

# Unequal access to higher education based on parental income: evidence from France

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## Abstract

In this paper, we provide new stylized facts on inequalities in access to higher education by parental income in France. On average, an increase of 10 percentile ranks in the parental income distribution is associated with a 5.8 percentage point (p.p.) increase in the proportion of children accessing higher education – 4.2 p.p. in the bottom half of the income distribution and 9.3 p.p. in the top half –. This overall level of inequality is surprisingly close to that observed in the United States. We then document how these inequalities in access to higher education by parental income combine with inequalities related to parental occupation or degree. Finally, we assess the redistributivity of public spending on higher education and more generally of all public spending on young adults and their parents, and present a new method to take into account the tax contribution of parents in our redistributivity analysis.

## 1 Introduction

Since the 1960s, the number of students has increased significantly in developed countries. For example, it has been multiplied by eight in France (from 310,000 enrolled students in 1960 to 2,551,000 in 2015 (MENESR-DEPP (2021))). Is this increase in access to higher education due to massification really associated with equal opportunities? In this paper, we reassert the persistence of strong inequalities in access to higher education by observing these inequalities from an innovative perspective, according to parental income.

Although educational inequalities according to social origins (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)), very few studies address this economic dimension of inequalities. This perspective has been studied recently in the United States (Chetty et al., 2014) and in Norway (Bütikofer et al., 2019) but remains rare in most countries. The study of inequality by parental income provides a continuous measure of the effects of social background, which

is more suitable for international comparisons. To the best of our knowledge, we present the first comparison of the level of inequality in access to higher education by parental income between the United States and a European country, with a representative sample of the whole population and a reliable measure of parental income.

Access to higher education is rarely studied in relation to parental income for two main reasons. The first is related to the lack of administrative data on parental income and the presence of significant biases in self-reported income (Moore and Welniak (2000)), which makes it difficult to interpret survey results. The second problem concerns the representativeness of the survey. The specific situation of young adults raises difficult issues for 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 focused on young adults<sup>1</sup> – where young adults are surveyed regardless of their housing status (at home, in their own apartment, or in student housing) – combined with administrative data on parental income to provide novel estimates of inequalities in access to higher education by parental income in France. We organize our analysis into three parts.

In the first part, we present new statistics on access to higher education by parental income in France. Following the literature, we use the percentile rank of parental pre-tax income<sup>2</sup> to study access to higher education across the income distribution. We find large differences in access to higher education as a function of parental income : at the bottom of the income distribution, less than 40 percent of individuals have access to higher education between the ages of 18 and 24, compared to around 90 percent at the top of the income distribution. On average, a 10-percentile increase in the parental income distribution is associated with a 5.8 percentage point (p.p.) increase in participation in higher education. Access to master's degrees and selective programs is more uneven. In the bottom 60 percent of the income distribution, less than 10 percent of children for master's degrees and less than 5 percent of children for selective programs have access to these programs. We then compare our estimates to those obtained in the United States by Chetty et al. (2014). We find a slightly lower level of inequality but very close to that observed in the United States, despite the important institutional differences between the two countries. However, the functional form is different : the effect of income on access to higher education is linear in the United States, whereas in France it is much higher in the upper half of the parental income distribution than in the lower half : a 10-percentile increase in the parental income distribution is associated with a 4.2 p.p. increase in access to higher education in the lower half of the income distribution

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1. The National Survey of Youth Resources or *Enquête Nationale sur les Ressources des Jeunes*, DREES-INSEE, 2014 (hereafter referred to as ENRJ).

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

and 9.3 p.p. in the upper half.

In the second part of the paper, we characterize how these income inequalities in access to higher education are related to other dimensions of inequalities such as parental occupation and parental degree. These three variables characterizing parental background (parental income, parental degree and parental occupation) are only weakly correlated. We decompose the higher education access gap using Oaxaca-Blinder decompositions (Oaxaca (1973), Blinder (1973)) and observe that parental degree explains between 50 and 60 percent of the higher education access gap for different income groups. We also observe a complementarity between parental occupation and parental income in explaining access to higher education. For a given level of parental income, the more privileged the parents' occupation or the higher the parents' degree, the higher the proportion of individuals accessing higher education. Conversely, for a given occupation and parental degree, the higher the percentile rank of parental income, the higher the proportion of individuals accessing higher education and selective tracks.

In the final section of the paper, we combine our estimates of inequality in access to higher education with new data on higher education spending to assess the redistributive profile of public and private spending on higher education. Despite the fact that we lack disaggregated data for the most expensive elite programs, we find substantial differences in higher education spending along the parental income distribution. On average, children in the bottom third of the income distribution (P0-P30) receive between 7,000 and 8,000 euros of investment in higher education, compared to around 27,000 for those in the top 10 percent of the income distribution – which are broken down into 18,000 of public investment and 9,000 of private investment through the tuition fees paid by their parents –. We also examine how redistribution through higher education spending changes when we consider the taxes needed to fund it. For this purpose, we present a new methodology that allows us to take into account only the share of taxes necessary to finance the expenditure under consideration (in this case, higher education expenditure), instead of taking into account all taxes as is generally the case in the literature. Our methodology requires estimating the share of taxes to be taken into account outside the analysis sample, in a sample representative of all taxpayers, but it seems to us to be more consistent with the fact that parents of young adults are not the only taxpayers financing higher education and that not all of their taxes are devoted to this expenditure item. Higher education public spending remain regressive when taxes paid by parents to finance these spending are taken into account : average net benefit remains twice higher 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 through family benefits and indirect through tax deductions –, and intra-family transfers to measure overall inequality in human capital investment, broadly defined, by parental income.

**Related literature.** Our paper builds on several strands of the literature. First, it relates

to the extensive literature 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 of 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 measuring the relative level of mobility in France compared to other countries (Dherbécourt (2020))<sup>3</sup> makes it all the more important to provide comparable evidence across countries on the distribution of access to higher education by parental income, as higher education access gap is known to be one of the main mechanisms of social mobility (Blau and Duncan (1967), Chetty et al. (2020)).

Our paper refers more directly to the literature that attempts to estimate the elasticity of educational attainment with respect to parental income<sup>4</sup> (Taubman (1989), Haveman and Wolfe (1995), Mayer (1997), Blau (1999)). Our estimate of the impact of parental income on access to higher education in France makes two contributions to this perspective. First, the vast majority of studies devoted to the relationship between parental income or wealth and children's educational attainment are based on the U.S. context, while the effect of income on university access has not been evaluated in most European countries.<sup>5</sup> Second, our results cover the entire distribution of parental income and apply to a representative sample of all young adults aged 18 to 24 in France. This makes them complementary to studies that attempt to measure a causal impact of income on educational attainment using an instrument whose validity is local – *i.e.* at a specific point in the parental income distribution – (Shea (2000), Acemoglu and Pischke (2001), Maurin (2002), Løken (2010)).<sup>6</sup> Some studies rely on

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3. 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, which implies an average level of social mobility. Corak (2013) and Perez-Arce et al. (2016) show that social mobility is low in France compared to what one would expect given an average level of income inequality. Alesina et al. (2018) find that social mobility is strong in France, and comparable to that observed in Sweden.

4. This literature has found much variation in the estimates : 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.

5. An exception to this is Bütikofer et al. (2019), who study this relationship in Norway. The authors find that parental education is a much better predictor of children's educational attainment than parental income. Nevertheless, they observe some nonlinearities in the income distribution for access to certain degrees. The nonlinearities in their analysis point to the importance of studying access to higher education considering the entire distribution of income and not just the average impact of income on access to higher education.

6. Using income variation related to union status or industry, Shea (2000) finds that parental income due to luck has a negligible impact on children's human capital, but he argues that there may be confounding factors because union status is likely to be nonrandom and could be correlated with different parental investments in children's education. Acemoglu and Pischke (2001) use changes in the distribution of family income between the 1970s and 1990s and find that a 10% increase in family income is associated with a 1.4% increase in the probability of attending a four-year college. Nevertheless, their identification strategy can only identify the "causal" impact of income on education if changes in relative wealth structure are not associated with other changes in relative parental quality. Maurin (2002) uses the socioeconomic status of grandparents as a predictor of parental income and finds that the higher the household income, the less likely the child is to repeat a grade in elementary school. But there must be no transmission of ability across generations for the grandparent socioeconomic instrument to be valid. Løken (2010) uses the Norwegian oil shock of the 1970s and 1980s to examine the long-term effect of family income on children's educational attainment. She finds no effect of income on the educational attainment of families whose income was affected by the oil shock.

identification strategies based on quasi-random assignment but yield results that are either very specific to a local population (Akee et al., 2010) or focus on short-term impact at the youngest age (Duflo, 2003).

The stylized facts developed here also contribute to the literature explaining the importance of income in children’s educational attainment. Two main channels have been identified. The first is related to parents’ direct investments in their children’s education. Traditional models of human capital investment (Becker and Tomes (1979)) emphasize the importance of credit constraints in explaining low-income families’ low access to higher education. Our data include detailed parental transfers and show strong differences across students that could contribute to the effect of parental income on persistence in higher education. The second channel is related to long-run factors associated with parental income (parental degree, parental occupation, transmission of aspirations or risk aversion, etc.), including the intergenerational transmission of academic skills or abilities.<sup>7</sup> Although our data do not allow us to disentangle the causal mechanisms at play in explaining the influence of parental income on educational attainment, the detailed structure of the survey allows us to analyze descriptively; the different contributions of various parental background characteristics in explaining access to higher education (e.g., parental income, parental education and parental occupation).

Lastly, our paper contributes to the literature on the redistributive impact of public spending on higher education. The empirical question of the degree of regressivity of spending on higher education has been the subject of intense methodological debate since the 1970s.<sup>8</sup> We provide in table 1 a review of results on the redistributivity of educational spending obtained in different institutional settings and with different methodological choices. Our study updates and extends the work of Albouy et al. (2002) in the French context by focusing on higher education spending with data that for the first time breaks down the costs of different higher education fields and programs. The issue of redistribution through in-kind transfers has recently received new attention in distributional accounts research (Piketty et al. (2018), Accardo et al. (2021)). The study of redistribution through higher education spending is all the more important in France because the share of public financing of higher education is very high, while tuition fees paid by households are very limited.

Our paper is structured as follows. We begin in section 2 by presenting the institutional

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7. The importance of this transmission has been confirmed in France by recent studies (Gurria (2016), Herbaut (2019), Barhoumi and Caille (2020)), while other studies carried out in the American context have found an increasing relationship over the last twenty years between family income and educational attainment conditional on academic skills (Belley and Lochner (2007)). An important debate in this literature is related to the decomposition between the nature and nurture effects of intergenerational transmission of abilities. Using donor children in Denmark, Lundborg et al. (2020) find that once genetic transmission is taken into account, only the mothers’ education matters in explaining the children’s school performance.

8. The first empirical studies, conducted in the United States from 1969 onwards, gave rise to a controversy between Hansen and Weisbrod (1969), on the one hand who find higher education spending in California to be anti-redistributive – individuals at institutions with the least subsidies being less wealthy on average – and Pechman (1970), on the other hand, who claim that higher education spending in California is redistributive – wealthy people paying more in taxes than they receive in subsidies compared to less wealthy people –.

context of the French higher education system. Section 3 describes the data used, the main variables of our analyses and our methodology. In section 4, we present our main results in terms of access to higher education according to parental income. Section 5 reports on the complementarity between the different aspects of inequality, those related to income and those related to parents' occupation or degree. Section 6 examines the redistribution that occurs through public spending on higher education, related to these inequalities in access to higher education and section 7 concludes.

## 2 Institutional background

**French higher education system.** The French higher education system is characterized by a high degree of institutional differentiation and academic hierarchy of the different tracks. Higher education is divided into three main tracks : a technical and vocational track,<sup>9</sup> a non-selective academic track (university) and a selective academic track composed of elite graduate schools (*Grandes écoles*). Among first-year students in 2014-2015, about 35% were enrolled in the technical and vocational track, 45% in the university track, and about 20% in the selective academic track (Depp (2015)). The coexistence of two academic tracks is a specificity of French higher education. Until 2018, access to university was formally granted to anyone holding the high school graduation exam (*Baccalauréat*<sup>10</sup>) whereas access to the elite graduate schools was very selective. Admission to these programs is based on a national competitive examination (*concours*), and candidates must follow an intensive 2 to 3 year training course called *classes préparatoires aux grandes écoles (CPGE)* – hereafter referred to as preparatory courses – to be able to take the competitive exams. Access to these preparatory courses after high school is already very selective, as the number of seats is very limited.<sup>11</sup> For example, in 2014-2015, 39% of the students in preparatory courses obtained their high school graduation exam with highest honors – *i.e.*, with a GPA of 16/20 or higher – as opposed to 3% of the students in the technical and vocational track and 6% of the students in the university (Bonneau et al. (2021)).

The elite graduate schools play a central role 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 according to "meritocratic" criteria. In the most recent cohorts, about 6% of a generation graduates from one of these schools (Bonneau et al. (2021)) and the passage through these selective training programs very often conditions access to dominant positions, whether in politics, business or engineering.

**Financing of higher education.** Most French higher education institutions are publicly

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9. Composed of technical programs (*Institut Universitaire de Technologie (IUT)*) and vocational programs (*Sections de Technicien Supérieur (STS)*).

10. Of all the students who passed the *Baccalauréat*, (whether general, technological or professional *Baccalauréats*), 75% enrolled in higher education (99% of the holders of a general *Baccalauréat* (Depp (2015))).

11. These students represent only 3 percent of the total student enrollment in 2014-2015 (Depp (2015)).

funded, with tuition fees set at a very low level. In 2014-2015, tuition fees in the public sector were set at 184 euros for undergraduate students, 256 euros for master’s students, 391 euros for Ph.D. students, and 610 euros for most engineering schools (arr (2014)). The private sector represents only about 18% of total enrollment in higher education institutions (Depp (2015)). All universities are public and the private sector includes mainly business schools, about one third of engineering schools and other specialized schools (journalism schools, paramedical and social schools, cultural and artistic schools, etc.). Tuition fees for business schools generally range from 9,000 to 15,000 euros per year and those for private engineering schools are around 7,000 euros per year.<sup>12</sup>

**Financial aids for young adults.** In France, financial aid for students is mainly composed of need-based scholarships (*Bourses sur critères sociaux*) and housing benefits (*Aide personnalisée au logement (APL)*). Tax reductions are granted to all parents whose child is attached to their tax return until the age of 21, and then only to parents whose child is a student until the age of 25. Family benefits are paid to parents on a means-tested basis according to the number of children and their age. The various financial assistance programs available to young adults and their parents are described in more detail in appendix A1.

### 3 Data and Methodology

In this section, we first describe our data, the construction of our main analysis sample, present summary statistics, and define the key variables and concepts used in our analysis. Then, we briefly present the methods used in our study, namely, Oaxaca decompositions, Gupta decompositions, and a new method to assess the redistributivity of public transfers dedicated to young adults, taking into account the taxes needed to finance these transfers. See appendix C3 for a more detailed description of the methods used.

#### 3.1 Data

Our primary data source is the National Survey of Youth Resources (*Enquête Nationale sur les Ressources des Jeunes (ENRJ)*), 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 size is more limited than in studies based on administrative data, but these data offer the advantage of combining detailed questions about young adults’ educational background and the resources they have to live on (including detailed questions about transfers received from their parents), with the reliability of administrative data on parental income. Parental income is obtained

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12. There are a number of private schools specializing in fields that are often not well covered by public higher education : video games, digital, cinema, animation, design, fashion, etc. These schools cost around 8,000 euros per year.

from administrative tax data for parents interviewed in the survey. Matched parental income is individual income before transfers. It includes wages, unemployment benefits, pensions, alimony, disability pensions, life annuities, agricultural income, industrial and commercial income, and noncommercial income. Capital income is not included (property income, rent, finance, and securities).<sup>13</sup> A total of 5,776 young adults and 6,304 parents responded to the survey, and in 5,197 cases, both the young adult and at least one parent responded. The survey includes weights to assess nonresponse bias.

The last part of our analysis includes additional data on higher education spending and tax contributions. In national accounts, data on higher education expenditures are usually only displayed in three categories,<sup>14</sup> regardless of the program or field of study (MENESR-DEPP, 2021). We supplement these existing data with data from the "Cost Awareness Survey" (*Connaissance des coûts*, Boiteau and Jameux (2019)) aimed at better assessing the expenditures of different higher education institutions. This recent survey was conducted between 2016 and 2019 from 65 higher education institutions representing approximately one-third of all French students.<sup>15</sup> This survey allows us to break down the costs between the different tracks and fields and to know the real 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 for a more accurate estimate of public spending on higher education for each individual.<sup>16</sup>

Data on taxes paid by all taxpayers come from the Tax and Social Income Surveys<sup>17</sup> (*Enquêtes Revenus fiscaux et sociaux (ERFS)*; Insee, 2014), 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 taxpayers and parents, we rely on aggregate distributional account estimates (Accardo et al. (2021), Germain (2021)).

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13. 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 non-decohabiting young adults. Taking into account property and capital incomes would mainly change the ranking within the last decile, but should only marginally change the ranking of individuals in the rest of the distribution.

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

15. Not all waves of the survey have been conducted yet, but the institutions sampled are representative of all public institutions of higher education under the supervision of the Department of Higher education. Some institutions, notably some 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 business school student costs (<https://www.cefdg.fr/fr/ecoles-et-formations-visees>). On average, public funding covers about 5 percent of student costs for these private programs.

16. Unlike university programs, we cannot break down the costs of vocational programs and preparatory courses by field because we do not have detailed expenditure data for these programs, which are located in some 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. We consider only the share of expenditures associated with educational costs in these programs : 85.3 percent of total costs for preparatory courses and 86.7 percent for vocational programs.

17. A survey matched with administrative sources on income from the various administrations concerned (DGFIP-Cnaf-Cnav-CCMSA).

## 3.2 Sample Definition

In our main analysis sample, we include all respondents (aged 18 to 24) of the survey for whom at least one parent was interviewed ( $N = 5,197$ ). When the parents are still living together, only one of the two parents was interviewed and answered questions about their partner.<sup>18</sup> When the parents are separated (for 26% of individuals in our sample), the two were interviewed in 46% of cases and only one in 54% of the cases, in which case we have no information on the non-responding parent apart from the young adult's responses. When analysing spending on higher education, we restrict ourselves to individuals aged 22 to 24 in order to focus on those who have finished or are near the end of their studies.

## 3.3 Baseline characteristics

Table 2 presents some descriptive statistics of our sample of young adults aged 18-24 years old, by quintile of parental pre-tax income. On average, individuals in our sample are 20.9 years old and 49 percent are female. The average pre-tax income of parents – the sum of the father's pre-tax income and the mother's pre-tax income – increases from 8,657 euros per year in the bottom quintile of the income distribution to 95,478 euros per year in the top quintile, with an average of 43,099 euros per year. Parents' of students or former students are richer on average, with a yearly pre-tax income of 52,499. About 13 percent of parents of young adults have a bachelor's or master's degree, compared with about 20 percent of parents of students or former students. Higher income quintiles tend to have a greater proportion of parents from high socioeconomic status (SES) and with advanced degrees. About 40 percent of individuals in the top quintile have a father from a high SES, compared with less than 3 percent in the bottom quintile.<sup>19</sup> About two thirds of the parents are still living together while one quarter are separated. Separated parents tend to be more represented at the bottom of the income distribution, partly mechanically because we sometimes have no information on non-responding parents.<sup>20</sup> The father is unknown or deceased in 6 percent of cases, while this is the case for 1.5 percent of the mothers. In regards to geographic origin, just under 20 percent of the individuals in our sample have at least one parent living in the Paris region and 30 percent in an urban unit with more than 100,000 inhabitants (excluding Paris). The proportion of individuals in the Paris region or in large urban units is higher at the top of the income distribution.

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18. 67% of the young adults in the sample have their parents still living together. In 68% of cases, the mother answered the parents' questionnaire.

19. The overlap of these different dimensions of inequality with parental income is explored in section 5.

20. When the parents are separated, the two were interviewed in 46% of cases and only one in 54% of the cases, in which case we have no information on the non-responding parent and, in particular, we do not have an income variable for non-responding separated parents.

### 3.4 Variable definitions

In this section, we briefly define the key variables used to measure access to higher education by parental income. Appendix A1 provides more details on the definition of our main variables.

**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 obtained a higher education degree, or if they have reached a higher education level without necessarily having obtained the corresponding degree. Similarly, we define access to a specific track (master’s degree, medical school, selective higher education, etc.) as being currently enrolled in, graduating from, or having obtained a level of one of these tracks without necessarily graduating.

**Selective higher education.** We define selective tracks as preparatory courses, elite graduate schools, medical studies and Ph.D. tracks. The degree of selectivity of each of these tracks 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 those in university (except for medical studies) is 50.2, while that of those in medical studies is 68.1, that of those in preparatory courses is 84.9, and that of those in elite graduate schools is 72.8 (Bonneau et al. (2021)).

