are currently studying (i.e., enrolled in a higher education program). Panel (a) shows the amount of parental transfers received by students over a year. The financial transfers considered are regular direct financial aid, the amount paid for housing, weekly savings out of allowances, expenses for gasoline, car maintenance, insurance, public transportation passes, train tickets, telephone, internet, leisure expenses, and complementary health insurance. These transfers received from parents are reported by young adults in the survey. Panel (b) presents the annual amount of public aid received by students over a year. For students, public support is mainly composed of need-based scholarships and housing benefits – which represent 51.4% and 46.6% of all public support received by students respectively. 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. We further decompose the distribution into the top 10% of the income distribution (x-axis). The black line represents the standard errors.

Figure C9: Educational Aspirations, by Parents' Pre-Tax Income



Notes: This figure 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.

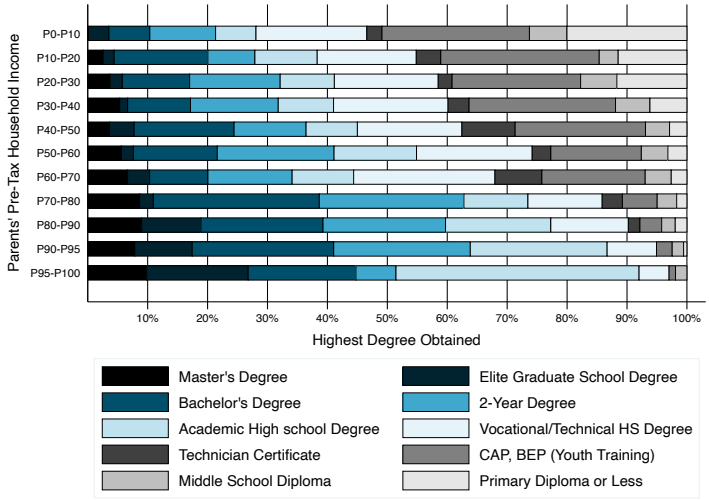
Table C11: Decomposition of Access Rate Differences by Prior Crendentials

Contribution of previous credentials to access disparities (in percent)	Higher education	Selective programs	Master's degrees
Middle school graduation	21	9	11
High school graduation	50	21	26
Access to higher education	–	13	15
Residual differential access	29	57	48

Notes: This table presents the contribution of the different variables – middle school graduation, high school graduation for those who passed the middle school graduation exam, higher education access gap for those who passed the high school graduation exam – to the total difference in access to higher education, selective programs, and master's degrees between individuals in the top and bottom 10 percent of the income distribution (in percent). The sample is reduced to youth aged 20 years or older. We exclude the youngest from our sample in order to limit the minor bias stemming from the fact that some are still in high school. To decompose the contribution of different factors, we rely on Gupta's decomposition methods (Das Gupta, 1991). See section 4.5 and Appendix A.1.3 for more details on this decomposition method.

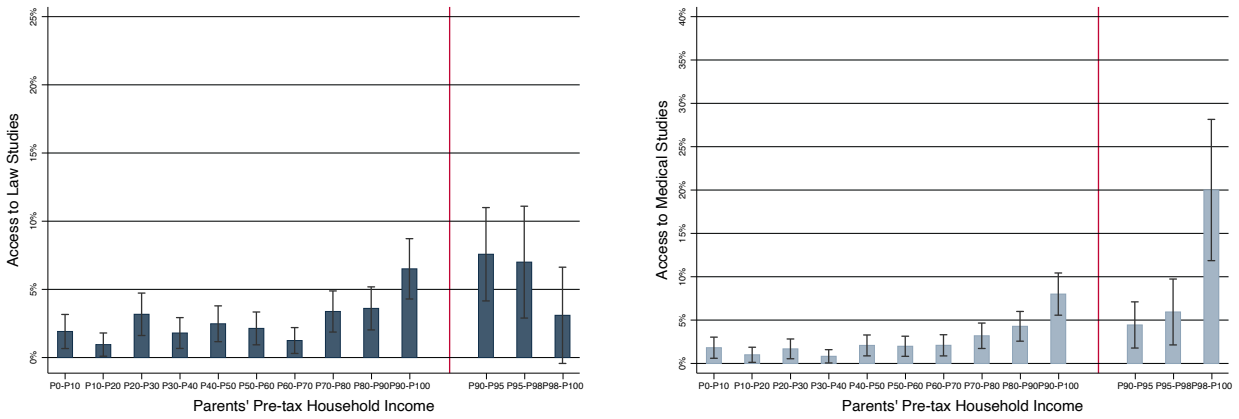
C.3.3 Disparities in Highest Degree Earned and Access to Specific Fields

Figure C10: 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. We further decompose the top 10 percent of the income distribution into vintiles (y-axis).