**Parental Income.** Following Chetty et al. (2014),<sup>21</sup> our preferred specification focuses on the percentile rank of parental pre-tax income. We add the father’s pre-tax income and the mother’s pre-tax income, regardless of the parents’ marital status. To further assess the representativeness of our sample, we compare the distribution of pre-tax incomes of parents in our sample and individuals aged 42-60 in the Tax and Social Income Surveys (*Enquête Revenus Fiscaux et Sociaux, 2014*), another survey where income is collected from tax sources. Overall, pre-tax income data are very similar in both samples (see table B1). We also observe how our income categories fall in relation to the income distribution of the general population. Overall, parents are slightly wealthier than households in the general population, as they are further along in their life cycle but the two distributions are very close (table B2 and figure B1).

**Parental tax income versus self-reported income.** Our data show that self-reported income is poorly correlated with tax income. The deciles obtained with self-reported income coincide for only 35 percent of youth with those constructed from administrative data, and the correlation rate of the two variables is only 0.66. The gap in access to higher education is significantly underestimated – by about 5 to 10 percentage points depending on the specification – when reported income is used instead of administrative income.

**Parents’ occupation.** For occupations, we rely on the Department of Education’s statis-

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21. This paper shows 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.

tical service (DEPP<sup>22</sup>) grouping into four socioeconomic statuses (SES). High SES includes professionals, managers, CEOs, teachers, professionals and artists. Medium-high SES corresponds to intermediate occupations, technicians, foremen and supervisors. Medium-low SES refers to farmers, artisans, shopkeepers and employees. Low SES is defined as blue-collar workers and non-working people. Table H7 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 : those with an elementary school certificate or less, those with a middle school certificate, those with a high school diploma or equivalent, those with a two-year degree, those with a bachelor's or master's degree, and those with an M.D. or Ph.D..

**Place of residence of parents.** When we study heterogeneity by parental residence, we define three categories : Parisian area, urban units with more than 100,000 inhabitants (except Paris) and urban units with less than 100,000 inhabitants. When both parents do not live in the same city, we retain the largest one.

**Financial transfers received from parents.** The financial transfers considered are direct monetary aid and indirect financial aid (via payment of rent, tuition, food, etc.). These transfers received from parents are reported by young adults in the survey. Since parents of students give proportionally more to their child than if he or she were not studying, we construct a potential financial transfer variable that estimates what a young adult would have received, if he or she were studying, based on his or her observable characteristics.<sup>23</sup>

### 3.5 Methods

**Oaxaca-Blinder decompositions.** To decompose the higher education access gap by parental income, we rely on Oaxaca-Blinder decompositions methods (Blinder (1973), Oaxaca (1973)). This statistical approach, commonly used in the economic literature, consists of breaking down the observed gaps into an "explained" part, which comes from the differences between the average observable characteristics of the two groups (in our case, parental diplomas) and an "unexplained" part, which is not attributable to these characteristics.

Applied to our context of inequalities in access to higher education between children whose parents are at the top of the income distribution (noted  $T$ ) and children whose parents are at the bottom (noted  $B$ ), the method consists first in estimating the effect of parental diplomas<sup>24</sup> on access to higher education for the entire population and for our two subgroups. Then, these different estimations are combined to obtain :<sup>25</sup>

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22. *Direction de l'évaluation, de la prospective et de la performance.*

23. 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 unit where the young adult lives.

24. Introduced in 14 dummies, 7 for the father's diploma and 7 for the mother's.

25. See Appendix C3 for more details on the Oaxaca-Blinder estimation methods.

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

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

**Gupta decompositions.** We decompose both the access gap to higher education and the differences in the cost of public higher education between individuals from the top income decile ( $T$ ) and individuals from the bottom income decile (noted  $B$ ) 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 these variables to the overall gap in the outcome variable between two subpopulations.

We write  $r$  the outcome variable of interest and  $x_1, \dots, x_k$  the  $k$  explanatory factors such that  $r(x_1, \dots, x_k) = \prod_{n=1}^k x_n$ .

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

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

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

Applied to our setting, we first decompose the higher education access gap between individuals in the top ( $T$ ) and bottom ( $B$ ) income deciles into a middle school graduation gap, a high school graduation gap for those who passed the middle school graduation exam, and a higher education access gap for those who passed the high school graduation exam. Then, we decompose the differences in public cost of higher education between top ( $T$ ) and bottom ( $B$ ) individuals into a portion related to the access gap to higher education, differences in length of study, and differences in annual cost (see Appendix C3 for more details on the application of the rate decomposition methods to our particular setting).

**Redistributivity of public spending for young adults.** We assess the redistributive effect of public spending on higher education and develop a method to compute higher education spending net of the share of taxes needed to fund it. We assume that higher education is financed by households through direct and indirect taxation and by firms through corporate taxes, but not by direct contributions from firms (as is the case for apprenticeships,

for example) or by the issuance of public debt.<sup>26</sup> As we can see in table 1, results obtained concerning the redistribution of higher education spending depend very much on the methodological choice.<sup>27</sup> In our case, the way in which taxes are taken into account to study the redistribution of the public higher education financing system is somewhat complicated by the fact that we are only interested in one specific expenditure item, higher education spending. Our method is designed to be consistent with the idea that, on the one hand, not all types of taxes contribute to the financing of higher education and, on the other hand, only a portion of the revenues from dedicated taxes is used to finance higher education. Our estimation proposes a static closure of expenditures and revenues that draws on recent developments in distributed national accounts.<sup>28</sup> We focus on a 6-year period corresponding to expenditures on students when they are between 18 and 24. We thus do not consider the public expenditures associated with individuals who continue their education after age 24.

We first 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,<sup>29</sup> as all taxpayers, not just the parents of young adults, contribute to the funding of higher education. The total amount of unallocated taxes over 6 years is 1.480 billion euros. A total of 4 percent of all these taxpayers' taxes must be devoted to funding the cost of higher education. This proportion is consistent with official data from national accounts.<sup>30</sup>

Then, we calculate the mean net benefit for each decile  $d$  as follows :

$$Net\_Benefit_d = \frac{1}{n_d} \sum_{i=1}^{n_d} (S_i^{HE} - (0.04 \times Taxes_i \times 6)) \quad (3)$$

With  $Net\_Benefit_d$  the mean net benefit for young adults aged 22 to 24 whose parents belong to income group  $d$ ,  $S_i^{HE}$  4-6 years of cumulative higher education spending for young adults  $i$ ,  $Taxes_i$  the sum of taxes (income tax, VAT, corporate tax, and energy and excise tax) paid annually by parents of young adult  $i$ ,<sup>31</sup> and  $n_d$  the number of young adults whose

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26. See appendix C3 for more details on this methodology.

27. When taxes are not taken into account, the 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 rich people pay more in taxes than they receive in subsidies for public higher education.

28. Although this analysis is the most appropriate for our data, other methodologies for analyzing tax contributions would be possible. A dynamic life-cycle approach, inspired by the contingent repayment loan model, might consider that youth finance their own education ex post by paying taxes.

29. We use the 2014 Tax and Social Income Survey (*Enquête sur les revenus fiscaux et sociaux* 2014 (ERFS)).

30. Draft finance law for 2021 indicates 220 billion euros corresponding to the taxes considered here (VAT, income tax, corporate tax and domestic consumption tax on petroleum and energy products) and higher education expenditures excluding university research of 10 billion euros, i.e. a ratio of 4.5%.

31. Our database includes administrative data on parents' income tax contributions. We impute the share of income devoted to VAT, corporate income tax, and other indirect taxes in each income decile by dividing the tax revenue coming from that decile by their income in the distributed national accounts (Accardo et al.

parents belong to the income decile  $d$ .

## 4 Unequal access to higher education based on parental income

In this section, we present our main results in terms of access to higher education and to different programs according to parental income in France. Then, we present a comparison of the correlations between parental income and children’s access to higher education in France and the United States.

### 4.1 Strong inequalities in access to higher education for different income groups

The proportion of 18- to 24-year-olds who have access to higher education increases sharply with parental income (figure 1) : about 35 percent of individuals aged 18-24 whose parents are in the bottom quintile of the income distribution (P0-P20) are or have been students, compared with nearly three times as many in the top decile (around 90 percent).<sup>32</sup>

Access to master’s degrees and selective programs – defined here as medical school, preparatory courses, elite graduate schools, and Ph.D.<sup>33</sup> – is more unequal (figure 2). Up to the 7th income decile for master’s degrees and up to the 9th income decile for selective programs, less than 10% of individuals access these studies. On the other side of the distribution, just over 40 percent of individuals whose parents are in the top 3 percent of the income distribution reach the master’s level and 40 percent enter a selective program between the ages of 18 and 24. In appendix B, we present results for heterogeneity by gender, and parents’ place of residence. Female students have more access to higher education at a given parental income, but have less access than their male counterparts to selective higher education : at the top of the income distribution (10th decile), the proportion of female students in selective education is half that of male students (figure D2). This is consistent with the fact that at the start of the 2014 academic year, while female students represented 55% of total student enrollment, they represented only 42% of preparatory courses enrollment and 27% of engineering school enrollment (MENESR-DEPP, 2016). This results supports the evidence of an early construction of gender inequalities prior to labor market entry and the existence of strong gender stereotypes influencing educational choices (Carrell et al. (2010), Ceci and Williams (2011), Carlana (2019)). Geographical inequalities in access to higher education are also observed. Individuals whose parents belong to the middle of the income distribution (P30-P70) access

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(2021), Germain (2021)).

32. Our data allow us to compare reported income with income obtained from tax returns. Inequality in access to college would be significantly underestimated using reported income instead of administrative income data - by about 5 to 10 percentage points depending on the specification -.

33. See section 3 and appendix A1 for more details on the definition of this variable.

higher education at much higher rates when at least one of their parents lives in the Parisian area. At the top of the income distribution (10th decile), having a parent living in a large urban unit (more than 100,000 inhabitants) significantly increases the chances of accessing selective higher education (figure D3).

These inequalities in terms of access to higher education and selective programs are reflected in inequalities in educational attainments. To observe this, we limit ourselves to individuals aged 22 to 24, who are the most advanced in their studies in our sample. Nearly 50 percent of 22- to 24-year-olds whose parents are in the top 5 percent of the income distribution have obtained a bachelor's degree, compared with less than 15 percent of those whose parents are in the bottom 10 percent of the income distribution (figure 3). Among the 10th income decile, almost everyone obtains at least a high school diploma, while about half of individuals in the 1st decile have no high school diploma.

Figure E4 in the appendix shows the access rate to law and medical studies. Access to these specific fields is highly uneven. For medical school, the access rate for individuals in the top 1 percent is ten times the access rate for individuals in the bottom 80 percent of the income distribution (25 percent versus less than 2.5 percent).

**Linearity of the income effect.** In the literature studying the impact of parental income on access to higher education, no consensus is found regarding the linearity of the income effect. While Chetty et al. (2014) found that access to education grows linearly with parental income, Bütikofer et al. (2019) found strong non-linearities at the top and bottom of the income distribution.<sup>34</sup> Løken et al. (2012) find a concave relationship with larger marginal effects of family income on children's educational attainment at the lower end of the family income distribution.

On a purely descriptive basis, we find a convex relationship in France : the effect of income on access to higher education is twice as large in the top half as in the bottom half of the income distribution (table 3). Having parents in the fifth versus third income quintile increases the likelihood of attending college by 31 percentage points, while having parents in the first versus third income quintile decreases that likelihood by 16 percentage points. For access to master's degrees and selective studies, the coefficient on income is rarely significant in the bottom half of the distribution but is very high in the top half of the income distribution and even much higher in the top 20 percent of the income distribution (table I9 and table I10 in the appendix). When no controls are included, having parents in the fifth income quintile relative to the third quintile increases the probability of going to the master's degree (respectively selective programs) by 20 percentage points (respectively 18 percentage points (p.p.)) compared to only 6.4 p.p. (respectively 4.0 p.p.) for the fourth income quintile relative to the third.

The stronger income effect in the second half of the distribution is somewhat counterin-

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34. Due to our small sample size, we are unable to 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.

tuitive. If the income effect were related to credit constraints, one would expect the impact to be larger at the bottom than at the top of the distribution, as households at the bottom of the distribution are more financially constrained than at the top. This tends to show that much of the income effect is not directly related to financial barriers but rather to other characteristics correlated with income, such as parental occupation and education, something we explore further in the second part of the paper (also see below and appendix G7 for the presentation of some correlates of higher education access gap by parental income).

**Robustness checks.** A first concern with our data is that individuals at the bottom of the income distribution might enter higher education at a later age than those at the top of the income distribution, and we would then overestimate inequality in access to higher education. To overcome this potential bias, we perform robustness checks by removing individuals who are still in high school between the ages of 18 and 24 (figure F5 in the appendix) and then focusing on individuals between the ages of 21 and 24 (figure F6 in the appendix). By removing those who are still in high school, the proportion of individuals in higher education or with a higher education degree is mechanically higher, but the gradient across the different income deciles is almost the same.<sup>35</sup> Restricting our sample to those aged 21-24 also makes very little difference in the gap in access to higher education across income deciles (although standard errors are larger due to the smaller sample size).<sup>36</sup>

A second concern is the underestimation of inequality in access to higher education due to the fact that our parental income is calculated over one year, thus likely influenced by transitory fluctuations (Solon (1992)). We perform a robustness check using the parents' household taxable income,<sup>37</sup> an administrative tax variable available in our sample at the household level for years  $t$  and  $t - 2$  (table F5). Higher education access rates by parental income decile for parental household taxable income in year  $t$  and in year  $t - 2$  are slightly different but never statistically different from each other.

**Correlates of higher education access gap.** The detailed questions asked to parents and young adults in the survey allow us to identify variables correlated with parental income that may be potential mechanisms to explain the higher education access gap. Although descriptive, these correlations could facilitate the search for causal mechanisms.

In the student subpopulation, nine out of ten parents financially support their child, whether through expenses, in-kind support, or regular monetary support. But the amounts

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35. A 10 percentile point increase in parental income is associated with a 5.8 percentage point increase in the proportion of children accessing higher education in the whole sample – 4.2 in the first half and 9.3 in the second half – compared to a 5.9 percentage point increase when removing those who are still in high school – 4.6 in the first half and 7.0 in the second half –.

36. For this age group, a 10 percentile point increase in parental income is associated with a 5.7 percentage point increase in the proportion of children accessing higher education – 4.7 in the first half and 10.1 in the second half –. The differences between these coefficients and those obtained in the entire sample are not statistically significant.

37. This variable does not exactly correspond to the variable we use in our main analysis because the variable used in our main analysis (sum of the father's pre-tax income and mother's pre-tax income is not available in year  $t-2$ ).

of total aid received are very uneven.<sup>38</sup> While direct public aid – mainly composed of need-based scholarships and housing benefits for the student population – are somewhat larger at the bottom of the income distribution, the amounts involved do not compensate for the absence of parental transfers (figure G7). These large differences in the ability of parents to finance their children’s education may 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 financing their education – working while studying<sup>39</sup> or obtaining a loan, but the latter is very uncommon in France<sup>40</sup> –. Tables 3, shows that the coefficient of the percentile rank of parental income on the probability of accessing higher education is only marginally affected when potential financial transfers received from parents are taken into account.<sup>41</sup> Results are very similar for access to master’s degrees and selective programs (tables I9 and I10). This suggests that credit constraints are less relevant in explaining the higher education access gap than other factors correlated with parental income, which we explore further in section 2.

Aspirations also differ significantly along the parental income distribution. At the top of the income distribution, individuals aged 18-19 years old<sup>42</sup> plan to study much longer than those at the bottom of the distribution (figure G8) : around 80 percent of those in the top 10 percent of the income distribution want to obtain a graduate degree (a master or a Ph.D.), compared with about 30 percent in the bottom decile of the income distribution. These differentiated aspirations by parental income are strongly, but not entirely, related to parental education. Parental degree explains about three-quarters of the differential educational aspirations across income groups, suggesting that young adults are influenced by their parents’ educational background when choosing their studies (see Oaxaca-Blinder decompositions<sup>43</sup> in table 4, column (4)).

Inequalities in access to higher education are related to differences in ability, which are correlated with parental income. Our data do not include measures of ability or academic

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38. At the bottom of the income distribution, students receive an average of 3,000 euros per year in direct and indirect aid from their parents, compared to about 10,000 euros at the very top of the distribution (figure G7(a)). The financial transfers taken into account are regular direct financial aid, the amount paid for housing, weekly savings from provisions given to the child, 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.

39. In France in 2013, 46% of students work during the academic year, and for 13% of them, this activity is highly detrimental to their studies – defined as a paid activity unrelated to studies, carried out at least half-time and more than 6 months per year – (OVE, 2014). Some empirical evidence (Beffy et al., 2013) has shown that holding a regular part-time job has significant negative effects on the likelihood of graduating from college.

40. In 2013, on average, less than 1% of students’ overall resources came from student loans in France (OVE, 2014).

41. 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 A1 for more details on the construction of this variable.

42. We reduce our sample to the youngest to avoid aspirations being influenced by completed years of schooling.

43. See section 3.5 and appendix C3 for more details on these decompositions methods and section 5.2 for Oaxaca decompositions of access gap to higher education.

performance, but do provide information on prior degrees earned, which gives an idea of how much of the inequality in access to higher education is due to differences in access to the middle school graduation exam and to the high school graduation exam.

The gap in access to higher education is 53 percentage points between the richest 10 percent and the poorest 10 percent aged 20 or older (we exclude 18- and 19-year-olds, which avoids underestimating access to the baccalaureate exam among high school repeaters), – 91% vs. 38% –, but the gap is reduced to 46 p.p. among those with a middle school diploma, and to 24 p.p. among those with a high school diploma. We use Das Gupta’s rate decomposition method<sup>44</sup> (Das Gupta (1991)) to quantify the contribution of differential access to these different degrees on inequalities in access to higher education. Middle school certification access gap accounts for 18 percent of the overall higher education access gap, but the contribution of high school certification access gap among middle school graduates is three times as large, amounting to 54 percent. These two steps do not fully explain the gap in access to higher education, as a residual gap of 29 percent between individuals whose parents belong to the top or bottom income decile remains among high school graduates (see table G6 in the appendix). These results confirm that access to a high school diploma remains a necessary condition for access to higher education, although it is not sufficient.

## 4.2 Comparison with the United States

Very few studies have linked access to higher education to parental income on a nationally representative basis. One exception to this is Chetty et al. (2014) in the United States, which studies college access between the ages of 18 and 21 using large administrative data. In order to be as close as possible to the sample covered by these authors and to avoid the bias associated with individuals still in high school, we consider all individuals aged 21-24 who are currently enrolled in higher education or who have already graduated from higher education. The definition of income is not exactly the same as in the rest of our study because our main specification focuses on individual income, whereas here, in order to be more comparable to Chetty et al. (2014), we consider parents’ household income, divided by two when we have both father and mother’s household income.<sup>45</sup>

Surprisingly enough, given the differences in institutional contexts, inequalities appear to be almost as pronounced in France as in the United States (figure 4). In the United States, an increase of one decile in parental income is associated with an increase in the proportion of young people entering higher education of 6.75 percentage points compared to 5.68 percentage points in France. In both countries, the proportion of individuals studying at the top of the

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44. See section 3.5 and appendix C3 for more details on this decomposition method.

45. 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 non-decohabiting young adults. Taking into account property and capital incomes would mainly change the ranking within the last decile, but should only marginally change the ranking of individuals in the rest of the distribution. Chetty et al. (2014) 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.

income distribution is around 90 percent. However, the functional form of the effect of income on access to higher education differs between the two countries. The income effect is linear in the United State, whereas in France, this effect is around twice bigger in the top half of the income distribution than in the bottom half – an increase of one decile in parental income is associated with an increase in the proportion of young people entering higher education of 4.6 in the first half of the income distribution and 9.6 in the second half –.

The fact that the magnitude of the income effect is close between these two countries is surprising. One would expect the link between parental income and access to higher education to be stronger in the United States for at least three different reasons. First, higher education is much more expensive in the United States than in France. 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 (Baum et al., 2014), compared to between 184 and 610 euros for most tracks in France (see section 2 for more details). Second, the level of income inequality is higher in the United States than in France, which means that there are more differences in income between the top and bottom decile in the United States than in France. Table B3 in appendix B 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 United States and \$53,127 in France and the share of the top income decile was 33% in the United States versus 22% in France in 2014 (Alvaredo et al. (2014)). Third, the return to higher education is higher in the United States (about 14%) than in France (about 10%). (Psacharopoulos and Patrinos (2018)). Due to a strong correlation between parents' and children's education, when looking at 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 link between parental income and children's educational attainment.