Figure C11: Access to Law or Medical Studies, by Parents' Pre-Tax Income



(a) Law Studies

(b) Medical Studies

Notes: These figures show the access rate to law studies (Panel (a)) and medical studies (Panel (b)) between the ages of 18 and 24 as a function of parental income. We define an individual as having access to a certain field of study if he or she is currently enrolled in that field, has earned a degree in that field, or has achieved a certain level in that field without necessarily earning a corresponding degree. 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. We further decompose the distribution into the top 10 percent of the income distribution (x-axis). The black line represents the standard errors.

C.3.4 Regression Results for Access to Masters' Degrees and Selective Programs

Table C12: Access to Master's Degree, by Parents' Pre-Tax Income Quintile

Access to master's degree	(1)	(2)	(3)	(4)	(5)
Baseline proba. of access	0.12	0.12	0.12	0.12	0.12
Parents' income quintile					
Parents' income quintile=1	-0.037**	-0.032**	-0.031*	0.015	-0.0045
Parents' income quintile=2	-0.036**	-0.033**	-0.033**	-0.012	-0.014
Parents' income quintile=3	0	0	0	0	0
Parents' income quintile=4	0.060***	0.058***	0.029*	0.043***	0.027
Parents' income quintile=5	0.19***	0.19***	0.070***	0.097***	0.054***
Control variables included					
Log of potential financial transfers		X			X
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	5,197	5,197	4,801	4,094	4,035

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

Notes: This table presents the estimates of the effect of parental income on access to master's degree (1), successively adding controls for potential financial transfers (2), parental occupation (3), parental education (4), and all these controls simultaneously with family status and urban center size (5). 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 access to master's degree 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 A1), 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 C13: Access to Selective Programs, by Parents' Pre-Tax Income Quintile

Access to selective programs	(1)	(2)	(3)	(4)	(5)
Baseline proba. of access	0.10	0.10	0.10	0.10	0.10
Parents' income quintile					
Parents' income quintile=1	-0.019	-0.012	-0.022	-0.0098	-0.019
Parents' income quintile=2	-0.020*	-0.016	-0.014	-0.0052	-0.0049
Parents' income quintile=3	0	0	0	0	0
Parents' income quintile=4	0.038***	0.035***	0.024*	0.016	0.012
Parents' income quintile=5	0.18***	0.17***	0.10***	0.091***	0.065***
Control variables included					
Log of potential financial transfers		X			X
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	5,197	5,197	4,801	4,094	4,035

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

Notes: This table presents the estimates of the effect of parental income on access to selective programs (1), successively adding controls for potential financial transfers (2), parental occupation (3), parental education (4), and all these controls simultaneously with family status and urban center size (5). 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 accessing selective programs 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 A1), 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 C14: Access to Master's Degree Based on Parents' Income, Occupation and Diploma

	(1)	(2)	(3)	(4)	(5)	(6)
Parent's income percentile rank	0.28***	0.27***	0.13***	0.12***	0.081***	0.072***
Log of potential financial transfers		0.0029				-0.0010
Father Primary school			0		0	0
Father Middle School			-0.012		-0.023	-0.024
Father High School			0.022		0.021	0.026
Father Two-year degree			0.081***		0.055**	0.060**
Father Bachelor or Master degree			0.12***		0.074***	0.071***
Father Ph.D.			0.21***		0.17***	0.16***
Mother Primary school			0		0	0
Mother Middle School			-0.0016		-0.0062	-0.0039
Mother High School			0.013		0.0084	0.013
Mother Two-year degree			0.12***		0.099***	0.10***
Mother Bachelor or Master degree			0.10***		0.064**	0.062**
Mother Ph.D.			0.19***		0.13***	0.12**
Father Low SES				0	0	0
Father Lower-middle SES				0.046***	0.031**	0.030**
Father Upper-middle SES				0.034**	0.018	0.018
Father High SES				0.16***	0.099***	0.098***
Mother Low SES				0	0	0
Mother Lower-middle SES				0.0033	-0.0040	-0.0050
Mother Upper-middle SES				0.070***	0.032	0.034
Mother High SES				0.11***	0.056**	0.058**
Parents live together						0
Separated parents						-0.021
Parisian area						0
Urban unit of more than 100,000 inhabitants						-0.017
Urban unit of less than 100,000 inhabitants						-0.049***
Observations	5,197	5,197	4,094	4,427	4,065	4,022
R^2	0.055	0.056	0.100	0.092	0.108	0.112

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

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 access to master's degree. 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 socioeconomic 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 A1 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.

Table C15: Access to Selective Programs Based on Parents' Income, Occupation and Diploma

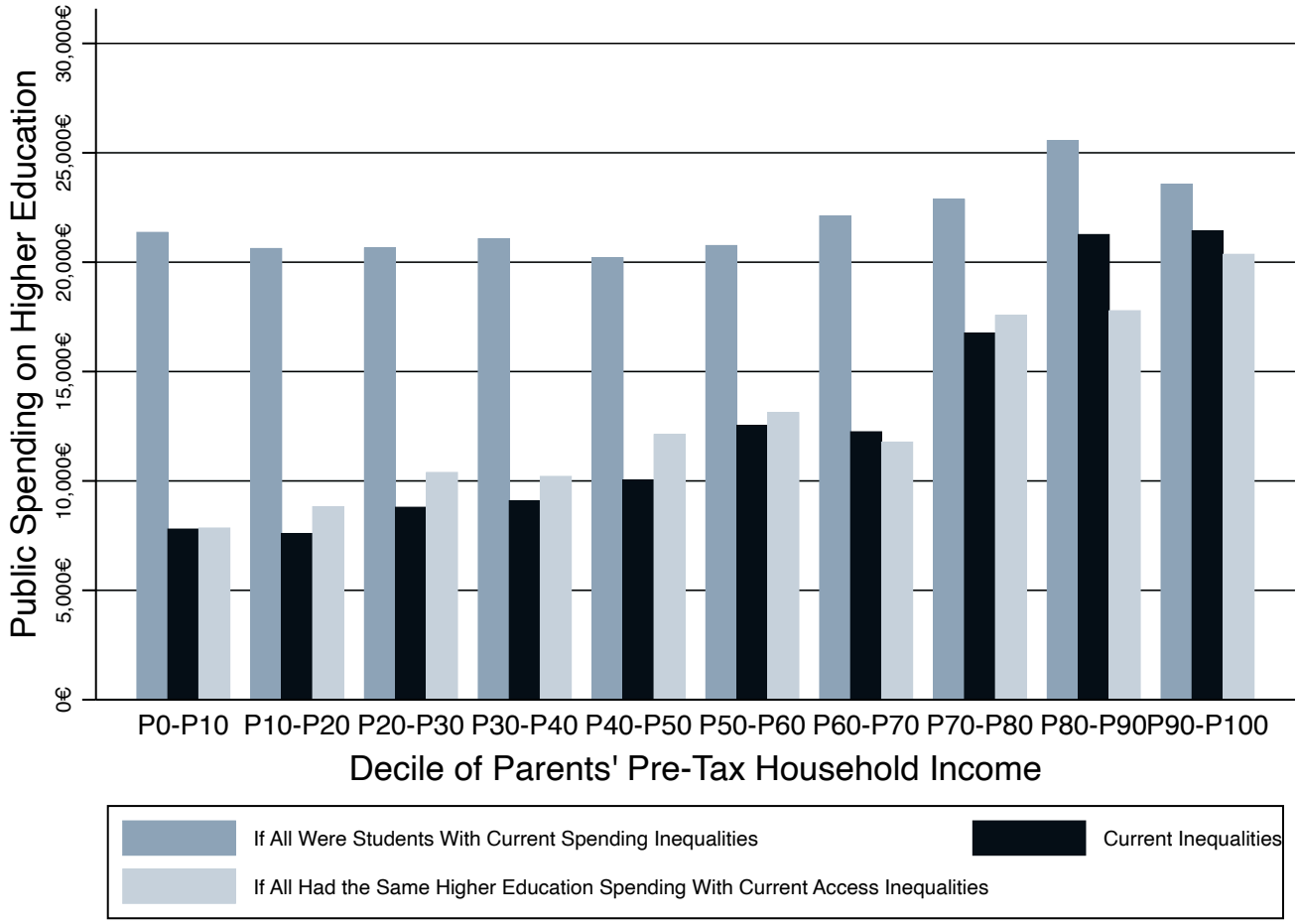
	(1)	(2)	(3)	(4)	(5)	(6)
Parent's income percentile rank	0.23***	0.21***	0.12***	0.10***	0.090***	0.066***
Log of potential financial transfers		0.0063***				0.0035
Father Primary School			0		0	0
Father Middle School			-0.030		-0.033	-0.033
Father High School			-0.013		-0.012	-0.0074
Father Two-year degree			0.052***		0.039**	0.043**
Father Bachelor or Master degree			0.11***		0.079***	0.076***
Father M.D or Ph.D.			0.13***		0.099***	0.10***
Mother Primary School			0		0	0
Mother Middle School			0.0096		0.0088	0.012
Mother High School			0.0068		0.0069	0.013
Mother Two-year degree			0.089***		0.085***	0.092***
Mother Bachelor or Master degree			0.077***		0.055***	0.057***
Mother M.D. or Ph.D.			0.18***		0.14***	0.14***
Father Low SES				0	0	0
Father Lower-middle SES				0.020*	0.0035	0.0020
Father Upper-middle SES				0.015	-0.0039	-0.0029
Father High SES				0.12***	0.057***	0.058***
Mother Low SES				0	0	0
Mother Lower-middle SES				0.0066	0.0034	0.0033
Mother Upper-middle SES				0.039**	0.0046	0.0048
Mother High SES				0.099***	0.041**	0.043**
Parents live together						0
Separated parents						-0.039***
Parisian area						0
Urban unit of more than 100,000 inhabitants						-0.0077
Urban unit of less than 100,000 inhabitants						-0.034***