Nevertheless, several arguments could explain this higher than expected level of inequality in the French context. The absence of a unified high school system in France implies an early orientation leading students of low socioeconomic status more often to short and less valued vocational tracks. Moreover, the French education system is characterized by a strong effect of social origin on academic performance before higher education.<sup>46</sup> Some programs in the United States offer higher and more frequent scholarships than in France. The dual system of higher education in France (with predominantly non-selective universities and elite graduate schools) could explain the strong relationship observed between parental income and access to selective programs in France. Although counterintuitive, this result is consistent with the paradox of a lower level of social mobility in France than might be expected given its relatively low level of income inequality (known as the great Gatsby curve paradox). This result also extends the scope of Landersø and Heckman (2017)'s finding of a similar influence of family background on educational outcomes between the United States and Denmark, despite the

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46. According to the results of the 2015 PISA survey, 20 percent of the variation in science performance is explained by socioeconomic status in France, compared to only 11 percent in the United States, with the OECD average being 12.9 percent (Gurria, 2016).

fact that the Danish welfare state provides free university education and that social mobility in terms of income is much higher in Denmark than in the United States.

In this first section, we presented novel estimates of inequality in access to higher education by parental income in France – using reliable income data obtained from administrative tax sources – and compared our estimate to that observed in the United States. The next section examines the interactions between parental income, degree and occupation in explaining inequalities in access to higher education.

## 5 Complementarity of inequalities related to parents' income, education or occupation

Inequalities in access to higher education are mainly studied in terms of social background (e.g., parents' degree or occupation) but very few studies address the economic dimension of these inequalities. In this section, we examine the complementarity between inequalities in access to higher education related to parental income, parental degree, and parental occupation, to see if the different dimensions of inequality overlap or combine to explain the higher education access gap.<sup>47</sup> We first present the Oaxaca-Blinder decompositions that allow us to quantify the share of the gap in access to higher education by parental income attributable to parental degree and the share not explained by this observable characteristic. We then observe how the coefficient on income changes when we introduce different controls for parental background. Although descriptive, these estimates show that the effect of income on access to higher education is not entirely attributable to parental education and occupation. This indicates the existence of a complementarity of the different dimensions of inequality to explain the gap in access to higher education between individuals from different socio-economic backgrounds.

### 5.1 Correlation of parental background variables.

One might worry that income does not add information to that contained in parental occupation or degree. We first check that this is not the case by computing correlations between pre-tax income and parental occupation or degree. The results are presented in table H8 in the appendix. Pre-tax income variables are weakly correlated with occupation and degree, this is particularly true for fathers (for whom the correlation coefficients are 0.38 and 0.41 respectively versus 0.50 and 0.46 for mothers). Thus, when we try to predict the pre-tax income decile using a logit model with the other social origin variables as predictors, the prediction is very poor, with only about 30% of observations classified in the correct parental

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47. We grouped parental occupation in 4 categories – high SES, medium-high SES, medium-low SES and low SES – (see section 2, appendix A1 and table H7 for more details on the construction of this variable). We measure parental degrees with six categories – primary school or lower, middle school diploma, high-school diploma, Two-year degree, Bachelor or master degree, and M.D. or Ph.D. –.

pre-tax income decile when using occupation (39 categories) as a covariate, 23% when using degree (6 categories) as a covariate, and 29% when using both parental occupation and degree as predictors. Results are very similar when we predict separately for mothers and fathers.

## 5.2 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 these characteristics. To do this, we rely on Oaxaca-Blinder decompositions. This statistical method, developed independently by Blinder (1973) and Oaxaca (1973) makes it possible to decompose the average differences observed between two groups of individuals (for example, the differences in access rates to higher education between individuals from high income and low income families) into a portion that can be "explained" by differences in the average observable characteristics of the two groups (e.g., their parental education) and a portion that is "unexplained" by those characteristics.<sup>48</sup>

Applied to inequality in access to higher education and selective programs, these decompositions show that while parental education explains some of the access gap through parental income, about half of the observed gap is due to other factors.

We apply these decompositions to different outcomes – overall access to higher education or access to more selective tracks – and between different subgroups of parental income – bottom 50/top 50, bottom 20/top 20, and bottom 10/top 10 –. Table 4 shows the detailed results of these decompositions. Among individuals whose parents are in the bottom decile of the income distribution, 36 percent had access to higher education between the ages of 18 and 24, compared to 89 percent of individuals whose parents belong to the top decile of the income distribution. Of these 53 percentage points of difference in access, 31 points (58% of the gross difference) are "explained" by parental degree.<sup>49</sup> The residual difference of 22 percentage points (42% of the gross difference) cannot be explained by parental degree. The application of the Blinder-Oaxaca decomposition method to the analysis of inequalities in access to master's degrees and selective programs leads to conclusions similar to those obtained for access to higher education as a whole. The results of these decompositions (see columns (2) and (3) of table 4) indicate that inequalities in access to master's degrees and selective programs across income groups are only partly explained by differences in parental education between individuals from high and low income families : differences in parents' educational backgrounds explain less than half of the unequal probability of accessing a master's degree between individuals from low income and high income families and about 60 percent of difference in access rates to selective programs. The results of the decompositions for other income groups – top 20 and bottom 20 of the income distribution ; top 50 and bottom 50 of the income distribution – are very similar, with parental degree still explaining between 50 percent and 60 percent of the gap in access to higher education, master's degrees

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48. See section 3.5 and appendix C3 for more details on this statistical decomposition method.

49. Father's degree accounts for 16 percentage points, and mother's degree for 15 percentage points.

and selective programs.

The Oaxaca-Blinder decompositions confirm that the differences in access by parental income that we measure are only partially related to differences in parental degree : about half of the access gap by parental income is not attributable to parental degree.

### 5.3 Complementarity of several dimensions of inequalities.

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

Table 5 presents the coefficients of a regression of access to higher education on the percentile rank of parents' income, indicators of six categories of fathers' and mothers' degrees, indicators of four categories of fathers' and mothers' occupations, potential financial transfers<sup>50</sup> received from parents, marital status and urban unit size. These regressions show a complementarity between inequalities in income, occupation and parental education in explaining access to higher education.

For a given occupation and parental degree, the higher the percentile rank of parental income, the greater the proportion of individuals accessing higher education and different tracks. For example, individuals whose mothers obtained a high school diploma as their highest degree (12 years of education) are 38 percent to access higher education between the ages of 18 and 24 when their parents are in the bottom quintile of the income distribution and 74 percent to access it when their parents are in the top quintile. The coefficient on the percentile rank of parental income is equal to 0.58 without controls and is greatly reduced when controls are added – reduced by around half when controls for parental occupation or degree are added, and divided by a factor of around four when controls for occupation and degree are added simultaneously –, but it remains significant at the 1% level in all specifications. When parental degree and occupation are included as controls, a 10 percentile point increase in parental income is still associated with a 1.5 percentage point increase in access to higher education. We cannot give a causal interpretation to the residual effect of income, because it could be related to unobservable parent characteristics correlated with their income. However, this residual effect of parental income demonstrates a complementarity between inequalities related to parents' occupation and degree and a more economic dimension of inequality, related to parental income. This means that the share of parents' income that is not related to their occupation or degree still matters in explaining access to higher education, master's degrees and selective programs.

Conversely, for a given level of parental income, the more privileged the parents' occupation or the higher the parents' degree, the higher the proportion of individuals accessing

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50. This variable represents what a young adult would have received from his or her parents, if he or she were studying, based on his or her observable characteristics.

higher education. With respect to parental occupation, for a given level of parental income, the more selective the track, the higher the occupational group that is determinant in explaining access to this track. The main gap in access to overall higher education is between individuals from "medium-low SES" and from "low SES," while the main access gap is between individuals from "high SES" and from "medium-high SES" for selective programs (see table 5 for higher education and table I12 in the appendix for selective programs). With respect to parental education, having parents who have had access to 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 seems to be at play here. For instance, 84 percent of individuals whose mother has a higher education degree (14 years of education or more) have access to higher education between the ages of 18 and 24, compared to 45 percent of those whose mother does not have a higher education degree. For all levels of parental degree, with the exception of the Ph.D., having a mother with this degree compared to a mother without a degree has a significantly greater effect on access to higher education than the same degree for the father. This result, which suggests a 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. (2020)).

Overall, the results explaining access to master's degrees and selective programs (tables I11 and I12 in the appendix) are very similar and indicate a complementarity between "economic", "social", and "educational" factors that is very comparable to that of access to higher education as a whole.

In this section, we have described how the gap in access to higher education by parental income, observed in the first section, may interfere with other factors, such as parental education and occupation. The existence of a residual effect of parents' income demonstrates a complementarity between the dimensions of inequality usually studied in the literature – those related to parents' occupation and diploma – and a more economic dimension of inequality, related to parental income. After quantifying inequalities in access to higher education by parental income in the first part of our paper, and observing the complementarity between several dimensions of inequality in the second part, we show in the last section of the paper how inequalities in access to higher education creates an anti-redistributional pattern of public spending in higher education, even after accounting for the taxes paid by households to finance this public spending.

## 6 Unequal public expenditure for young adults

In this section, we further analyze the implications of the inequality of access to higher education by parental income measured above 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 redistribution of education spending obtained in different institutional settings and with different methodological choices. Usually, spending on K12 education tends to be redistributive while spending on higher education tends to be regressive. The table also shows that the results obtained are highly dependent on methodological choices. When all taxes are taken into account, the authors conclude that education spending is progressive, even in higher education, which is not the case if not all taxes are taken into account. In our study, we focus only on spending on higher education and consider taxes that finance this specific spending (as not all taxes are dedicated to this spending).<sup>51</sup> We adopt a cross-sectional analysis (i.e., not using a life-cycle perspective) assessing progressivity in terms of parental income. The benefit of higher education is implicitly evaluated here at its cost price, as is the case in the literature (Smeeding et al. (1993), Allègre et al. (2012)). We use more recent and disaggregated data on the costs of public higher education than the existing literature, and we also account for private investment in higher education and human capital more generally – through tuition and parental transfers to students –.

We first briefly present the higher education expenditure data used.<sup>52</sup> We then use these expenditure data to assess the redistributability of public and private spending on higher education. We test whether removing the share of taxes paid by parents and used to specifically fund these public higher education expenditures changes the results in terms of redistribution. We then add public subsidies dedicated to young adults and their parents – direct and indirect through tax deductions – in order to extend the analysis to the redistributive profile of total public spending on young adults. Finally, we combine these inequalities in public spending on youth with inequalities in private transfers to observe inequalities in human capital investment in the broad sense. By convention, expenditures are considered over a 6-year period corresponding to the 18-24 years of age of young adults, which corresponds to the scope of our data.

## 6.1 Public and private spending on higher education

In the previous literature on the redistribution of education spending, higher education spending is aggregated into one (Albouy et al. (2002)) or three categories (Allègre et al. (2012)). We rely on more comprehensive data ( "Cost Awareness Survey" data) breaking down student costs by fields and programs.<sup>53</sup> Per student cost varies considerably depending

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51. See section 3.5 and the appendix C3 for more details on the methodology developed here for assessing the redistribution of public spending on young adults.

52. See section 3.1 for more details on these new higher education spending data.

53. See section 3.1 for a detailed description of the higher education spending data we use. Despite their quality, these new data still have some limitations. We are not able to differentiate public spending among the elite graduate schools – we thus attribute the average cost of engineering schools to the other graduate schools –, which might lead us to underestimate inequalities in public spending. Some of these schools have very high spending per student (for example, Berné and Métivier (2015) found that some specific elite graduate schools have spending of 60,000 euros per student per year) and an access rate that remains very

on the program and field of study. Table L13 in the appendix details the cost we obtain for different programs and fields.<sup>54</sup> On average, students in undergraduate degrees cost 3,648 euros per year, those in graduate degrees 5,318 euros and those in engineering schools 10,584 euros. Scientific fields – with the exception of medical studies – tend to be much more expensive than the humanities fields (up to two times more in bachelor degree), which can be explained by the fact that students have more tutorials and practical work, with a much lower student/faculty ratio.

To study inequalities throughout the higher education trajectory, we restrict ourselves to individuals aged 22-24, who are the most advanced in their education in our sample. We retain the higher cost between students' highest degree obtained, highest level of education attained, or current studies. We partially account for re-orientations.<sup>55</sup> In the absence of complete information on individual trajectories in the data, we do not account for individuals who repeat in the same program.<sup>56</sup> We account for private investment in higher education through tuition. We average the tuition paid reported by young adults and parents to limit measurement error.<sup>57</sup>

## 6.2 Inequality in public spending on higher education by parental income

Spending on higher education is higher for those at the top of the income distribution than for those at the bottom (figure 5). Those in the bottom 30 percent of the income distribution receive between 7,000 and 8,000 euros of investment in higher education between the ages

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unequal (Bonneau et al. (2021)). More generally, public spending still varies greatly within programs and majors, which we do not take into account because we cannot link students to the exact university in which they are enrolled. We address these issues in the following in the next section and in appendix M13, by simulating the effect of assigning wealthier individuals to better-endowed programs on our results.

54. For engineering schools, technical training (*IUT*), bachelor's degrees (professional or general), and master's degrees, public expenditures are divided into 9 fields : Humanities, Arts, Languages ; Markets and Organizations ; Mathematics, Engineering, Computer Science ; Law ; Sciences of Matter, Earth and the Universe ; Social Sciences ; Life Sciences ; Medical and Miscellaneous containing what cannot be classified in one of the previous categories.

55. For instance, 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.

56. It is likely that this approximation leads us to underestimate the cost of university students who repeat : 27 % of first year students (MENESR-DEPP (2020)) but also of 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 (*Bulletin officiel de l'éducation nationale n°18*, 3 May 2012) –.

57. Since our cost data represent the cost of expenditures and not the resources of the universities, in cases where the tuition paid is less than 650 euros, we subtract the tuition paid by parents from the total cost to obtain the net public cost. When the tuition is more than 7,500 euros, we consider it is private education and the net public cost is set at 5 % of the tuition paid. Between these two extreme limits that we have fixed by convention, we consider public cost data as the public cost and tuition as the private cost. For individuals who had already graduated from college (16 percent of the individuals in our sample and 29 percent 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 infer 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.

of 18 and 24, compared to about 27,000 euros – of which 18,000 euros correspond to public spending – for those in the top 10 percent of the income distribution (figure 5a). Substantial differences in private investment in higher education are also observed : parents at the bottom of the income distribution pay an average of 300 euros in tuition fees for their child over six years compared to more than 9,000 euros at the top of the income distribution. The ratio of higher education spending between top and bottom income deciles (D10/D1) is equal to 3.4 while that of public investment alone is 2.3.

**Decomposition of inequalities in spending between the extensive and the intensive margins.** These inequalities in public spending appear to be primarily due to differences in access : inequality is much less pronounced when focusing only on those having had access to higher education (figure 5b). When they do enter higher education, individuals in the top and bottom decile of the income distribution benefit from roughly the same public investment (about 20,000 euros between the ages of 18 and 24). Those at the top of the distribution, however, still benefit from a much higher private investment in higher education : about 10,000 euros over 6 years on average, compared to 700 euros for those at the bottom of the income 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 – differences in the cost of higher education among those who had access to higher education, linked to both the length of study and differences in annual cost – .<sup>58</sup> Inequalities in access account for about 70 percent of the inequalities in spending between the top and bottom income deciles (see first column of table 6 and figure J9 in the appendix). The remaining 28 percent of the expenditure gap between individuals at the top and bottom of the income distribution is mostly explained by differences in the length of studies (26 percent). Among those who have had access to higher education, those at the bottom of the income distribution pursue higher education for an average of 2.9 years, compared to 3.9 years for those at the top of the income distribution (see figure J10 in the appendix). In our main specification, there are almost no differences in annual public spending among students whose parents are at the top or bottom of the income distribution.

**Robustness check : matching richer individuals to better-endowed programs.** We may be concerned that this result of equal annual public spending for those who access higher education may be related to our limited ability to match students to the exact program in which they are enrolled and to disaggregate higher education spending for some of the most selective programs (elite graduate schools in particular). The contribution of access inequalities to inequalities 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 track and field might change this result (see second and third column of table 6). When we assume that within a particular track

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58. See section 3.5 and appendix C3 for more details on this decomposition method.

and field of study, the most affluent consistently benefit from the most expensive programs (column 2), and if we also account for the most expensive elite graduate schools that we attribute to the most affluent (column 3),<sup>59</sup> the contribution of inequality of access on declines significantly, but remains equal to at least half of the total differences in public spending on higher education between the poorest and richest individuals.

### 6.3 Net benefit for parents taking into account taxes financing higher education

One objection to the finding of regressive government spending is the idea that wealthier parents contribute more to the funding of higher education through their taxes. The issue deserves empirical examination, but this specification is just informative since paying a tax, unlike a social security contribution for example, is not supposed to give one privileged access to the public services financed by that tax.

We estimate a net benefit measuring the degree of redistribution of public spending on higher education, after deducting the share of taxes paid by parents and needed to finance these spending. We consider a static framework in which young adults' higher education is funded by a contribution from all taxpayers, including their parents. Overall, 4% of all taxes over six years are needed to finance public higher education spending.<sup>60</sup> The net benefit to parents of students or former students is therefore defined as the public funding of their young adult's higher education minus 4% of their unallocated taxes paid over 6 years. We compute this net benefit for young adults aged 22-24 who are the most advanced in their studies. See section 3.5 and appendix C3 for more details on this methodology.

The average net benefit to parents is 8,311 euros over 6 years (see table 7). Parents of young adults benefit from horizontal solidarity since their children's higher education expenses are largely financed (75 percent according to our data) by taxes paid by taxpayers without young adults. This average figure hides heterogeneity between households whose young adults have access to higher education and those who do not : the net benefit is almost twice as high as the average net benefit for the former (15,900 euros), and is negative (-1,900 euros on average) for parents whose young adults never access higher education but still contribute to its financing.

The inclusion of taxes paid by households to finance higher education spending does not change the fact that this spending is regressive but changes the relative situation at the two extremes of the income distribution. The net benefit is twice as high in the top third of the distribution (11,700 euros) as in the bottom third (5,900 euros). It increases with parental income in the second half of the distribution (from P50 to P90), up to 15,800 euros.

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59. See appendix M13 for more details on the assumptions made in these counterfactual scenarios associating the wealthiest individuals with the best-endowed programs.

60. If these spending were to be funded by parents of students or former students alone, 23% of their tax contribution over six years would be required.

Due to lower tax amounts and slightly more expensive training, the bottom decile of the income distribution receives a slightly higher benefit than the average among the top third of the income distribution (see table 7 and figure 7). Conversely, due to a higher level of taxation and despite more frequent access to higher education, the top decile of the income distribution receives half the benefit of the ninth decile (8,200 euros versus 15,800 euros). This net advantage is nevertheless higher than that of the first decile.

These results taking into account the taxes paid by parents in financing public higher education should not be seen as legitimizing or minimizing inequalities in access to higher education since the payment of a tax is not expected to provide privileged access to the public services funded by the tax. The considerable disparities in permanent income by parental income are of a much greater order of magnitude than the differences in funding for public higher education (Allègre et al. (2012)). The main challenge, therefore, is not so much to revise the higher education funding system,<sup>61</sup> but rather to ensure more equal access along the parental income distribution to higher education and its selective programs.

## 6.4 Distribution of public and private spending for young adults by parental income

In order to obtain a complete picture of inequality in human capital investment, this final section extends the analysis of the redistribution of higher education spending to all public spending on young adults and their parents. Finally, we add private transfers to young adults to observe inequalities in human capital investment in a broad sense.

**Total public spending benefiting young adults and their parents.**<sup>62</sup> The means-testing of scholarships leads to a progressive distribution of public aid (see figures 6a and 6b). But the addition of regressive tax deductions offsets this progressivity. The amount of tax and social assistance is slightly lower around the median parental income, creating a small U-shape pattern.<sup>63</sup> Due to the regressivity of public spending on higher education, total public spending on young adults resulting from public aid for them and their parents and public spending on higher education remains clearly regressive. Young adults and their parents in the top 10 percent of the income distribution receive 75 percent more public spending than those in the bottom 10 percent (see table 7 and figure 7).

**Total inequality in public and private spending on young adults.** Inequality of opportunity results from 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. Cumulated over a six-year period, private spending on young adults aged 22 or older gives

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61. Through the introduction of much higher tuition fees that would depend on parental income, for example, as this could distort higher education enrollment decisions in the middle of the income distribution.

62. See section 2 appendix A1 for a description of the public aid and tax deductions available in France for young adults.