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

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 access to selective programs. 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 socioeconomic 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 A1 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, as access to higher education is potentially easier if at least one parent lives in a city with a major university, presumably enabling the student to avoid paying rent.

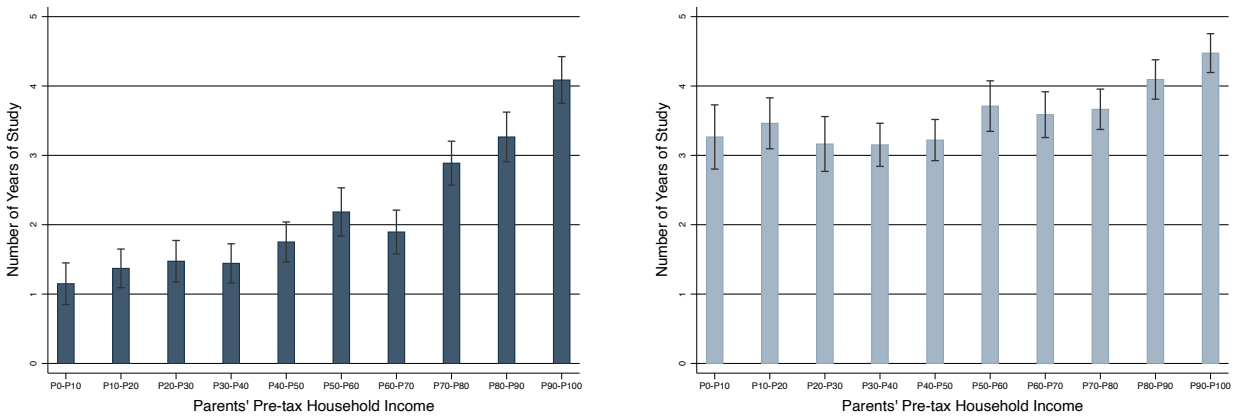
C.3.5 Decompositions of Inequalities in Public Spending on Higher Education

Figure C12: Extensive and Intensive Margins



Notes: This figure shows the decomposition of inequality in public spending on higher education between an extensive margin – differences in access to higher education – and an intensive margin – differences in spending on higher education for those who have access, 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 4a). The left curve represents the level of inequality that would result if all individuals accessed 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 access. 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).

Figure C13: Duration of Study



(a) All individuals

(b) Students or former students

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.

C.3.6 Distribution of Public Spending on Young Adults

Throughout the paper, we study the distribution of public spending by parental income. The question arises as to how this spending is distributed across the general population, regardless of parental income. Thus, in this section we present the distribution of public expenditures dedicated to young adults and their parents, regardless of parental income.