63. This is less the case among young people who have entered higher education, for whom the least affluent receive a bit more social aids and tax allowances.

rise to considerable inequality : while young adults whose parents belong to the poorest 10 percent receive about 6,600 euros in private transfers, those who belong to the richest 10 percent receive nearly 40,000 euros, or about six times as much (table 7). Thus, total public and private spending is 2.5 times higher for young adults whose parents belong to the top decile of the income distribution than for those whose parents belong to bottom decile (see the dotted gray line in figure 7). Although only a portion of this expenditure is an educational investment in the strict sense, it nonetheless contributes to the youth’s empowerment and well-being. It can affect the young person’s educational and job-seeking choices, as well as his or her level of human capital in the broader sense.

## 7 Conclusion

Using a detailed survey of young adults linked to administrative data on their parents’ income, we provide evidence of inequality in access to higher education and selective programs by parental income. On average, a 10 percentile rank increase in the distribution of parental income is associated with a 5.8 percentage point increase in the proportion of children accessing higher education. Economic inequalities created by income interfere, but do not fully overlap, with inequalities created by social origins in terms of parental socioeconomic status or degree. Spending on higher education is regressive, even after accounting for the taxes paid by parents to fund higher education. Nevertheless, the main concern remains the inequality of access to higher education and particularly selective programs between different income groups, which creates large differences in educational investment but even larger differences in permanent income later in the life cycle and thus strongly limits social mobility.

Our analysis documents the existence of strong differences in parental transfers among students, which call for increased scholarships to better cover the costs associated with higher education. As income inequality and inequality related to parental socioeconomic status do not fully overlap, our results also suggest that reliable data on parental income should be further developed in educational data. Detailed data on spending differentials in higher education, especially for selective programs such as elite graduate schools, would allow a more systematic estimation of the redistribution effect of public spending on higher education.

## Références

- (2014). Arrêté du 12 août 2014 fixant les taux de droits de scolarité d'établissements publics d'enseignement supérieur relevant du ministre chargé de l'enseignement supérieur.
- Accardo, J., M. André, J.-M. Germain, and M. Sicsic (2021). Measuring inequality and redistribution including in-kind benefits from health and education. Document de travail du DESE, Insee, à paraître.
- Acemoglu, D. and J.-S. Pischke (2001). Changes in the wage structure, family income, and children's education. *European Economic Review* 45(4-6), 890–904.
- Akee, R. K., W. E. Copeland, G. Keeler, A. Angold, and E. J. Costello (2010). Parents' incomes and children's outcomes : a quasi-experiment using transfer payments from casino profits. *American Economic Journal : Applied Economics* 2(1), 86–115.
- Albouy, V., F. Bouton, and N. Roth (2002). Les transferts en faveur des familles : un bilan statique des transferts liés à l'éducation. *INSEE-Division Études sociales*.
- Alesina, A., S. Stantcheva, and E. Teso (2018). Intergenerational mobility and preferences for redistribution. *American Economic Review* 108(2), 521–54.
- Allègre, G., T. Melonio, and X. Timbeau (2012). Dépenses publiques d'éducation et inégalités. *Revue économique* 63(6), 1055–1079.
- Alvaredo, F., T. Piketty, and E. Saez (2014). *The world top incomes database*. Paris School of Economics.
- Barbaro, S. (2003). The distributional impact of subsidies to higher education-empirical evidence from germany. *FinanzArchiv : Public Finance Analysis* 59(4), 458–478.
- Barhoumi, M. and J.-P. Caille (2020). Les élèves sortent de l'enseignement secondaire de plus en plus diplômés mais au terme de parcours scolaires encore socialement différenciés. *Éducation & Formations n°101*.
- Baum, S., J. Ma, D. Bell, and D. C. Elliott (2014). Trends in college pricing, 2014. trends in higher education series. *College Board*.
- Becker, G. S. and N. Tomes (1979). An equilibrium theory of the distribution of income and intergenerational mobility. *Journal of political Economy* 87(6), 1153–1189.
- Beffy, M., D. Fougère, A. Maurel, et al. (2013). *The effect of college employment on graduation : evidence from France*. Centre for Economic Policy Research.
- Belley, P. and L. Lochner (2007). The changing role of family income and ability in determining educational achievement. *Journal of Human capital* 1(1), 37–89.

- Berné, O. and F. Métivier (2015). Inégalités de traitement des étudiants suivant les filières en France. *Science en Marche*.
- Black, S. E. and P. J. Devereux (2011). Recent developments in intergenerational mobility. *Handbook of Labor Economics* 4, 1487–1541.
- Blau, D. M. (1999). The effect of income on child development. *Review of Economics and Statistics* 81(2), 261–276.
- Blau, P. M. and O. D. Duncan (1967). The American occupational structure.
- Blinder, A. S. (1973). « Wage Discrimination : Reduced Form and Structural Estimates ». *Journal of Human Resources* 17(1), 436–455.
- Boiteau, J.-S. and C. Jameux (2019). Le projet de connaissance des coûts des activités des établissements d’enseignement supérieur et de recherche : Retour d’expérience. *Recherches en sciences de gestion* 4(127), 215–240.
- Bonneau, C., P. Charoussat, J. Grenet, and G. Thébaud (2021). *Quelle démocratisation des grandes écoles depuis le milieu des années 2000 ?* Institut des Politiques Publiques.
- Boudon, R. (1973). *L’inégalité des chances : la mobilité sociale dans les sociétés industrielles*. Armand Colin.
- Bourdieu, P. and J.-C. Passeron (1964). *Les héritiers : les étudiants et la culture*. Minuit.
- Bütikofer, A., E. Risa, and K. Salvanes (2019). Status traps and human capital investment.
- Carlana, M. (2019). Implicit stereotypes : Evidence from teachers’ gender bias. *The Quarterly Journal of Economics* 134(3), 1163–1224.
- Carrell, S. E., M. E. Page, and J. E. West (2010). Sex and science : How professor gender perpetuates the gender gap. *The Quarterly Journal of Economics* 125(3), 1101–1144.
- Ceci, S. J. and W. M. Williams (2011). Understanding current causes of women’s underrepresentation in science. *Proceedings of the National Academy of Sciences* 108(8), 3157–3162.
- Chetty, R., J. N. Friedman, E. Saez, N. Turner, and D. Yagan (2020). Income segregation and intergenerational mobility across colleges in the United States. *The Quarterly Journal of Economics* 135(3), 1567–1633.
- Chetty, R., N. Hendren, P. Kline, and E. Saez (2014). Where is the land of opportunity? The geography of intergenerational mobility in the United States. *The Quarterly Journal of Economics* 129(4), 1553–1623.

- Chevalier, A., C. Harmon, V. O’Sullivan, and I. Walker (2013). The impact of parental income and education on the schooling of their children. *IZA Journal of Labor Economics* 2(1), 8.
- Corak, M. (2013). Inequality from generation to generation : The united states in comparison. *The economics of inequality, poverty, and discrimination in the 21st century* 1, 107–126.
- Currie, J. and E. Moretti (2003). Mother’s education and the intergenerational transmission of human capital : Evidence from college openings. *The Quarterly journal of economics* 118(4), 1495–1532.
- Das Gupta, P. (1991). Decomposition of the difference between two rates and its consistency when more than two populations are involved. *Mathematical Population Studies* 3(2), 105–125.
- Depp (2015). *Repères et références statistiques sur les enseignements, la formation et la recherche - édition 2015*. Ministère de l’Éducation nationale, de l’Enseignement supérieur et de la Recherche, (Depp).
- Dherbécourt, C. (2020). Social mobility in france : what do we really know ?
- Duflo, E. (2003). Grandmothers and granddaughters : old-age pensions and intrahousehold allocation in south africa. *The World Bank Economic Review* 17(1), 1–25.
- Fields, G. S. (1975). Higher education and income distribution in a less developed country. *Oxford Economic Papers* 27(2), 245–259.
- Germain, J.-M. d. (2021). *Rapport du groupe d’experts sur la mesure des inégalités et de la redistribution*. Insee Méthodes.
- Gurria, A. (2016). Pisa 2015 results in focus. *PISA in Focus* (67), 1.
- Hansen, W. L. (1970). Income distribution effects of higher education. *The American Economic Review* 60(2), 335–340.
- Hansen, W. L. and B. A. Weisbrod (1969). The distribution of costs and direct benefits of public higher education : The case of california. *Journal of human resources*, 176–191.
- Hatchuel, G. (1976). *Les bénéficiaires des dépenses de l’éducation nationale en 1965 et 1970 : analyse par catégorie socio-professionnelle*. Centre de recherches et de documentation sur la consommation.
- Haveman, R. and B. Wolfe (1995). The determinants of children’s attainments : A review of methods and findings. *Journal of economic literature* 33(4), 1829–1878.

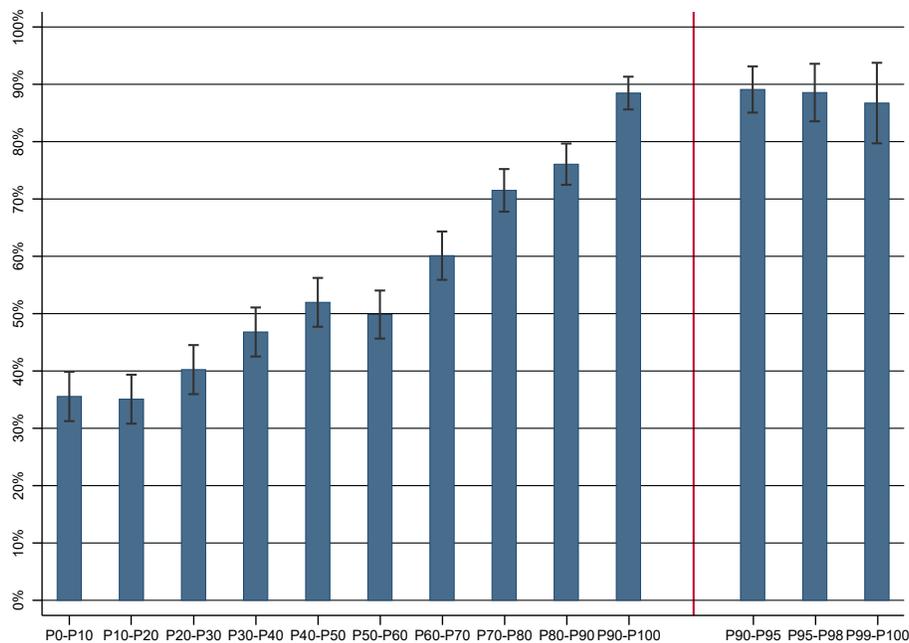
- Herbaut, E. (2019). Les inégalités d'accès à l'enseignement supérieur français. *Revue française de sociologie* 60(4), 535–566.
- Horriere, Y. and P. Petit (1972). *Les effets redistributifs de l'enseignement supérieur*. CEPREMAP.
- Johnson, W. R. (2006). Are public subsidies to higher education regressive? *Education Finance and Policy* 1(3), 288–315.
- Landersø, R. and J. J. Heckman (2017). The scandinavian fantasy : The sources of intergenerational mobility in denmark and the us. *The Scandinavian journal of economics* 119(1), 178–230.
- Lefranc, A. and A. Trannoy (2005). Intergenerational earnings mobility in france : Is france more mobile than the us? *Annales d'Economie et de Statistique*, 57–77.
- Lemelin, C. (1992). Short-term redistributive effects of public financing of university education in quebec. *Canadian Public Policy/Analyse de Politiques*, 176–188.
- Li, J. (2017). Rate decomposition for aggregate data using das gupta's method. *The Stata Journal* 17(2), 490–502.
- Løken, K. V. (2010). Family income and children's education : Using the norwegian oil boom as a natural experiment. *Labour Economics* 17(1), 118–129.
- Løken, K. V., M. Mogstad, and M. Wiswall (2012). What linear estimators miss : The effects of family income on child outcomes. *American Economic Journal : Applied Economics* 4(2), 1–35.
- Lundborg, P., E. Plug, and A. W. Rasmussen (2020). On the family origins of human capital formation : Evidence from donor children. *Working Paper*.
- Maurin, E. (2002). The impact of parental income on early schooling transitions : A re-examination using data over three generations. *Journal of public Economics* 85(3), 301–332.
- Mayer, S. E. (1997). *What money can't buy : Family income and children's life chances*. Harvard University Press.
- Mendès France, B. (1987). Les dépenses publiques d'éducation : les effets redistributifs n'éliminent pas toutes les inégalités. *Économie et Statistique* 203(1), 37–48.
- MENESR-DEPP (2016). *Filles et garçons sur le chemin de l'égalité : de l'école à l'enseignement supérieur - Édition 2016*. Ministère de l'Éducation nationale, de l'Enseignement supérieur et de la Recherche.

- MENESR-DEPP (2020). *L'état de l'Enseignement supérieur et de la Recherche en France - Édition 2020*. Ministère de l'Éducation nationale, de l'enseignement supérieur et de la recherche.
- MENESR-DEPP (2021). *L'état de l'Enseignement supérieur et de la Recherche en France - Édition 2021*. Ministère de l'Éducation nationale, de l'enseignement supérieur et de la recherche.
- Moore, J. C. and E. J. Welniak (2000). Income measurement error in surveys : A review. *Journal of official statistics* 16(4), 331.
- Oaxaca, R. (1973). « Male-Female Wage Differentials in Urban Labor Markets ». *International Economic Review* 14(3), 693–709.
- OVE (2014). *Repères Conditions de vie – Édition 2014*. Observatoire de la Vie Étudiante.
- O'Donoghue, C. (2002). The redistributive impact of education in the european. union. *Communication préparée pour le séminaire organisé par le CERC, «Les effets redistributifs de l'éducation : les enseignements d'une approche monétaire statique*.
- Pechman, J. A. (1970). The distributional effects of public higher education in california : A review article.
- Perez-Arce, F., E. F. Amaral, H. C. Huang, and C. C. Price (2016). *Inequality and Opportunity : The Relationship Between Income Inequality and Intergenerational Transmission of Income*. Rand Corporation.
- Piketty, T., E. Saez, and G. Zucman (2018). Distributional national accounts : methods and estimates for the united states. *The Quarterly Journal of Economics* 133(2), 553–609.
- Psacharopoulos, G. and H. A. Patrinos (2018). *Returns to investment in education : a decennial review of the global literature*. The World Bank.
- Rawls, J. (1971). *A theory of Justice*. Harvard University Press.
- Sacerdote, B. (2007). How large are the effects from changes in family environment ? a study of korean american adoptees. *The Quarterly Journal of Economics* 122(1), 119–157.
- Shea, J. (2000). Does parents' money matter ? *Journal of public Economics* 77(2), 155–184.
- Smeeding, T. M., P. Saunders, J. Coder, S. Jenkins, J. Fritzell, A. J. Hagenaars, R. Hauser, and M. Wolfson (1993). Poverty, inequality, and family living standards impacts across seven nations : The effect of noncash subsidies for health, education and housing. *Review of Income and Wealth* 39(3), 229–256.

- Solon, G. (1992). Intergenerational income mobility in the united states. *The American Economic Review*, 393–408.
- Taubman, P. (1989). Role of parental income in educational attainment. *The American Economic Review* 79(2), 57–61.
- Tsakoglou, P. and M. Antoninis (1999). On the distributional impact of public education : evidence from greece. *Economics of Education Review* 18(4), 439–452.

# Figures

FIGURE 1 – Proportion of individuals accessing higher education between 18 and 24 according to parents' pre-tax income

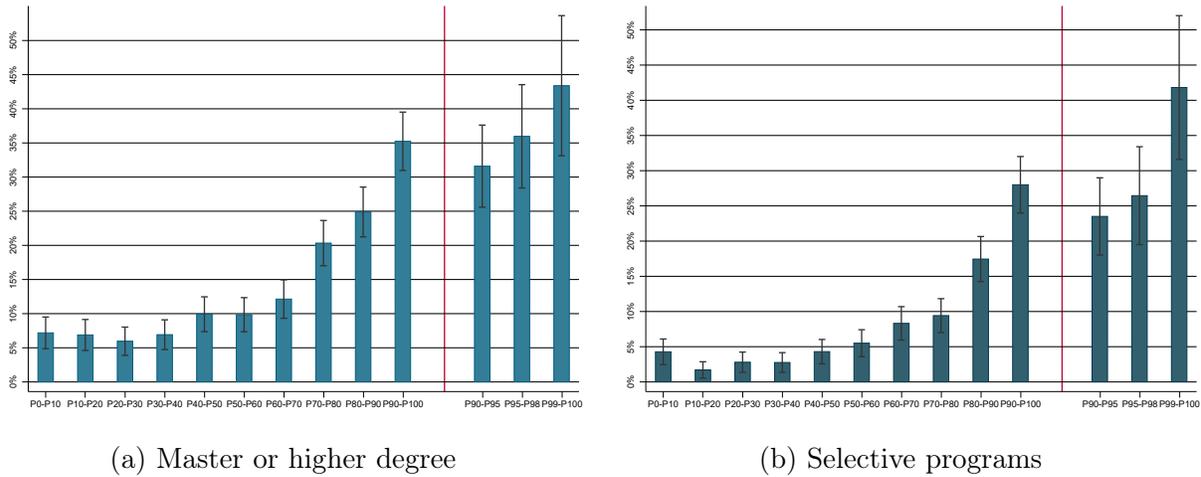


*Reading :* About 35% of young people aged 18 to 24 whose parents belong to the 1st decile (P0-P10) of the income distribution are student, have obtained a higher education diploma or have attained some level of higher education without necessarily obtaining a degree.

*Note :* The figure shows the proportion of individuals aged 18-24 currently enrolled in or already holding a higher education degree, by parental income. The parental income used is the sum of the father's pre-tax income and the mother's pre-tax income. Deciles are computed 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.

*Source :* Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes.

FIGURE 2 – Proportion of individuals aged 18 to 24 in masters’ degree or in a selective programs (preparatory courses, elite graduate schools, medical studies, Ph.D.) according to the parents’ pre-tax income

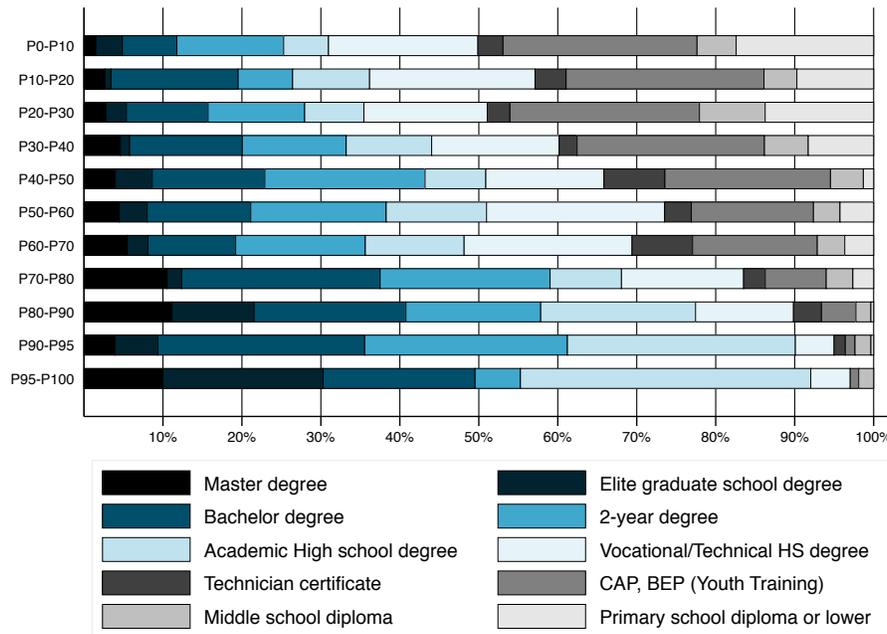


*Reading :* Almost 40% of individuals aged 18 to 24 whose parents belong to the top 3% of the income distribution are studying in a selective program (preparatory courses, elite graduate schools, medical studies or Ph.D.).

*Note :* Figure (a) shows the proportion of individuals aged 18-24 currently enrolled in, who have already reached the master level, without necessarily obtaining the diploma or already holding a master’s degree or higher, by parental income. Figure (b) shows the proportion of 18-24 year olds currently enrolled in, who have obtained a certain level of selective programs without necessarily having graduated or already holding a degree from a selective program (preparatory courses, elite graduate schools, medical school, or PhD), by parental income. The parental income used is the sum of the father’s pre-tax income and the mother’s pre-tax income. Deciles are computed 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.

*Source :* Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes.