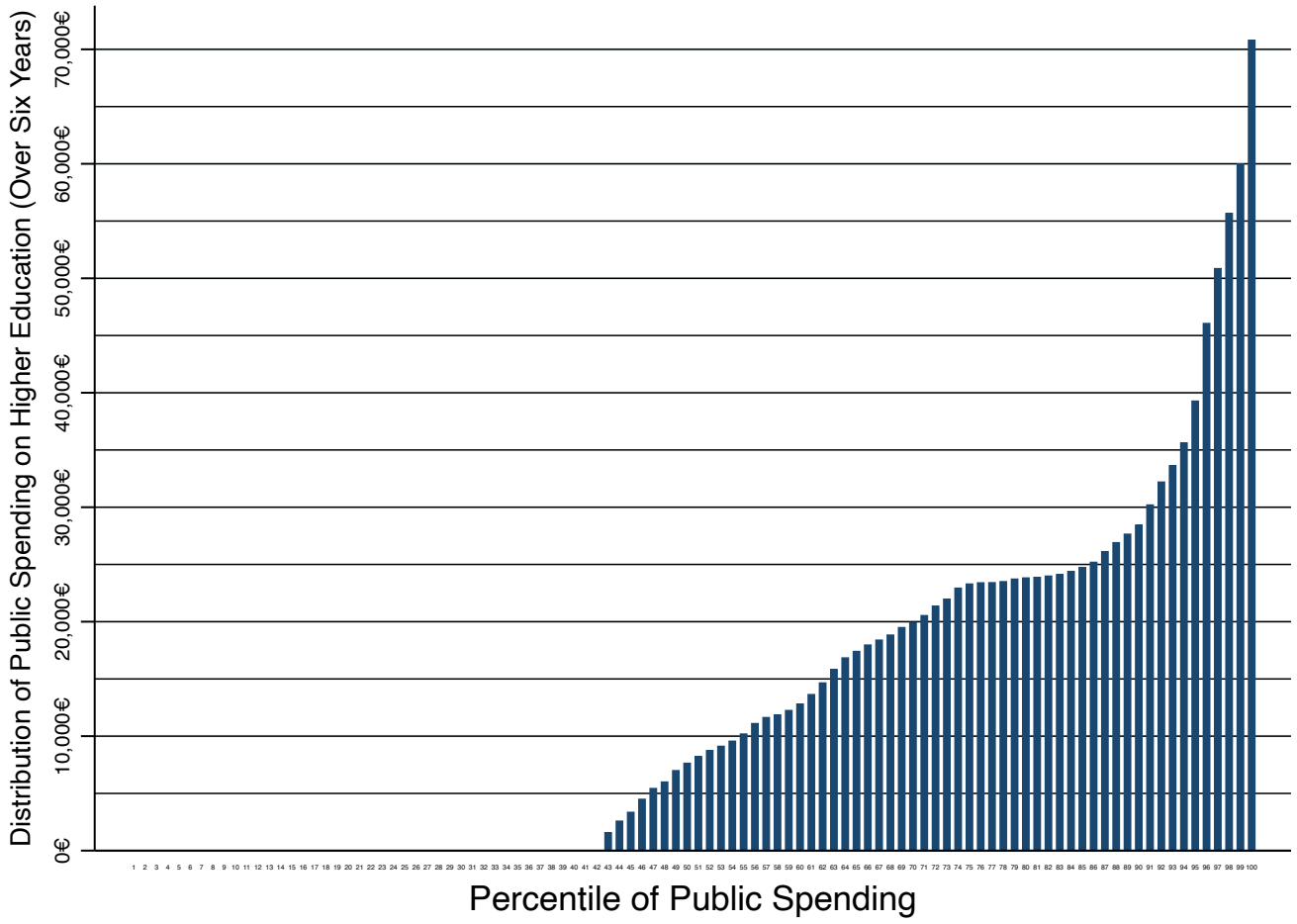
Figure C14 shows the distribution of public spending on higher education aggregated over studies (from 18 to 24). About 40% of individuals have zero spending because they did not enter higher education. Only 10% of individuals receive more than €30,000 of investment in higher education during their education (ages 18-24). 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 C15 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 C16 shows the distribution of public spending on higher education by gender. Because of strong gender inequalities in access to selective programs (Figure C6 (b)), there are strong inequalities in public spending between male and female students. Deciles are calculated separately by gender. In all deciles of public spending on higher education from the 2nd decile onward, male students receive significantly more public spending than female students. This finding is particularly pronounced at the

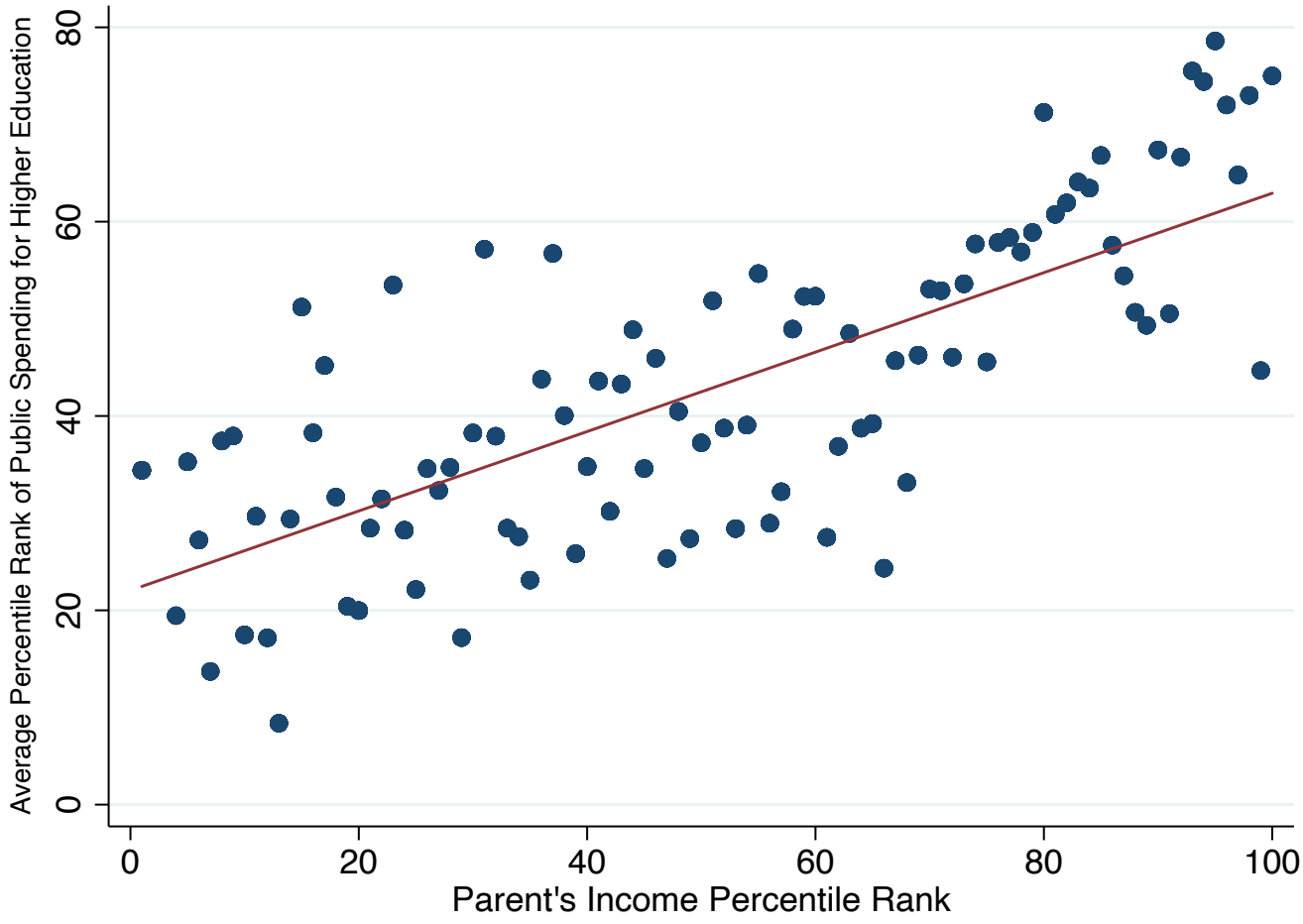
top of the distribution.