FIGURE 3 – Highest degree obtained by individuals aged 22 to 24 based on parents’ pre-tax income

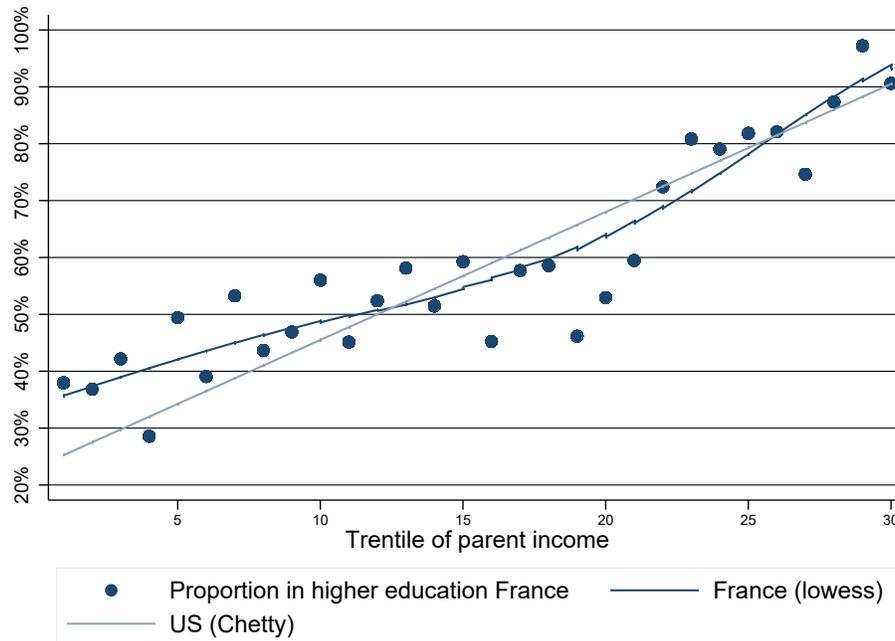


*Reading :* Almost 50% of young people aged 22 to 24 whose parents belong to the top vintile of the income distribution have obtained at least a bachelor degree.

*Note :* This figure shows the highest degree obtained by individuals aged 22 to 24, by parental income. The parental income used is the sum of the father’s pre-tax income and the mother’s pre-tax income. Deciles are computed based on this definition. We further decompose the distribution into the top 10 percent of the income distribution in vintile (x-axis).

*Source :* Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes.

FIGURE 4 – Proportion of young people in higher education according to parents' pre-tax income in France (21-24 years old) and in the United States

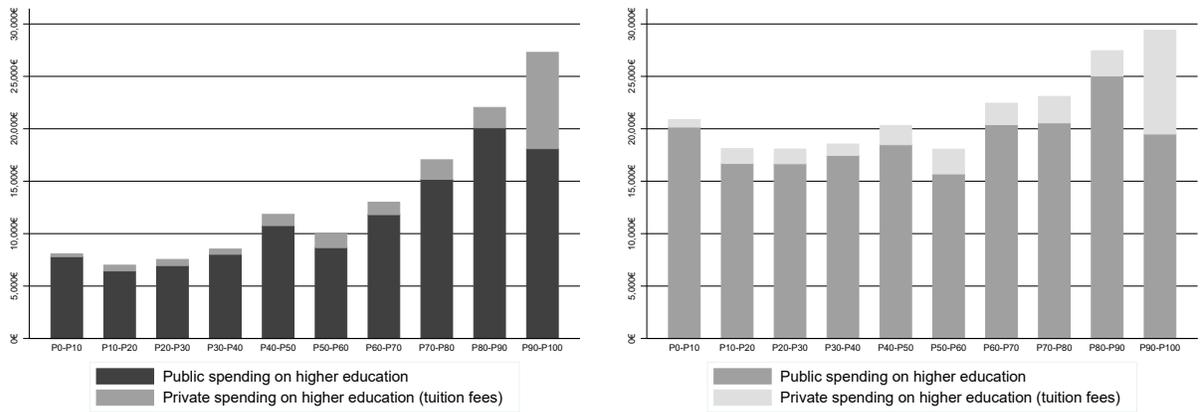


*Reading* : Almost 90% of individuals whose parents belong to the top of the income distribution are in higher education in France as in the United States.

*Note* : 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 (based on figures from Chetty et al. (2014)). In France, the parental income used is the sum of the father's pre-tax household income and the mother's pre-tax household income, in 2014, divided by two when we have both the father's and mother's household income. In the United States, the parental income used is the mother's total pre-tax income at the household level plus the father's total pre-tax income at the household level for each year from 1996 to 2000, divided by 10 or by 5 if only one parent is identified (Chetty et al. (2014)). The trentiles are calculated based on this definition. The definition of income is not exactly the same as in the rest of our study because our main specification focuses on individual income, whereas here, in order to be more comparable to Chetty et al. (2014), we consider parents' household income, divided by two when we have both father and mother's household income. 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 non-decohabiting young adults. Taking into account property and capital incomes would mainly change the ranking within the last decile, but should only marginally change the ranking of individuals in the rest of the distribution. Chetty et al. (2014) 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.

*Source* : Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes for France and Chetty et al. (2014) for the United States.

FIGURE 5 – Inequality in spending for higher education over the entire educational career (from 18 to 24 years old)



(a) All individuals (22-24)

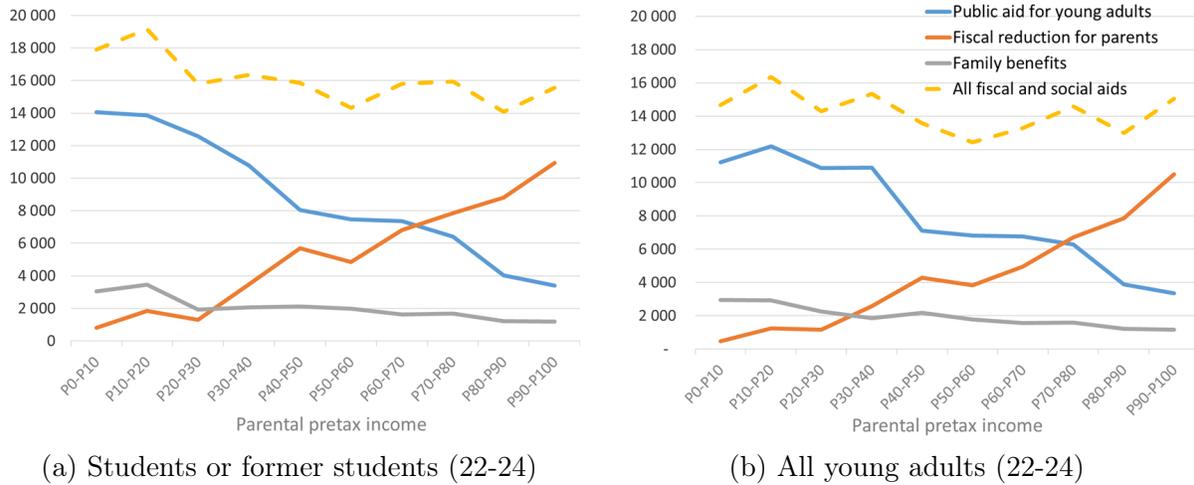
(b) Students or former students (22-24)

*Reading* : Students whose parents are in the top 10 percent of the income distribution benefit from an investment of about 30,000 euros in higher education, of which 20,000 euros are funded by the state and 10,000 by tuition paid by their parents.

*Note* : Figure (a) displays the total amount of public investment in higher education for all individuals over the course of their education from age 18 to 24, as a function of parental income. Figure (b) depicts the total amount of public investment in higher education for students or former students over the course of their education from age 18 to 24, by parental income. We restrict ourselves to individuals aged 22-24 to focus on those most advanced in their studies and to limit the bias from those who have not completed their studies. The parental income used is the sum of the father's pre-tax income and the mother's pre-tax income. Deciles are computed based on this definition (x-axis). The black line represents the standard errors.

*Source* : Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes, MENESR-DEPP (2021), and *Connaissance des coûts* (2016-2019) data.

FIGURE 6 – Public aid for young adults (aged 22 to 24) and their parents (direct and indirect) over a 6 year period



(a) Students or former students (22-24)

(b) All young adults (22-24)

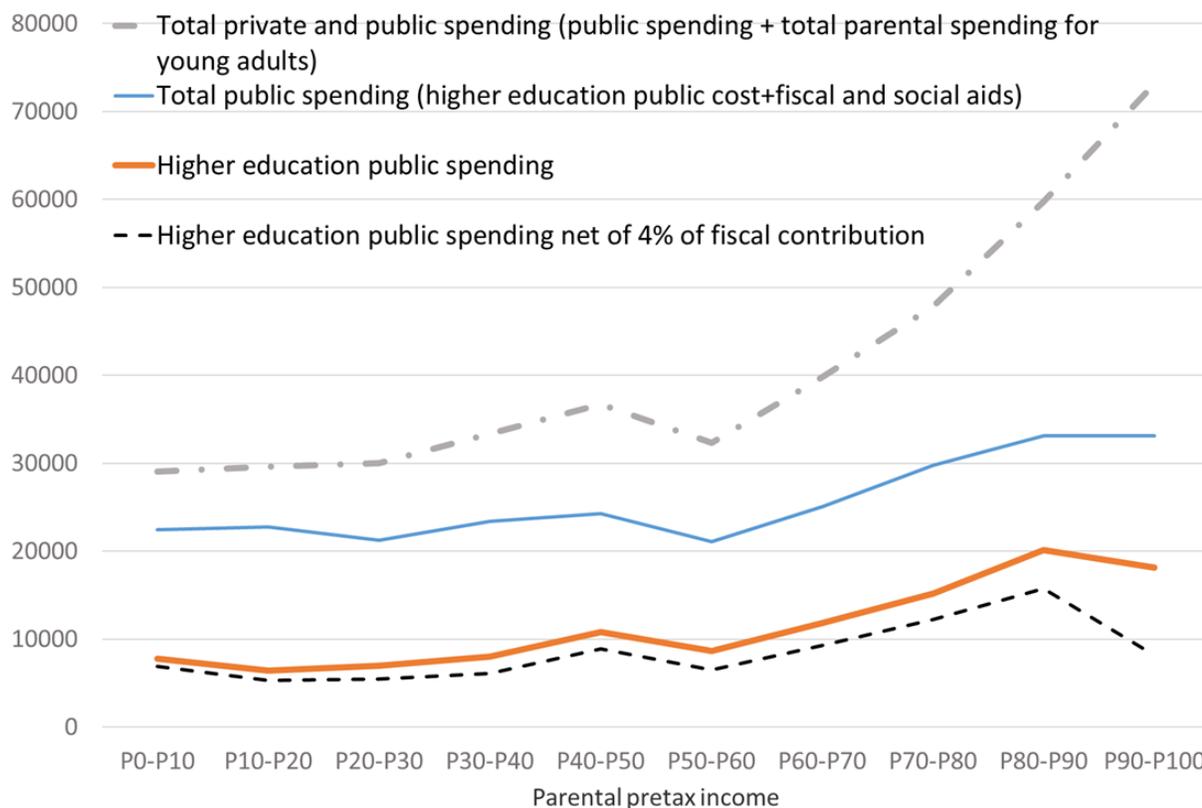
*Reading :* Students or former students aged 22 to 24 whose parents belong to the richest 10 percent of the income distribution receive an average of around 15,600 euros in government aid, parental tax cuts or family benefits over 6 years. Those whose parents belong to the poorest 10 percent receive 17,900 euros. Among all young adults, individuals at the very bottom of the income distribution receive less than students (14,700 euros) and almost the same as those at the very top (15,000 euros), but more than those in the middle of the distribution (12,400 euros between P50 and P60).

*Note :* Figure (a) shows the amount of public aid and tax reductions for students or former students aged 22-24, by parental income. Figure (b) shows the same figures for all individuals aged 22-24. Public aid is mainly composed of need-based scholarships (*Bourses sur Critères Sociaux*) and housing benefits (*Aide Personnalisée au Logement*) for students. In our survey, it also includes unemployment benefits, income support (*Revenu de Solidarité Active (RSA)*), the allowance for disabled adults (*Allocation aux adultes handicapés*), the contract for integration into social life (*Contrat d'Insertion dans la Vie Sociale (CIVIS)*), and family benefits for all young adults. The earned income tax credit (*Prime d'activité*) and the youth guarantee (*Garantie Jeune*), which were introduced after the survey date, are not included here. We consider direct public support to parents through tax deductions and indirect public support through tax reductions related to the presence of a young adult.

Tax cuts are granted to all parents whose child is attached to their tax return until the age of 20, and then only to parents whose child is a student until the age of 24. They are part of a more general system of tax splitting linked to the family quotient ensuring a proportional reduction of the taxes paid and increasing with the number of children (proportionally more important from the 3rd child). Family benefits paid to parents are imputed on the basis of official scales and include family allowances (*allocations familiales*, including the flat-rate allowance) and the family supplement (*complément familial*). Total family benefits are divided by the total number of children concerned to considered only those linked to the young adult we consider. The parental income used is the sum of the father's pre-tax income and the mother's pre-tax income. Deciles are computed based on this definition (x-axis).

*Source :* Drees-Insee 2014, *Enquête Nationale sur les Ressources des Jeunes*.

FIGURE 7 – Total public and private expenditure received by young adults over a 6-year period, by parental pre-tax income



*Reading* : Net benefit – i.e. public spending on higher education minus the taxes paid by parents who specifically contribute to funding this spending – for higher education is under 7,000 euros in the bottom 40% of the parental income distribution. It increases with parental income in the second half of the distribution (P50 to P90) up to 15,800 euros and decreases for the richest 10 percent (8,200 euros). Young adults (22-24) whose parents are in the top 10 percent of the income distribution receive 33,100 euros of total public spending (including higher education spending, social aid, family benefits for their parents as well as tax reductions), which is 50% more than the bottom 10 percent (22,400 euros).

*Note* : The solid orange line shows public expenses for higher education received by young adults aged 22 to 24 over a 6-year period (between 18 and 24). The dotted dark blue line shows the same figure, net of 4 percent of parental tax contribution (corresponding to the share of all taxpayers unallocated taxes needed to finance higher education). The solid blue line shows the total public expenditures, related to public spending on higher education, public aid, and tax cuts to their parents. The dotted grey line is the total public spending and total private spending received by young adults over the period. Private spending is the parental spending for the young adult including financial transfers, in-kind support and expenses made directly for the benefit of the youth (rent, telephone charges, clothing; etc.). The parental income used is the sum of the father's pre-tax income and the mother's pre-tax income. Deciles are computed based on this definition (x-axis).

*Source* : Drees-Insee 2014, *Enquête Nationale sur les Ressources des Jeunes*; *Connaissance des coûts* survey and MENESR-DEPP (2021) for higher education costs; Insee 2014, *Enquête Revenus fiscaux et sociaux (ERFS)* for the total tax revenues; Germain (2021) for indirect and corporate tax imputation coefficients.

# 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 | Result 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  |
| Horriere & Petit (1972)      | France            | Social origins (occupation)   | Yes                      | Yes                   | Regressive   |
| 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 until 15 Higher Ed. regressive         |
| Lemelin (1992)               | Quebec            | Education level of parents    | No                       | Yes                   | Regressive   |
| Antoninis & Tsakoglou (1999) | Greece            | Income quintiles              | No                       | No                    | Progressive  |
| Barbaro (2003)               | Germany           | Income                        | Yes                      | Yes                   | Progressive  |
| Albouy et al. (2002)         | France            | Living standards              | Yes                      | No                    | Progressive until 8th decile Higher Ed. regressive |
| O'Donoghue (2002)            | European Union    | Income                        | Yes                      | No                    | Progressive  |
| Johnson (2006)               | U.S.              | Income decile                 | Yes                      | Yes                   | Progressive  |
| Allègre et al. (2012)        | France            | Permanent income (life cycle) | Yes                      | No                    | Progressive  |

*Note* : 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. In this case, we specify which income concept is used). The column "taxes taken into account" indicates whether the author deducts the taxes paid by the parents (either partially or entirely) or not. The "higher education only" column specifies states 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=963            | N=1,033           | N=1,083           | N=1,091           | N=1,027            | N=5,197            | N=2,963                     |
| <b>Age of young adults</b>                    | 21.1 (2.0)       | 21.0 (2.1)        | 20.9 (2.0)        | 20.9 (2.0)        | 20.8 (2.0)         | 20.9 (2.0)         | 21.0 (2.0)                  |
| <b>Age of fathers</b>                         | 55.5 (6.59)      | 53.8 (7.29)       | 51.8 (5.67)       | 53.3 (6.17)       | 53.0 (6.13)        | 53.2 (6.41)        | 53.5 (6.30)                 |
| <b>Age of mothers</b>                         | 50.0 (6.33)      | 49.9 (6.09)       | 49.7 (5.51)       | 49.9 (4.80)       | 50.8 (4.74)        | 50.1 (5.59)        | 50.6 (5.33)                 |
| <b>Female</b>                                 | 51.8%            | 48.2%             | 49.2%             | 49.9%             | 47.4%              | 49.3 %             | 53.1 %                      |
| <b>Pre-tax income of parents</b>              | 8,657<br>(6,139) | 23,997<br>(3,614) | 36,748<br>(3,655) | 50,687<br>(5,125) | 95,478<br>(59,216) | 43,099<br>(39,969) | 52,499<br>(46,420)          |
| <b>Fathers' occupation</b>                    |                  |                   |                   |                   |                    |                    |                             |
| Low SES                                       | 39.2%            | 50.5%             | 46.1%             | 28.4%             | 6.8%               | 33.1%              | 22.2%                       |
| Medium-low SES                                | 51.0 %           | 34.2%             | 24.6%             | 21.5%             | 13.4%              | 27.5%              | 26.2%                       |
| Medium-high SES                               | 5.8%             | 11.9%             | 22.7%             | 30.3%             | 20.6%              | 19.2%              | 22.0%                       |
| High SES                                      | 4.0 %            | 3.3%              | 6.6%              | 19.9%             | 59.2%              | 20.2%              | 29.6%                       |
| <b>Mothers' occupation</b>                    |                  |                   |                   |                   |                    |                    |                             |
| Low SES                                       | 30.9%            | 23.4%             | 18.4%             | 12.2%             | 3.7%               | 17.5%              | 10.7%                       |
| Medium-low SES                                | 60.9%            | 61.3 %            | 62.6%             | 48.9%             | 26.6%              | 51.8%              | 45.5%                       |
| Medium-high SES                               | 5.5%             | 11.7%             | 13.1%             | 27.4%             | 30.5%              | 17.9%              | 24.1%                       |
| High SES                                      | 2.7%             | 3.6 %             | 5.9%              | 11.6%             | 39.2%              | 12.9%              | 19.7%                       |
| <b>Fathers' diploma</b>                       |                  |                   |                   |                   |                    |                    |                             |
| Primary school degree or lower                | 40.3%            | 31.1%             | 21.1%             | 9.3%              | 2.6%               | 17.9%              | 11.0%                       |
| Middle School degree                          | 4.7%             | 5.8%              | 5.5%              | 6.5%              | 4.0%               | 5.3%               | 4.4%                        |
| High-School degree                            | 41.5%            | 55.7%             | 60.4%             | 57.2%             | 28.9%              | 49.1%              | 44.6%                       |
| Two-year degree                               | 6.8%             | 4.6%              | 7.7%              | 14.4%             | 19.1%              | 11.4%              | 15.4%                       |
| Bachelor or Master's degree                   | 5.7%             | 2.4%              | 4.4%              | 11.6%             | 35.8%              | 13.5%              | 20.0%                       |
| Ph.D.   | 1.0%             | 0.3%              | 0.9%              | 0.9%              | 9.7%               | 2.9%               | 4.7%                        |
| <b>Mothers' diploma</b>                       |                  |                   |                   |                   |                    |                    |                             |
| Primary school degree or lower                | 46.0%            | 31.9%             | 18.9%             | 9.0%              | 2.5%               | 21.3%              | 11.6%                       |
| Middle School degree                          | 8.5%             | 10.2%             | 9.0%              | 7.2%              | 3.4%               | 7.6%               | 6.5%                        |
| High-School degree                            | 35.7%            | 45.1%             | 54.3%             | 51.1%             | 29.4%              | 43.1%              | 39.8%                       |
| Two-year degree                               | 5.2%             | 7.5%              | 9.6%              | 20.3%             | 24.3%              | 13.6%              | 20.1%                       |
| Bachelor or Master degree                     | 4.4%             | 5.0%              | 7.5%              | 11.6%             | 33.9%              | 12.7%              | 19.1%                       |
| Ph.D.   | 0.3%             | 0.4%              | 0.8%              | 0.9%              | 6.6%               | 1.8%               | 3.0%                        |
| <b>Marital status of parents</b>              |                  |                   |                   |                   |                    |                    |                             |
| Parents live together                         | 35.2%            | 59.7%             | 73.1%             | 83.0%             | 81.5%              | 66.5%              | 71.1%                       |
| Parents are separated                         | 43.8%            | 29.2%             | 22.4%             | 16.2%             | 17.2%              | 25.8%              | 22.5%                       |
| Father unknown or deceased                    | 17.8%            | 8.3%              | 2.9%              | 0.5%              | 0.9%               | 6.1%               | 4.9%                        |
| Mother unknown or deceased                    | 2.5%             | 2.8%              | 1.6%              | 0.3%              | 0.4%               | 1.5%               | 1.5%                        |
| Parents unknown or deceased                   | 0.6 %            | 0%                | 0%                | 0%                | 0%                 | 0.1%               | 0.1%                        |
| <b>Biggest urban units among both parents</b> |                  |                   |                   |                   |                    |                    |                             |
| Less than 100,000 inhabitants                 | 52.4%            | 58.6%             | 57.6%             | 58.5%             | 39.4%              | 53.3%              | 49.9%                       |
| More than 100,000 inhabitants                 | 34.0%            | 27.3%             | 28.4%             | 28.3%             | 32.0%              | 30.0%              | 30.0%                       |
| Parisian area                                 | 13.6%            | 14.1%             | 13.9%             | 13.3%             | 28.6%              | 16.7%              | 20.0%                       |

*Readings* : Individuals are on average 20.9 years old in the sample, 49.3% of them are girls.