Figure C14: Distribution of Public Spending for Higher Education



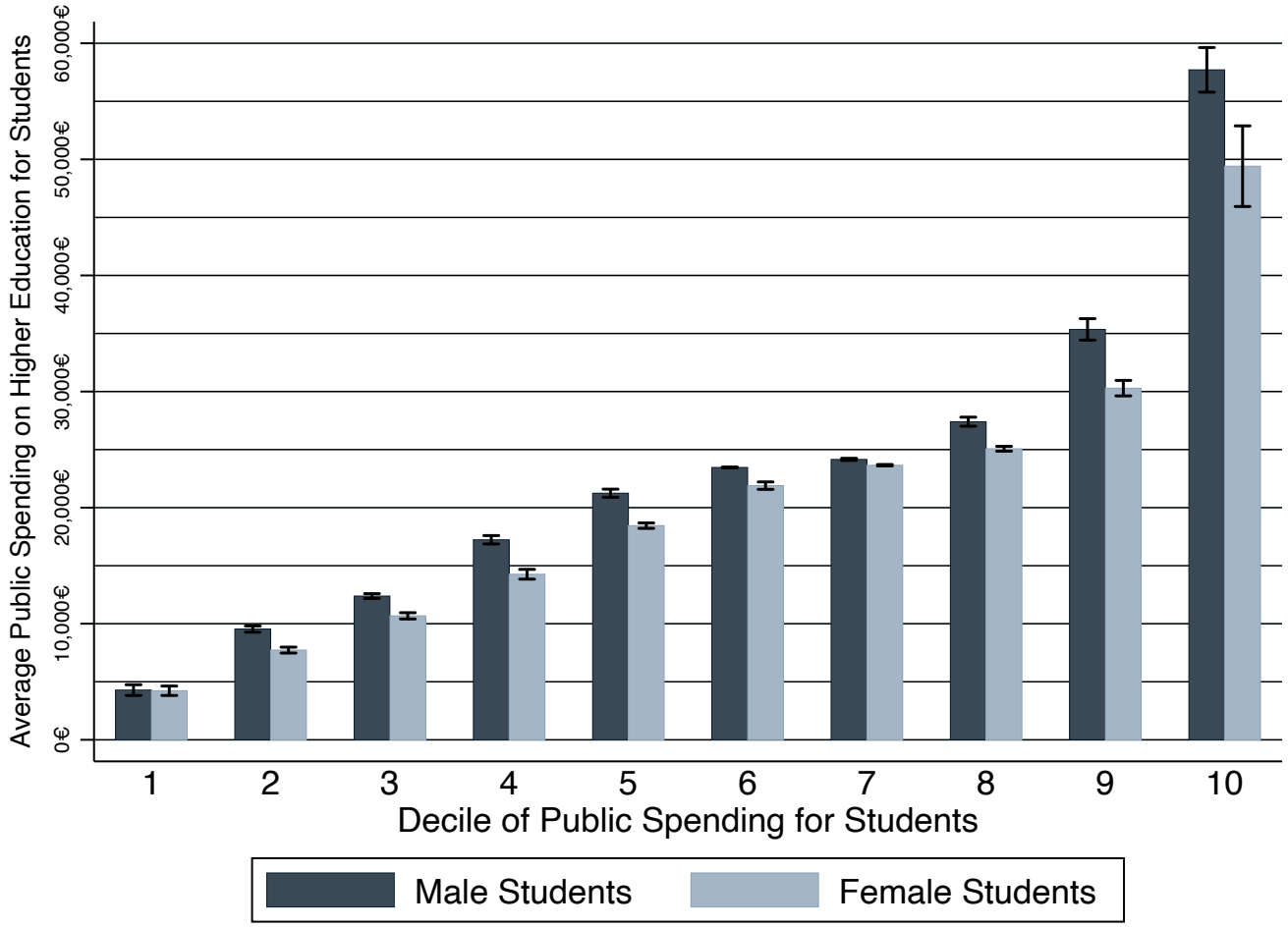
Notes: This figure shows the average public spending on higher education over 6 years (ages 18-24), by public spending percentile. 42% of 22-24 year olds have zero spending because they did not enter higher education. Unlike the rest of our analyses, we do not consider parental income in calculating 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 C15: 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.

Figure C16: Distribution of Public Spending for Higher Education Among Students, by Gender



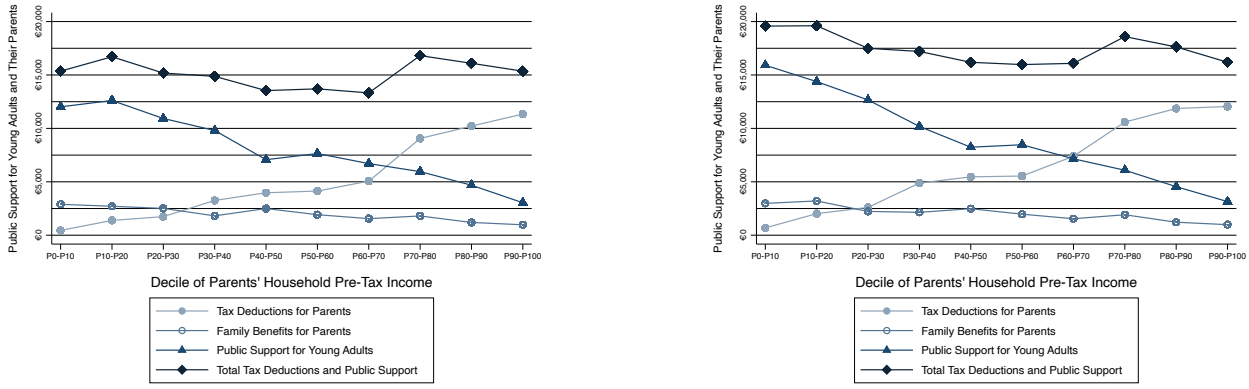
Notes: This figure shows the average public spending on higher education for students, over 6 years (18-24 years), by gender and by decile of public spending. Deciles are calculated separately by gender. Unlike the rest of our analyses, we do not consider parental income in calculating this distribution. 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, by gender.