*Note* : The sample is constructed from the ENRJ survey. Only individuals for whom a young adult and at least one parent responded to the questionnaire are included in our sample. The number of observations in each parental income decile is not the same because we take into account the survey weights assessing the non-response bias when creating the deciles. The mother's occupation is missing for 4 percent of the observations and the father's for 9 percent of the observations. The mother's diploma is missing for 4 percent of the observations and the father's for 17 percent of the observations. When the parents are separated, both were questioned in 46 percent of the cases and only one in 54 percent of the cases, in which case we have no information on the non-resident parent apart from the young adult's answers. When both parents do not live in the same city, we retain the larger one.

*Sources* : Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes.

TABLE 3 – Access to higher education by parental pre-tax income percentile rank

| <b>Access to higher education</b>    | (1)       | (2)       | (3)       | (4)     | (5)      |
|--------------------------------------|-----------|-----------|-----------|---------|----------|
| Baseline                             | 0.57      | 0.57      | 0.57      | 0.57    | 0.57     |
| <b>Parents' income quintile</b>      |           |           |           |         |          |
| Parents' income quintile=1           | -0.16***  | -0.14***  | -0.13***  | -0.011  | -0.075** |
| Parents' income quintile=2           | -0.074*** | -0.063*** | -0.065*** | -0.0063 | -0.021   |
| Parents' income quintile=3           | 0         | 0         | 0         | 0       | 0        |
| Parents' income quintile=4           | 0.15***   | 0.14***   | 0.090***  | 0.11*** | 0.086*** |
| Parents' income quintile=5           | 0.31***   | 0.29***   | 0.11***   | 0.15*** | 0.068*** |
| <b>Control variables included</b>    |           |           |           |         |          |
| 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 unit size                      |           |           |           |         | X        |
| Observations                         | 5,197     | 4,455     | 4,801     | 4,094   | 4,078    |

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

*Readings* : When no control is included, having parents in the 4th quintile of the income distribution relative to the 3rd quintile increases the proportion of individuals in higher education or with a higher education degree by 15 percentage points (out of a baseline probability of access of 57 percent). Having parents in the 5th quintile of the income distribution relative to the 3rd quintile increases the proportion of individuals in higher education or with a higher education degree by 31 percentage points.

*Note* : In this table, we regress a categorical variable of parental income quintile (with the 3rd quintile as the reference category) on access to higher education (1) and observe how this coefficient varies when we successively include controls for potential financial transfers<sup>64</sup>(2), parental occupation (3), parental education (4), and all these controls simultaneously with family status and urban unit size (6). The parental income used is the sum of the father's pre-tax income and the mother's pre-tax income. These regressions show that the effect of income on access to higher education is not linear. The income effect is about twice as large in the top half of the income distribution as in the bottom half. The coefficient does not change much with the inclusion of the potential financial transfer variable. In the upper half of the income distribution, the coefficients are reduced by about two when controls for parental occupation or degree are included, and by a factor of two to five when all controls are included simultaneously. When parental degree is controlled for, the income coefficients are no longer significant in the bottom half of the income distribution.

*Sources* : Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes.

64. This variable represents what a young adult would have received from his or her parents, if he or she were studying, based on 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 size of urban unit where the young adult lives).

TABLE 4 – Oaxaca-Blinder decompositions

|                                    | Higher education |        | Master's degrees |        | Selective programs |        | Aspiration higher than master degree |        |
|------------------------------------|------------------|--------|------------------|--------|--------------------|--------|--------------------------------------|--------|
| Access rate of top decile (%)      | 88.5             |        | 35.2             |        | 28.0               |        | 77.8                                 |        |
| Access rate of bottom decile (%)   | 35.6             |        | 7.2              |        | 4.3                |        | 30.7                                 |        |
| Gross difference                   | 52.9             | 100.0% | 28.1             | 100.0% | 23.7               | 100.0% | 47.1                                 | 100.0% |
| « Explained » part (%)             | 31.0             | 58.6%  | 13.0             | 46.3%  | 14.4               | 60.8%  | 33.9                                 | 72.0%  |
| Degree (father)                    | 16.1             | 30.4%  | 9.3              | 33.1%  | 8.8                | 37.1%  | 18.1                                 | 38.4%  |
| Degree (mother)                    | 14.9             | 28.2%  | 3.7              | 13.2%  | 5.6                | 23.6%  | 15.8                                 | 33.5%  |
| « Unexplained » part (%)           | 21.9             | 41.4%  | 15.1             | 53.7%  | 9.3                | 39.2%  | 13.2                                 | 28.0%  |
| Access rate of top quintile (%)    | 82.2             |        | 30.1             |        | 22.7               |        | 67.8                                 |        |
| Access rate of bottom quintile (%) | 35.3             |        | 7.0              |        | 3.0                |        | 35.3                                 |        |
| Gross difference                   | 46.9             | 100.0% | 23.0             | 100.0% | 19.7               | 100.0% | 32.5                                 | 100.0% |
| « Explained » part (%)             | 28.1             | 59.9%  | 12.4             | 53.9%  | 9.8                | 49.7%  | 23.8                                 | 73.2%  |
| Degree (father)                    | 12.1             | 25.8%  | 6.2              | 27.0%  | 3.7                | 18.8%  | 14.3                                 | 44.0%  |
| Degree (mother)                    | 16.1             | 34.3%  | 6.3              | 27.4%  | 6.1                | 31.0%  | 9.5                                  | 29.2%  |
| « Unexplained » part (%)           | 18.8             | 40.1%  | 10.6             | 46.1%  | 9.9                | 50.3%  | 8.7                                  | 26.8%  |
| Access rate of top half (%)        | 69.2             |        | 20.5             |        | 13.7               |        | 53.6                                 |        |
| Access rate of bottom half (%)     | 41.9             |        | 7.4              |        | 3.2                |        | 37.0                                 |        |
| Gross difference                   | 27.3             | 100.0% | 13.1             | 100.0% | 10.6               | 100.0% | 16.6                                 | 100.0% |
| « Explained » part (%)             | 17.4             | 63.7%  | 6.6              | 50.4%  | 5.8                | 54.7%  | 13.5                                 | 81.3%  |
| Degree (father)                    | 6.6              | 24.2%  | 2.1              | 16.0%  | 2.4                | 22.6%  | 7.6                                  | 45.8%  |
| Degree (mother)                    | 10.8             | 39.6%  | 4.4              | 33.6%  | 3.4                | 32.1%  | 5.9                                  | 35.5%  |
| « Unexplained » part (%)           | 9.9              | 36.3%  | 6.6              | 50.4%  | 4.7                | 44.3%  | 3.1                                  | 18.7%  |

*Readings* : Among individuals whose parents belong to the bottom decile of the income distribution, 35.6 percent had access to higher education between the ages of 18 and 24, compared to 88.5 percent of individuals whose parents belong to the top decile of the income distribution. Of this difference of 52.9 percentage points, 31.0 (58.6% of the gross difference) can be "explained" by the father's degree (for 16.1 percentage points) and by the mother's degree (for 14.9 percentage points). The residual difference of 21.9 percentage points (41.4 percent of the gross difference) is not explained by these factors.

*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; top half vs. bottom half). The parental income used is the percentile rank calculated from the sum of the father's pre-tax income and the mother's pre-tax income. Deciles are computed based on this category. The explanatory variables included in the decomposition are parental education. Separate dummy variables are included for father's degree (7 items) and mother's degree (7 items). In column (4), we restrict ourselves to individuals aged 18-19 to avoid educational aspirations being influenced by completed years of schooling.

*Sources* : Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes.

TABLE 5 – Access to higher education based on parents' income, occupation and diploma

|   | (1)     | (2)     | (3)     | (4)      | (5)      | (6)       |
|---|---------|---------|---------|----------|----------|-----------|
| <b>Parent's income percentile rank</b>      | 0.58*** | 0.57*** | 0.23*** | 0.29***  | 0.15***  | 0.15***   |
| Log of potential financial transfers        |         | 0.0033  |         |          |          | -0.0044   |
| Father Primary school                       |         |         | 0       |          | 0        | 0         |
| Father Middle School                        |         |         | 0.0092  |          | -0.019   | -0.020    |
| Father High School                          |         |         | 0.046** |          | 0.029    | 0.034     |
| Father Two-year degree                      |         |         | 0.18*** |          | 0.12***  | 0.13***   |
| Father Bachelor or Master degree            |         |         | 0.20*** |          | 0.14***  | 0.13***   |
| Father 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                          |         |         | 0.15*** |          | 0.12***  | 0.13***   |
| Mother Two-year degree                      |         |         | 0.35*** |          | 0.29***  | 0.29***   |
| Mother Bachelor or Master degree            |         |         | 0.31*** |          | 0.22***  | 0.23***   |
| Mother Ph.D.                                |         |         | 0.32*** |          | 0.22***  | 0.21***   |
| Father Low SES                              |         |         |         | 0        | 0        | 0         |
| Father Medium-low SES                       |         |         |         | 0.14***  | 0.11***  | 0.11***   |
| Father Medium-high SES                      |         |         |         | 0.14***  | 0.098*** | 0.098***  |
| Father High SES                             |         |         |         | 0.23***  | 0.14***  | 0.14***   |
| Mother Low SES                              |         |         |         | 0        | 0        | 0         |
| Mother Medium-low SES                       |         |         |         | 0.081*** | 0.054*** | 0.055***  |
| Mother Medium-high SES                      |         |         |         | 0.23***  | 0.13***  | 0.14***   |
| Mother High SES                             |         |         |         | 0.26***  | 0.15***  | 0.16***   |
| Parents live together                       |         |         |         |          |          | 0         |
| Separated parents                           |         |         |         |          |          | -0.076*** |
| Parisian area                               |         |         |         |          |          | 0         |
| Urban unit of more than 100,000 inhabitants |         |         |         |          |          | -0.029    |
| Urban unit of less than 100,000 inhabitants |         |         |         |          |          | -0.039*   |
| Observations                                | 5197    | 5197    | 4094    | 4427     | 4065     | 4022      |
| $R^2$                                       | 0.113   | 0.113   | 0.184   | 0.168    | 0.201    | 0.207     |

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

*Readings* : When no controls are included, a 10-percentile increase in parental income is associated with a 5.8 percentage point increase in the proportion of individuals accessing higher education. When controls for parental potential financial transfers, parental education, parental occupation, family status, and urban unit size are included, a 10-percentile increase in parental income is associated with a 1.5 percentage point increase in the proportion of individuals accessing higher education. When only the percentile rank controls for parental income are included, having a mother with a PhD compared to a primary school degree or no degree increases access to higher education by 32 percentage points. Having a mother in a very favored occupation (professionals, managers, CEOs, teachers, professionals and artists) versus a disadvantaged occupation (blue-collar and non-working) increases access to higher education by 26 percentage points.

*Note* : In this table, we regress the percentile rank of parental income on access to higher education (1) and include controls for potential financial transfers (2), parental education (3), parental occupation (4), parental education and occupation (5) and all of these controls simultaneously with family status and urban unit size (6). The parental income used is the percentile rank calculated from the sum of the father's pre-tax income and the mother's pre-tax income.

*Sources* : Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes.

TABLE 6 – Decomposition of differences in public spending on higher education between the wealthiest and poorest individuals

| <b>Contribution of various factors to cost disparities</b><br>(in percent) | Observed cost data | <b>Simulation 1</b><br>Wealthier individuals attend better-endowed programs | <b>Simulation 2</b><br>Assumption of simulation 1 + Wealthier individuals attend very costly elite graduate schools |
|--|--------------------|---|---|
| Access to higher education   | 72                 | 53  | 48  |
| Length of study among students   | 26                 | 19  | 18  |
| Annual public spending among students                                      | 3                  | 27  | 34  |

*Note* : The table shows the contribution of the different variables – access to higher education, differences in the lengths of study for students, differences in public education spending for students – to the total difference in public higher education spending between individuals in the top and bottom 10 percent of the income distribution (in percent). To decompose the contribution of different factors, we rely on Gupta decomposition methods (Das Gupta, 1991). See section 3.5 and appendix C3 for more details.

*Readings* : Inequalities in access to higher education contribute to 72 percent of the differences in public spending on higher education between individuals in the top and bottom 10 percent of the income distribution.

*Source* : *Connaissance des coûts* data, authors' computation.

TABLE 7 – Average public and private spending on young adults over a 6 years period, by parental income (in euros)

|          | Public<br>expense<br>for higher<br>education<br>(A) | 4% of fiscal<br>contribution<br>of parents<br>over 6 years<br>(B) | Net benefit<br>(A)-(B) | Fiscal and<br>social aid<br>received<br>(C) | Total public<br>expense received<br>(A)+(C) | Private<br>expense<br>(D) | Total public<br>and private<br>expense<br>(A)+(C)+(D) |
|----------|---|---|------------------------|---|---|---------------------------|---|
| P0-P10   | 7,807   | 941   | 6,866                  | 14,667                                      | 22,474                                      | 6,604                     | 29,077  |
| P10-P20  | 6,444   | 1,144   | 5,300                  | 16,341                                      | 22,785                                      | 6,815                     | 29,600  |
| P20-P30  | 6,958   | 1,525   | 5,433                  | 14,290                                      | 21,248                                      | 8,784                     | 30,032  |
| P30-P40  | 8,031   | 1,900   | 6,131                  | 15,348                                      | 23,379                                      | 10,002                    | 33,382  |
| P40-P50  | 10,768  | 1,894   | 8,870                  | 13,571                                      | 24,243                                      | 12,495                    | 36,704  |
| P50-P60  | 8,669   | 2,188   | 6,481                  | 12,434                                      | 21,103                                      | 11,258                    | 32,361  |
| P60-P70  | 11,813  | 2,541   | 9,272                  | 13,294                                      | 25,107                                      | 14,740                    | 39,847  |
| P70-P80  | 15,180  | 2,909   | 12,271                 | 14,592                                      | 29,772                                      | 18,102                    | 47,874  |
| P80-P90  | 20,103  | 4,353   | 15,750                 | 12,986                                      | 33,089                                      | 26,676                    | 59,765  |
| P90-P100 | 18,106  | 9,954   | 8,151                  | 15,033                                      | 33,139                                      | 39,990                    | 73,129  |
| Total    | 11,135  | 2,822   | 8,311                  | 14,294                                      | 25,420                                      | 15,041                    | 40,460  |

*Readings* : Average public expenditure for higher education, net of taxes paid by parents to finance it, increases from 6,866 euros for the bottom 10% of parental income to 15,750 euros between P80 and P90, and is lower (8,151 euros) for the top 10% because of a higher fiscal contribution.

*Notes* : This table shows public spending on higher education, 4 percent parental contribution over 6 years (which is the amount of all taxpayers' unallocated taxes needed to fund this spending), the net benefit for higher education to young adults and their parents, tax and state aid received, total public spending, private expense and total public and private expense, by parental income decile. The net benefit is defined as public spending on higher education, minus 4 percent of the taxes paid by parents over 6 years. Private expenditure is here the total expenditure made by parents for their children over 6 years as measured by the ENRJ survey. Parental income is defined as the percentile rank calculated from the sum of the father's pre-tax income and the mother's pre-tax income.

*Sources* : Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes ; *Connaissance des coûts* data and MENESR-DEPP (2021) for higher education costs ; Insee 2014, *Enquête Revenus fiscaux et sociaux (ERFS)* for the total tax revenues ; Germain (2021) for indirect and corporate tax imputation coefficients.

# Appendix

## A1 Variable definition

### A1.1 Study definition

**Access to higher education.** We define individuals (aged 18-24 in our sample) as having access to higher education if they are currently enrolled in higher education, have already obtained a higher education degree, or have had access to some level of higher education, even if they have not obtained a higher education degree. Similarly, we define access to a specific track (master’s degree, medical school, selective higher education, etc.) as being currently enrolled in, graduating from, or having entered one of these programs even without having graduated.

**Selective higher education.** We define selective tracks as preparatory courses, elite graduate schools, medical studies and Ph.D. tracks. The degree of selectivity of each of these tracks can be assessed by ranking all students on the basis of their performance on the high school graduation exam (*Baccalauréat*). In 2016-2017, the median rank of those in university (except for medical studies) is 50.2, that of those in *IUT* is 47.0 and that of those in *STS* is 30.3, while that of those in preparatory courses is 84.9, that of those in elite graduate schools is 72.8 and that of those in medical studies is 68.1 (Bonneau et al. (2021)).

### A1.2 Income definition

**Parental Income.** Following Chetty et al. (2014),<sup>65</sup> our preferred specification focuses on the percentile rank of parental pre-tax income. Unless otherwise specified, we keep the definition of these ranks fixed by positions in the overall distribution, even when analyzing subgroups. Because some youth have separate parents who do not belong to the same household, we sum the father’s pre-tax income and the mother’s pre-tax income. We also generate variants using disposable income and household standard of living.<sup>66</sup> We replace negative income with zero. We cannot rely on multiple years of parental income data, so our measure of income is likely to be affected by transitory fluctuations (Solon (1992)). This could lead us to underestimate the true level of inequality due to measurement error attenuation bias.<sup>67</sup> Although our main specification focuses on individual income, in the comparison with the United States, in order to be more comparable to Chetty et al. (2014), we consider the parents’ household income, divided by two when we have both the father’s and mother’s household income. 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

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65. This paper shows 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.

66. In the case where parents are separated and living with a new spouse, we halve the disposable income of this new household before adding it to the disposable income of the other parent’s household (also halved only in the case where this parent has a new partner). Results are available upon request.

67. However, Chetty et al. (2014) indicate in their study that the results for the impact of parental income on access to higher education do not depend on the number of years used to measure parental income (figure III. B.). We also perform a robustness check with a slightly different measure of parental income for which we have data for year  $t$  and  $t-2$  (see table F5).

including the incomes of non-decohabiting young adults. Taking into account property and capital incomes would mainly change the ranking within the last decile, but should only marginally change the ranking of individuals in the rest of the distribution.

Another concern is that the top deciles of the distribution concentrate the oldest parents in our sample and thus the oldest young adults, which would bias the estimate of inequality in access to education by parental income. This is not the case because neither the age of youth nor the age of their parents is statistically different across income groups (see table 2) . To further assess the representativeness of our sample, we compare the distribution of pre-tax incomes of parents in our sample and individuals aged 42-60 in the Tax and Social Income Surveys 2014 (92% of parents of young adults aged 18-24 fall into this age range in our data), another survey where income is collected from tax sources. This survey has a larger sample size with 50,096 households interviewed in 2014. Table B1 in the appendix shows the comparison between the income distribution in ENRJ and ERFS. Overall, pre-tax income data are very similar in both samples. On average, parents in our data have 43,098 euros of pre-tax income and those in ERFS have 43,121 euros per year. The t-test for the difference in means is -0.97. Parents in ENRJ have slightly higher disposable income and lower living standards than those in ERFS, due to the presence of children. Because we are considering income deciles among parents of young adults and not deciles in the general population, it is also interesting to know where our income categories fall relative to the income distribution of the general population. Table B2 compares the values of the deciles in the two distributions, and figure B1 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 living standards (see figure B1c)).

**Parental 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 the latter is poorly correlated with tax income, including in terms of rank. The deciles obtained with self-reported income coincide for only 35 percent of youth with those constructed from administrative data, and the correlation rate of the two variables is only 0.66. This confirms the importance of using administrative data for the income variables. Using declared income instead of tax income leads to a significant underestimation of inequalities in access to higher education according to parents' income (by 5 to 10 percentage points depending on the specification at the top of the distribution).

### A1.3 Other parental background variables

**Parents' occupation.** For occupations, we rely on the Department of Education's statistical service (DEPP<sup>68</sup>) grouping into four socioeconomic statuses (SES). High SES includes professionals, managers, CEOs, teachers, professionals and artists. Medium-high SES corresponds to intermediate occupations, technicians, foremen and supervisors. Medium-low SES refers to farmers, artisans, shopkeepers and employees. Low SES is defined as blue-collar workers and non-working people. Table H7 details the four SES categories and the corresponding occupations. The mother's occupation is missing for 4% of the observations and that of the father for 9% of the observations.