C.3.7 Distribution of Parental Transfers, Public Support for Young Adults and Their Parents

Figure C17 shows the distribution of public support for young adults and their parents, for all individuals (Figure C17a) and for students or former students (Figure C17b). The means-testing of scholarships produces a progressive distribution of public support, but this is offset by the regressive tax deductions. The sum of tax deductions and public support is thus marginally lower around the median parental income, creating a slightly U-shaped pattern, and is only somewhat progressive among students.

Table C16 presents the distribution of annual parental financial transfers and annual public expenditures for young adults and their parents, for all individuals and separately for students and non-students. Large disparities in parental financial transfers, public support, and parental tax deductions are observed. The top 5 percent of individuals who receive the most financial transfers from their parents receive nearly 10 times more than individuals at the median of parental transfers. The top 5% of parents receiving tax deductions receive nearly 30 times more annual tax deductions than individuals at the median of tax deductions.

Figure C17: Public Support for Young Adults and Their Parents Over 6-Year Period, by Parents' Pre-Tax Income



(a) All Individuals (22-24)

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

Notes: These figures represent the amount of public support received by young adults and their parents over 6 years (from 18 to 24 years of age), by parents' pre-tax income. Panel (a) shows the amount of public support and tax deductions for all individuals, by parental income. Panel (b) shows the same variables for students or former students only. Public support for young adults includes need-based scholarships, housing benefits, unemployment benefits, guaranteed minimum income, disability benefits, integration contract, and family benefits. We consider direct public support to parents through family benefits and indirect public support through tax deductions related to the presence of a young adult. 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).

Table C16: Distribution of Annual Parents' Financial Transfers, Public Support for Young Adults and Their Parents

	Parents' financial transfers	Public support for young adults	Tax deductions for parents	Family benefits for parents
All individuals				
Average	2,800	1,400	800	300
Standard deviation	4,000	2,500	1,100	700
P5	0	0	0	0
P10	0	0	0	0
P25	200	0	0	0
P50	1,300	0	100	0
P75	3,800	2,000	1,200	0
P90	8,100	4,500	2,500	1,300
P95	11,100	6,300	3,400	2,000
Students				
Average	5,200	1,500	1,100	300
Standard deviation	4,900	2,000	1,100	700
P5	0	0	0	0
P10	400	0	0	0
P25	1,600	0	0	0
P50	3,800	700	900	0
P75	7,600	2,100	1,700	500
P90	11,600	4,400	2,300	1,200
P95	14,700	5,500	3,200	2,000
Non-students				
Average	1,300	1,300	600	300
Standard deviation	2,100	2,700	1,100	700
P5	0	0	0	0
P10	0	0	0	0
P25	0	0	0	0
P50	500	0	0	0
P75	1,600	1,400	700	0
P90	3,700	4,500	2,700	1,300
P95	5,300	7,400	3,400	2,000

Notes: This table presents the distribution of annual parental financial transfers and annual public support for young adults and their parents for all young adults and separately for students and non-students, regardless of parental income. The parental transfers considered are regular direct financial aid, the amount paid for housing, weekly savings out of allowances, expenses for gasoline, car maintenance, insurance, public transportation passes, train tickets, telephone, internet, leisure expenses, and complementary health insurance. These transfers received from parents are reported by young adults in the survey. Public support includes need-based scholarships, housing benefits, unemployment benefits, guaranteed minimum income, disability benefits, the insertion contract, and family benefits. The tax deductions correspond either to the half share of tax deduction or to the deduction of the pension paid to the young adult, depending on the number of brothers and sisters and whether or not the young adult belongs to the parents' tax household. Family benefits paid to parents until their child reaches the age of 20 are deducted on the basis of official scales (https://www.ipp.eu/baremes-ipp/prestations-sociales/0/3/prestations_generales/af_cm/ and https://www.ipp.eu/baremes-ipp/prestations-sociales/0/3/prestations_generales/cf_cm/). Total family benefits are divided by the total number of children involved to isolate the amounts paid for the young adult surveyed.

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D.4 List of Tables and Figures

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