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68. *Direction de l'évaluation, de la prospective et de la performance.*

**Parents' diploma.** We have information on the highest degree obtained by parents. We define six categories : those with an elementary school certificate or less, those with a middle school certificate, those with a high school diploma or equivalent, those with a two-year degree, those with a bachelor's or master's degree, and those with an M.D. or Ph.D.. The mother's degree is missing for 4 percent of observations and the father's degree is missing for 17 percent of observations.

**Place of residence of parents.** When we study heterogeneity by parental residence, we define three categories : Parisian area, urban units with more than 100,000 inhabitants (except Paris) and urban units with less than 100,000 inhabitants. When both parents do not live in the same city, we retain the largest one, as access to higher education is potentially easier if at least one parent lives in a city with a major university center, and the student can potentially avoid paying rent to access college.

## A1.4 Financial aids for students, young adults and their parents

**Financial aids 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 (Depp (2015)) for an amount varying from 100.7 euros to 553.9 euros per month (over 10 months) depending on the parents' income. Secondly, housing subsidies (*Aide personnalisée au logement*) are given to tenants whose income is below a certain threshold, regardless of their educational status. No condition is imposed on the parents' income so that many students who have decohabited receive housing subsidies, the amount depending on the rent, the location of the housing and the composition of the household. For students, most public aid comes from the *BCS* and the *APL*, which represent respectively 51.4% and 46.6% of all public aid received by students.

**Public aid for young adults.** Public aid taken into account includes need-based scholarships (*Bourses sur Critères Sociaux (BCS)*), housing benefits (*Aide personnalisée au logement (APL)*), unemployment benefits, income support (*Revenu de Solidarité Active (RSA)*), allowance for disabled adults (*Allocation aux adultes handicapés*), contract for integration into social life (*Contrat d'Insertion dans la Vie Sociale (CIVIS)*), and family benefits. The Earned Income Tax Credit (*Prime d'activité*) and the Youth Guarantee (*Garantie Jeune*), which were introduced after the survey date, are not included here.

**Financial transfers received from parents.** The financial transfers taken into account are regular direct financial aid, the amount paid for housing, weekly savings from provisions given to the child, 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.

**Potential financial transfers.** Parents of students give proportionately more to their child than if he or she were not studying. When we look at 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 size of the urban unit where the young adult lives).

**Tax reductions for young adults' and students' parents** Tax reductions are granted to all parents whose child is attached to their tax return until the age of 21, then only to parents whose child is a student until the age of 25. They are part of a system of tax splitting linked to the family quota ensuring a proportional reduction of the taxes paid and increasing with 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 family quota –. These reductions are only given to parents whose young adult is still attached to their tax household. When young adults are no longer attached to the tax household, parents can deduct the pension they pay to their child from their taxable income. We use information from the survey on the young adult's attachment to the tax household to account for any of the tax deduction situations.

**Family benefits for parents of young adults.** Family benefits are paid to parents on a means-tested basis according to the number of children and their age. Family allowances are paid from two dependent children under 20 years of age and family supplement from three dependent children aged 4 to 20 years.<sup>69</sup> We only consider the portion of family benefits related to the young adult himself or herself and not to his or her siblings (e.g., if there are three dependent children, we divide the total amount of family benefits by three).

## B2 Representativeness of the sample

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69. Family allowances and family supplement scales can be found at the following link : [https://www.ipp.eu/baremes-ipp/prestations-sociales/0/3/prestations\\_generales/af\\_cm/](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/](https://www.ipp.eu/baremes-ipp/prestations-sociales/0/3/prestations_generales/cf_cm/)

TABLE B1 – Comparison of ENRJ and ERFS income data distribution

|                               | <b>ENRJ (2014)</b><br>(Parents of<br>young adults) | <b>ERFS (2014)</b><br>(One member of<br>the household between<br>42-60 years old) | <b>t-test</b> |
|-------------------------------|--|---|---------------|
| <b>Mean age</b>               | 50.01 (5.93)                                       | 50.18 (6.7)   | -0.1935       |
| <b>Pre-tax income</b>         |  |   |               |
| Mean                          | 43,098   | 43,121  | -0.9705       |
| Median                        | 36,506   | 35,460  |               |
| P10                           | 9,462  | 9,380   |               |
| P90                           | 80,558   | 78,010  |               |
| P99                           | 180,781  | 187,080   |               |
| <b>Disposable income</b>      |  |   |               |
| Mean                          | 48,225   | 41,748  | 8.6657        |
| Median                        | 42,947   | 35,110  |               |
| <b>Living standards</b>       |  |   |               |
| Mean                          | 22,439   | 24,104  | -5.2675       |
| Median                        | 19,527   | 20,715  |               |
| <b>Number of observations</b> | 5,197  | 19,244  |               |

*Readings* : On average, individuals in our sample have pre-tax income of 43,098 euros against 43,121 euros in *ERFS* data.

*Notes* : This table compare the distribution of different income variables for parents in our database (*ENRJ*) and adults aged 42-60 in another tax survey with a bigger sample (*ERFS*) .

*Sources* : Drees-Insee 2014, *Enquête Nationale sur les Ressources des Jeunes (ENRJ)* and Insee 2014, *Enquête Revenus fiscaux et sociaux (ERFS)*.

TABLE B2 – Comparison of deciles of parental pre-tax income and deciles of all households pre-tax income

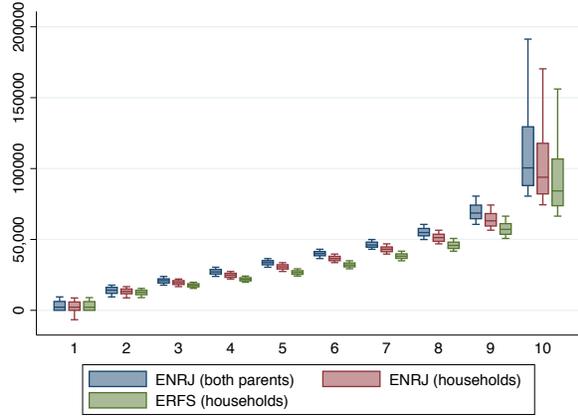
|                               | <b>ENRJ (2014)</b><br>(Parents of<br>young adults) | <b>ENRJ (2014)</b><br>(Households<br>of parents) | <b>ERFS (2014)</b><br>(All households) |
|-------------------------------|--|--|--|
| <b>P10</b>                    | 9,462  | 8,725  | 8,950                                  |
| <b>P20</b>                    | 17,762   | 16,716   | 15,470                                 |
| <b>P30</b>                    | 23,918   | 22,083   | 19,790                                 |
| <b>P40</b>                    | 30,390   | 27,406   | 24,150                                 |
| <b>P50</b>                    | 36,506   | 33,631   | 29,300                                 |
| <b>P60</b>                    | 43,070   | 39,679   | 34,960                                 |
| <b>P70</b>                    | 49,945   | 46,867   | 41,730                                 |
| <b>P80</b>                    | 60,626   | 56,477   | 50,710                                 |
| <b>P90</b>                    | 80,558   | 74,277   | 66,420                                 |
| <b>P95</b>                    | 100,344  | 93,820   | 84,240                                 |
| <b>P97</b>                    | 121,464  | 112,197  | 100,380                                |
| <b>P99</b>                    | 180,781  | 169,324  | 154,080                                |
| <b>Number of observations</b> | 5,197  | 5,878  | 50,096                                 |

*Reading* : The first decile of parental pre-tax income in our ENRJ sample is 9,462 euros.

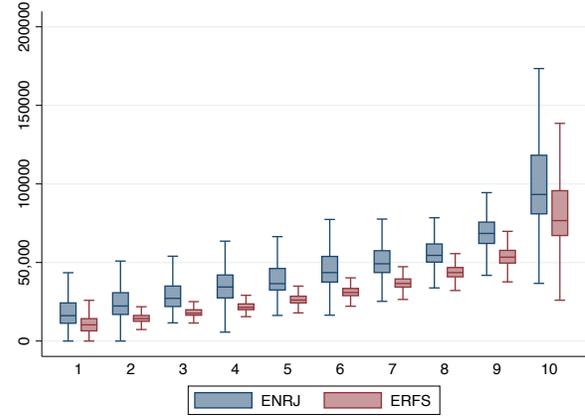
*N.B.* : The first column corresponds to the decile values of our main income variable of analysis, which is the sum of the individual pre-tax incomes of the father and mother, regardless of whether both parents belong to the same household; the second and third columns compare pre-tax incomes at the household level, considering separated parents in two different households (and including the pre-tax income of the parents' spouse if the parent has a new partner in the household), between the two surveys considered. This makes it possible to compare the income distribution of the general population with that of young adult parents using an exactly comparable income concept.

*Source* : Drees-Insee 2014, *Enquête Nationale sur les Ressources des Jeunes (ENRJ)* and Insee 2014, *Enquête Revenus fiscaux et sociaux (ERFS)*.

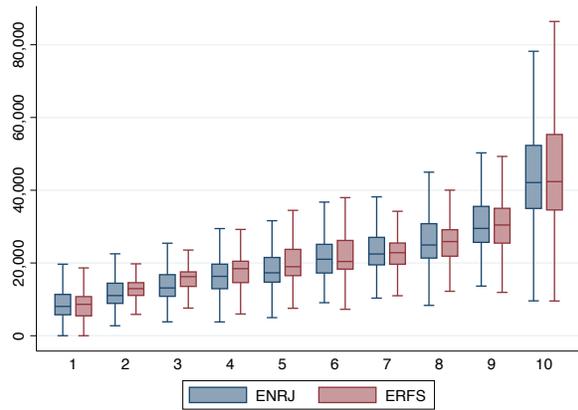
FIGURE B1 – Comparison of deciles of parents of young adults (ENRJ sample) and deciles of the general population of households (ERFS sample)



(a) Pre-tax income



(b) Disposable income



(c) Living standards

*Reading* : The median of parental pre-tax income among the 10% most affluent of our sample of parents is around 100,000 euros.

*N.B.1* : In the first graph, the first boxplot corresponds to the decile values of our main income variable of analysis, which is the sum of the individual pre-tax incomes of the father and mother, regardless of whether both parents belong to the same household ; the second and third boxplots allow to compare pre-tax incomes at the household level, considering separated parents in two different households (and including the pre-tax income of the parents' spouse if the parent has a new partner in the household), between the two surveys considered.

*N.B.2* : Each boxplot graph displays first quartile (P25), median (P50), last quartile (P75) as well as lower adjacent value (*i.e.* the furthest observation which is within one and a half interquartile range of the lower end of the box) and upper adjacent value.

*Source* : Drees-Insee 2014, *Enquête Nationale sur les Ressources des Jeunes (ENRJ)* and Insee 2014, *Enquête Revenus fiscaux et sociaux (ERFS)*.

## B2.1 Comparison of parental income distribution in France and the United States

TABLE B3 – Comparison of parental income distribution in France and the United States

| Income distribution | United States | France |
|---------------------|---------------|--------|
| Mean                | 87,219        | 60,630 |
| Std. Deviation      | 353,430       | 51,833 |
| Median              | 60,129        | 53,127 |
| Observations        | 9,867,736     | 5,197  |

*Note :* This table compares the distribution of parental income in France and the United States. The U.S. data are from table III in the online appendix of Chetty et al. (2014). In the United States, family income is the average household income from 1996 to 2000. In France, family income is 2014 family income. In both cases, family income is total household income before taxes, divided by two when we have both the father's and mother's household income. 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 non-decohabiting young adults. Taking into account property and capital incomes would mainly change the ranking within the last decile, but should only marginally change the ranking of individuals in the rest of the distribution. Chetty et al. (2014) 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.

*Source :* Drees-Insee 2014, *Enquête Nationale sur les Ressources des Jeunes (ENRJ)* and online appendix table III of Chetty et al. (2014) for the US.

## C3 Methods

### C3.1 Oaxaca decompositions

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

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

$$Y_i = \mathbf{X}_i \boldsymbol{\beta}^* + \epsilon_i \quad (4)$$

In this equation, the dependent variable  $Y_i$  takes the value 1 if student  $i$  has accessed higher education and 0 otherwise  $\mathbf{X}_i$  is the vector of observable characteristics retained in the analysis;<sup>70</sup>  $\boldsymbol{\beta}^*$  is a vector of coefficients measuring the average effect of each of these explanatory variables on the probability of access to higher education;  $\epsilon_i$  denotes the error term capturing the influence of all unobservable characteristics (i.e. those not included in the vector  $\mathbf{X}_i$ ) on the variable of interest  $Y_i$ . Then, the previous equation is estimated separately for each of the two groups considered : children whose parents are at the top of the income distribution (equation 5) and children whose parents are at the bottom (equation 6) :

$$Y_i^T = \mathbf{X}_i^T \boldsymbol{\beta}^T + \epsilon_i^T \quad (5)$$

$$Y_i^B = \mathbf{X}_i^B \boldsymbol{\beta}^B + \epsilon_i^B \quad (6)$$

The coefficients estimated using these three equations are noted respectively  $\boldsymbol{\beta}^*$ ,  $\boldsymbol{\beta}^T$  and  $\boldsymbol{\beta}^B$ . These three equations (4, 5, and 6) are then combined to decompose the access rate gap between the two groups as follows :

$$\underbrace{\bar{Y}^T - \bar{Y}^B}_{\text{observed gap}} = \underbrace{(\bar{\mathbf{X}}^T - \bar{\mathbf{X}}^B) \hat{\boldsymbol{\beta}}^*}_{\text{"explained" gap}} + \underbrace{\bar{\mathbf{X}}^T (\hat{\boldsymbol{\beta}}^T - \hat{\boldsymbol{\beta}}^*) + \bar{\mathbf{X}}^B (\hat{\boldsymbol{\beta}}^* - \hat{\boldsymbol{\beta}}^B)}_{\text{"unexplained" gap}} \quad (7)$$

The first term,  $(\bar{\mathbf{X}}^T - \bar{\mathbf{X}}^B) \hat{\boldsymbol{\beta}}^*$ , measures the share of the access rate gap between top income children and bottom income children that is attributable to differences in the average observable characteristics (in our case parental diplomas) of these two groups of individuals; the second term,  $\bar{\mathbf{X}}^T (\hat{\boldsymbol{\beta}}^T - \hat{\boldsymbol{\beta}}^*) + \bar{\mathbf{X}}^B (\hat{\boldsymbol{\beta}}^* - \hat{\boldsymbol{\beta}}^B)$ , measures the share of this gap that cannot be explained by these characteristics. If the vector  $\mathbf{X}_i$  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 diplomas. These factors could include, for example, the role of financial constraints or unequal access to information on higher education programs among income groups, as these dimensions are likely to influence study choices independently of parental diplomas. In our study, this statistical method is used to decompose the differences of access rates to higher education, master's degrees, selective programs (preparatory courses, elite graduate school, medical studies, Ph.D.) and differential aspirations between the top and bottom half, the top and bottom quintile,

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70. In our case, the parents' diplomas, introduced in 14 dummies, 7 for the father's diploma and 7 for the mother's.

and the top and bottom decile of the income distribution (see table 4 for detailed results).

### C3.2 Gupta decompositions

We decompose both the access gap to higher education and the differences in the cost of public higher education between individuals from the top income decile ( $T$ ) and individuals from the bottom income decile (noted  $B$ ) 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 these variables to the overall gap in the outcome variable between two subpopulations.

We write  $r$  the outcome variable of interest and  $x_1, \dots, x_k$  the  $k$  explanatory factors such that  $r(x_1, \dots, x_k) = \prod_{n=1}^k x_n$ .

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

$$\begin{cases} C(x_1) = \frac{1}{2}(x_2^T + x_2^B)(x_1^T - x_1^B) \\ C(x_2) = \frac{1}{2}(x_1^T + x_1^B)(x_2^T - x_2^B) \end{cases} \quad (8)$$

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

$$C(x_i) = \sum_{j=1}^{k-1} \frac{R(j-1, i)}{k \binom{k-1}{j-1}} (x_i^T - x_i^B) \quad (9)$$

Where  $R(j, i)$  is the sum of all possible values of the product of  $k - 1$  factors (excluding  $x_i$ ), out of which  $j$  factors 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 context, we first decompose the gap in access to higher education between individuals whose parents are at the top of the income distribution (noted  $T$ ) and individuals whose parents are at the bottom (noted  $B$ ) income groups based on access to various previous diplomas. The rate of access to higher education for each  $G$  group (with  $G \in (B, T)$ ) can be defined as follows :

$$HE^G = MSC^G \times HSC_{MSC}^G \times HE_{HSG}^G$$

With  $HE^G$  the rate of access to higher education for individuals in group  $G$ ,  $MSC^G$  the rate of access to middle school certificate for individuals in group  $G$ ,  $HSC_{MSC}^G$  the rate of access to high school certificate for individuals in the  $G$  group who had access to middle school certificate and  $HE_{HSG}^G$  the rate of access to higher education for individuals in the  $G$  group who had access to high school certificate. See table G6 for results obtained with this decomposition.

Second, we decompose differences in public spending on higher education between individuals in top ( $T$ ) and bottom ( $B$ ) income groups based on differences in access to higher education, length of

study, and spending for each year of higher education.

Formally, higher education public spending for individuals in group  $G$  (with  $G \in (B, T)$ ) can be defined as :

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

With  $PS^G$  higher education public spending for individuals in group  $G$ ,  $HE^G$  higher education access rate of individuals in group  $G$ ,  $LS_{student}^G$  average length of studies for students in group  $G$  and  $AC_{student}^G$  average annual public cost for students in group  $G$ . Results of the contribution to each of these factors to higher education cost differences are presented in table 6.

### C3.3 Redistributivity of public spending for higher education

We assess the redistribution occurring through public spending on higher education and propose a method to take into account the taxes paid by parents and used to finance this public spending. As can be seen in table 1, the results obtained regarding the redistributivity of education spending depend greatly on the methodological choices. When taxes are not taken into account, the 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. This section details and motivates the assumptions underlying our calculation of the degree of redistribution of higher education public spending, once tax contributions are taken into account. These assumptions concern the scope of the higher education spending considered, the types of taxes involved in their financing, the proportion of these taxes needed to finance the expenditures, and the length of studies covered by the expenditures. We present this specification for information purposes. However, in law, the payment of a tax, unlike a social security contribution, for example, does not entitle one to privileged access to tax-financed services, and the fact that expenditure inequalities are reduced after taxes are taken into account does not make these inequalities more legitimate.

**Scope of higher education public spending.** We propose to restrict our analysis to higher education spending only. A broader scope of public spending could have been considered, including social benefits for students as well as tax cuts and family benefits for their parents. In practice, it is complicated to separate social spending on students from overall spending on young adults, and for this reason it seemed preferable to limit our analysis to spending on higher education.<sup>71</sup>

**Period considered.** Our sample includes young adults between the ages of 18 and 24 and

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71. Some expenditures are exclusively dedicated to students : higher education funding, need-based scholarships, tax deductions for parents of students aged 21-25. For other expenditures, it is difficult to know whether the expenditure is related to student status or not. All young people are theoretically eligible for housing subsidies, but since these subsidies depend on the resources of young adults (and not their parents), they benefit students who have decohabited and less to young adults in employment. Similarly, tax deductions related to the attachment of a child to the tax household between the ages of 18 and 21 are not conditional on that 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. Although our consideration of the financing of expenditures through taxes is limited to higher education expenditures only, we extend the analysis to all benefits for young people and their parents in a second step, without taking into account their financing.

thus covers a 6-year period. This period covers the vast majority of student pathways. However, expenditures dedicated to individuals who continue their studies after age 24 are not included. We similarly consider tax contributions over a 6-year period by multiplying the annual parental contribution by 6. To compute higher education public spending, we restrict ourselves to individuals aged 22 to 24, who are the most advanced in their studies in our sample.

Total public spending on higher education for 18-24 year olds is therefore :

$$S_{all}^{HE} = \sum_{j=1}^y (S_j^{HE} \times Weight_j) \quad (10)$$

With  $y$  the total number of young adults in our sample and  $S_j^{HE}$  the expenditure on completed higher education over 6 years for young adult  $j$  (imputed on the basis of expenditure on individuals aged 22-24 in the same parental income decile), 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 that fund higher education.** The literature on distributed national accounts takes into account all taxes and the redistribution that takes place through direct social transfers and indirect transfers in kind (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 somewhat complicated by the fact that we are only interested in one specific item of expenditure, higher education expenditure. Unlike 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 to the extent that they finance only higher education. Deducting only the taxes needed to cover the expenditures under consideration is more consistent with the fact that neither all types of taxes nor the full amount of unallocated taxes paid by households actually contribute to the financing of higher education.

We assume that higher education is financed by households through direct and indirect taxation and by firms through corporate taxes, but not by direct contributions from firms (as is the case for apprenticeship, for example) or by the issuance of 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 funding 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,<sup>72</sup> a representative sample of all taxpayers in France, for this purpose.

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72. *Enquête sur les revenus fiscaux et sociaux*, 2014

We calculate the total amount of unallocated taxes paid over six years :

$$Taxes_{all} = 6 \times \sum_{i=1}^n [(IT_i + VAT_i + CT_i + E_i) \times Weight_i] \quad (11)$$

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. Total unallocated taxes paid by all French taxpayers over six years amounts to 1483 billion euros. Draft finance laws indicate amounts that are of the same order of magnitude. As for the taxes considered here (VAT, income tax, corporate tax and domestic consumption tax on petroleum and energy products), 220 billion euros per year in 2021, or 1320 billion euros over 6 years, and 260 billions in 2015, or 1560 billion over 6 years.

**Proportion needed to finance higher education spending.** We calculate the share of unrestricted taxes needed to fund public spending on higher education with the ratio :

$$Share\_Taxes^{HE} = \frac{S_{all}^{HE}}{Taxes_{all}} \quad (12)$$

With  $Share\_Taxes^{HE}$  the share of taxes dedicated to public spending on higher education between 18 and 24 ;  $S_{all}^{HE}$  the sum of total public spending on higher education dedicated to individuals aged 18 to 24 and  $Taxes_{all}$  the sum of all unallocated taxes paid by all taxpayers over six years. In total, 4 percent of all unallocated taxpayers' taxes must be devoted to financing the cost of higher education.<sup>73</sup>

**Net benefit for higher education spending.** Once we have calculated, from a macro perspective, the share of taxes devoted to public funding of higher education, we need to apply this share to the taxes paid by each parent's household. We then subtract this amount of taxes from the higher education spending they receive to get their net benefit (i.e., the benefit from public funding of higher education net of the taxes paid by parents and devoted to that spending). To compute taxes paid by parents, we use administrative data on parental income tax contributions available in our database. We then calculate the share of income devoted to VAT, corporate income tax, and other indirect taxes in each income decile by dividing the tax revenue from that decile by their income (including benefits received) in the distributed national accounts (Accardo et al. (2021), Germain (2021)). The proportion of income spent on these different taxes by each income decile is shown in the table C4 below.

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73. Draft finance law for 2021 indicates 220 billion euros corresponding to the taxes considered here (VAT, income tax, corporate tax and domestic consumption tax on petroleum and energy products) and higher education expenditures excluding university research of 10 billion euros, i.e. a ratio of 4.5%.

TABLE C4 – Taxes as a proportion of pre-tax income in the distributed national accounts, used for our imputations

|  | VAT  | Energy and<br>excise tax | Corporate<br>tax |
|--|------|--------------------------|------------------|
| D1   | 0,17 | 0,06                     | 0,02             |
| D2   | 0,14 | 0,05                     | 0,01             |
| D3   | 0,12 | 0,04                     | 0,01             |
| D4   | 0,12 | 0,04                     | 0,01             |
| D5   | 0,11 | 0,04                     | 0,01             |
| D6   | 0,11 | 0,03                     | 0,01             |
| D7   | 0,11 | 0,03                     | 0,01             |
| D8   | 0,10 | 0,03                     | 0,02             |
| D9   | 0,10 | 0,03                     | 0,02             |
| D10  | 0,08 | 0,01                     | 0,11             |
| Total  | 0,11 | 0,03                     | 0,04             |
| Social transfers included<br>in pre-tax income | Yes  | Yes                      | No               |

*Reading* : Households in the bottom decile of the income distribution spend 17 percent of their pre-tax income (including social transfers) on VAT.

*Source* : Germain (2021) for indirect and corporate tax imputation coefficients. *Direction de la Recherche, des études, de l'évaluation et des Statistiques (DREES)* for social benefits amounts.

Average net benefit for each parental income decile  $d$  is then calculated as follows :

$$Net\_Benefit_d = \frac{1}{n_d} \sum_{i=1}^{n_d} (S_i^{HE} - (0.04 \times Taxes_i \times 6)) \quad (13)$$

With  $Net\_Benefit_d$  the average net benefit for higher education public spending for young adults whose parents belong to income decile  $d$ ,  $S_j^{HE}$  spending on higher education over 6 years for young adult  $j$  whose parents belong to decile  $d$  (imputed based on the spending of individuals aged 22-24 in the same decile of parents' income),  $Taxes_j$  the sum of taxes (Income tax, VAT, corporate tax, and energy and excise tax) paid annually by 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 and private expense for the young adult and their parents.** In the last part, we extend the analysis of redistributivity to all public spending on young adults and their parents, not just spending on higher education. We include social benefits for young adults and their parents (family benefits) and tax deductions for parents related to the presence of a young adult.

Public spending on higher education is calculated as before. For tax deductions and public benefits, we calculate the amount in the survey year for each individual. We then calculate the total amount of tax deductions and public aids for each decile over six years as follows :

$$PA_j = [PA_{student_d} \times Years_{HE_j}] + [PA_{non\_student_d} \times (6 - Years_{HE_j})] \quad (14)$$

$$TD_j = [TD_{student_d} \times Years_{HE_j}] + [TD_{non\_student_d} \times (6 - Years_{HE_j})] \quad (15)$$

With  $PA_j$  the total amount of public aid for the young adult  $j$  over 6 years;  $TD_j$  the total amount of tax deductions for parents of  $j$  over 6 years;  $PA_{student_d}$  the average amount of annual public aid received by students in the  $j$  income decile;  $PA_{non\_student_d}$  the average amount of annual public aid received by non-students in the  $j$  income decile;  $TD_{student_d}$  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.

We then compute total public spending on young adults and their parents :

$$S_d^{public} = \frac{1}{n_d} \sum_{j=1}^{n_d} (S_j^{HE} + S_j^{soc\_fisc}) \quad (16)$$

$$S_j^{soc\_fisc} = PA_j + FB_j + TD_j \quad (17)$$

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 – imputed on the basis of the expenditure of individuals aged 22 to 24 in the same parental income decile –,  $S_j^{soc\_fisc}$  the total expenditure on social and fiscal benefits over six years defined as  $S_j^{soc\_fisc} = PA_j + FB_j + FB_j + TD_j$  with  $PA_j$  public aid for the young adult  $j$  between 18 and 24 years old,  $FB_j$  family benefits paid to the parents of the young adult  $j$  over six years,  $TD_j$  tax deductions for

the parents of  $j$  over six years.

Finally, we present total spending (both public and private through parental transfers) on young adults. Although much of this spending is not devoted to investment in higher education, it can be considered an investment in human capital in the broadest sense. The average total spending on young adults by income decile is defined as follows :

$$S_d^{total} = \frac{1}{n_d} \sum_{j=1}^{n_d} (S_j^{HE} + S_j^{soc\_fisc} + T_j) \quad (18)$$

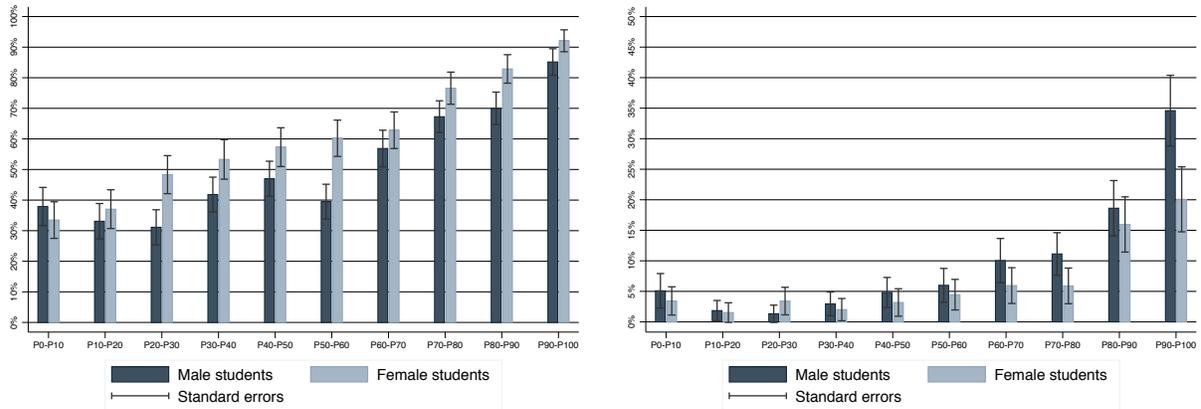
With  $T_j$  the total amount of financial transfers and expenses for the young adult  $j$ , computed as such :

$$T_j = [T_{student_d} \times Years_{HE_j}] + [T_{non\_student_d} \times (6 - Years_{HE_j})] \quad (19)$$

With  $T_{student_d}$  the average amount of annual parental transfers received by students in the  $j$  income decile; and  $PA_{non\_student_d}$  the average amount of annual parental transfers received by non-students in the  $j$  income decile.

## D4 Heterogeneity results

FIGURE D2 – Proportion of male and female accessing higher education and selective programs according to parents' pre-tax income



(a) In higher education or graduate from higher education

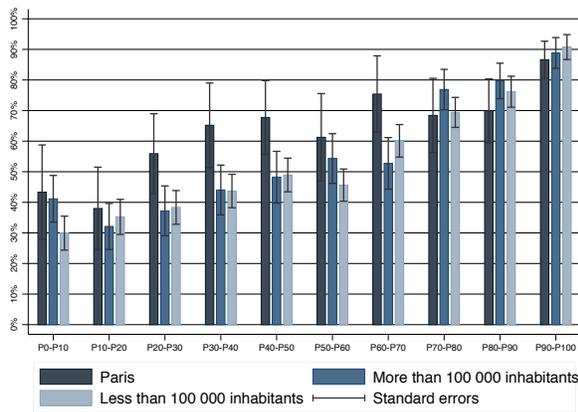
(b) In a selective program or graduate from a selective program

*Reading* : More than 30 percent of males with parents in the 10th decile of the income distribution have access to a selective program between the ages of 18 and 24, compared with just over 15 percent of females.

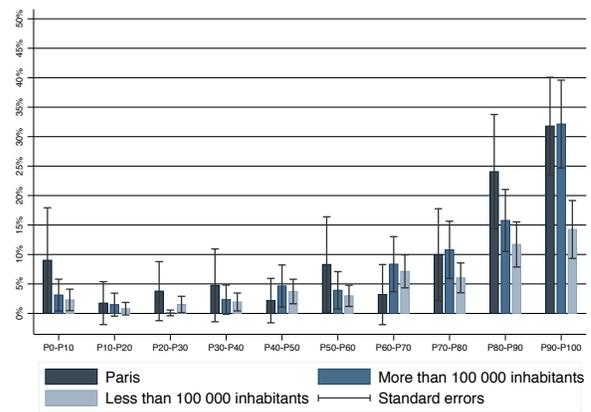
*Note* : The figure (a) shows the proportion of individuals aged 18-24 currently enrolled in or already holding a higher education degree, by gender and parental income. The figure (b) shows the proportion of individuals aged 18-24 currently enrolled in a selective program (preparatory courses, elite graduate schools, medical studies or Ph.D.) or already holding a degree from a selective program, by gender and parental income. The parental income used is the sum of the father's pre-tax income and the mother's pre-tax income. Deciles are computed based on this definition. The black line represents the standard errors.

*Source* : Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes.

FIGURE D3 – Proportion of individuals accessing higher education and selective programs according to the parents' pre-tax income and urban size of parents' housing



(a) In higher education or graduate from higher education



(b) In a selective program or graduate from a selective program

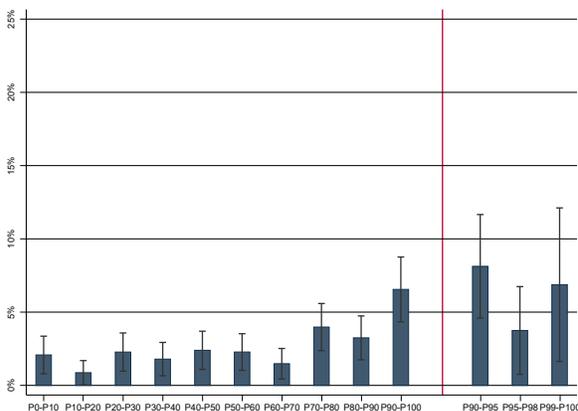
*Reading :* More than 30% of individuals aged 18 to 24 whose parents belong to the 10th decile of income and at least one of their parents live in a big city (more than 100,000 inhabitants) have access to a selective program, against a bit less than 15% for those in the same decile whose parents' live in a smaller city.

*Note :* The figure (a) shows the proportion of individuals aged 18-24 currently enrolled in or already holding a higher education degree, by urban unit size and parental income. The figure (b) shows the proportion of individuals aged 18-24 currently enrolled in a selective program (preparatory courses, elite graduate schools, medical studies or Ph.D.) or already holding a degree from a selective program, by urban unit size and parental income. The parental income used is the sum of the father's pre-tax income and the mother's pre-tax income. Deciles are computed based on this definition. The black line represents the standard errors.

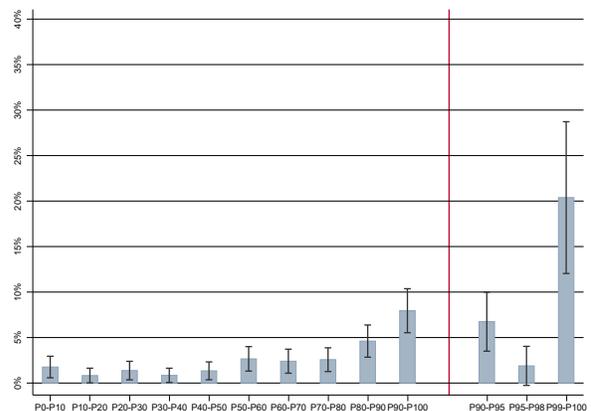
*Source :* Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes.

## E5 Access to specific fields

FIGURE E4 – Proportion of individuals aged 18 to 24 accessing law or medical studies according to parents' pre-tax income



(a) Law



(b) Medical studies

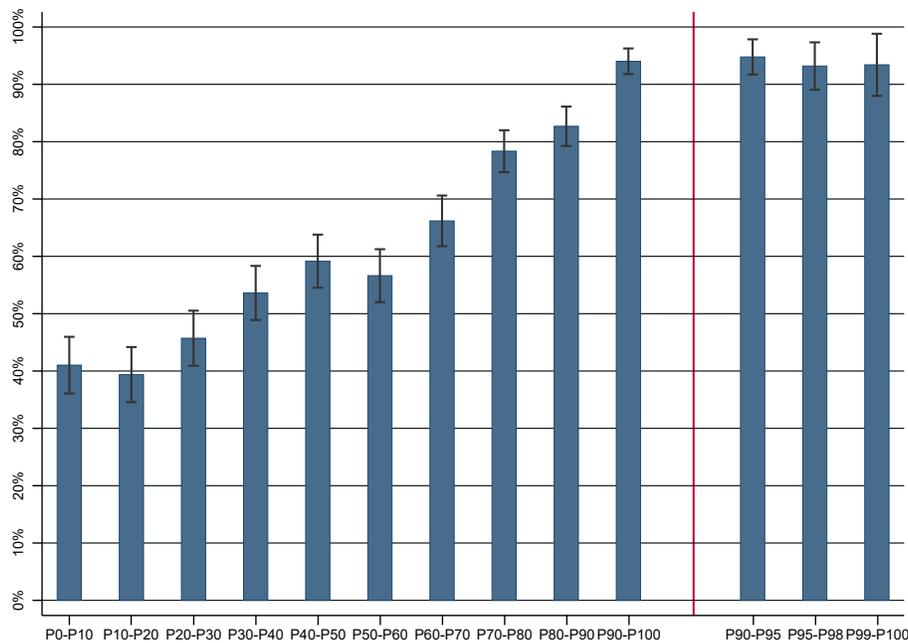
*Reading :* Around 25% of individuals aged 18 to 24 whose parents belong to the top 1% of the income distribution are in medical studies.

*Note :* Figure (a) shows the proportion of individuals accessing law programs between the ages of 18 and 24, by parental income. Figure (b) shows the proportion of individuals accessing medical school between ages 18 and 24, by parental income. The parental income used is the sum of the father's pre-tax income and the mother's pre-tax income. Deciles are computed 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.

*Source :* Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes.

## F6 Robustness checks

FIGURE F5 – **Robustness check 1** : Proportion of individuals aged 18 to 24 (excluding those still in high-school) accessing higher education according to parents' pre-tax income

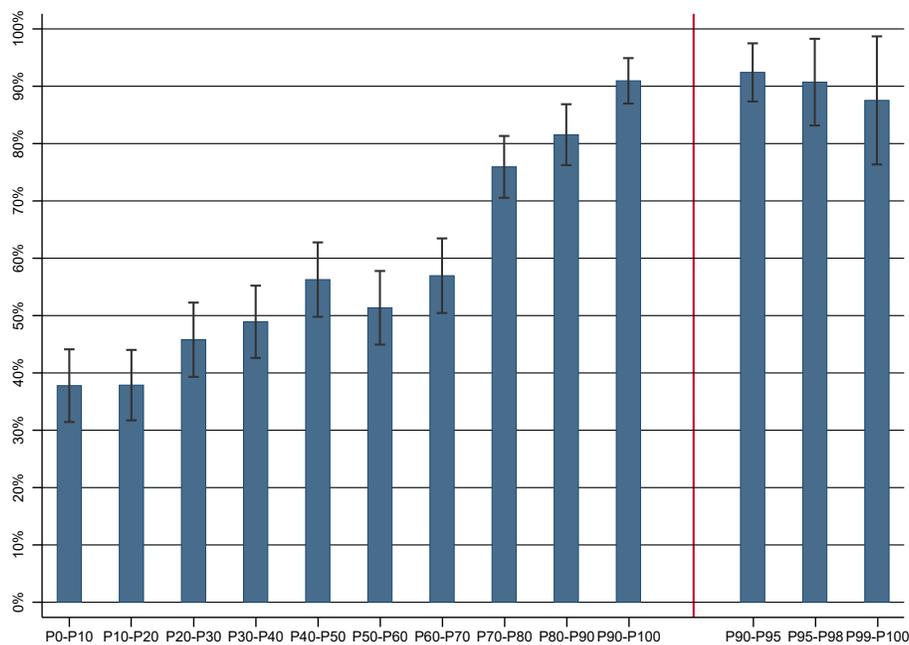


*Reading* : About 40% of young adults (excluding those still in high-school) whose parents belong to the 1st decile (P0-P10) of the income distribution have access to higher education between 18 and 24.

*Note* : The figure shows the proportion of individuals aged 18-24 (excluding those still in high-school) currently enrolled in or already holding a higher education degree, by parental income. The parental income used is the sum of the father's pre-tax income and the mother's pre-tax income. Deciles are computed 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.

*Source* : Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes.

FIGURE F6 – **Robustness check 2** : Proportion of individuals aged 21 to 24 accessing higher education according to parents' pre-tax income



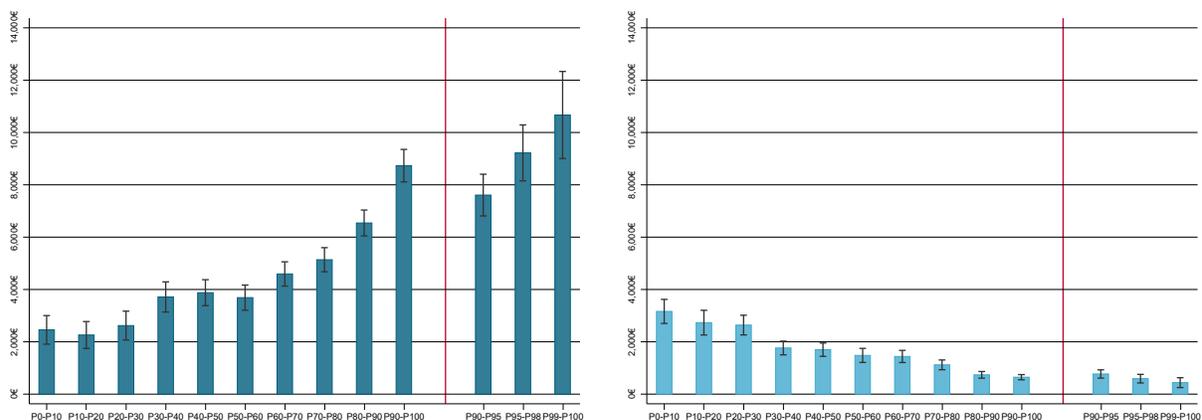
*Reading* : About 80% of young people aged 21 to 24 whose parents belong to the top centile (P99-P100) of the income distribution have access to higher education.

*Note* : The figure shows the proportion of individuals aged 21 to 24 currently enrolled in or already holding a higher education degree, by parental income. The parental income used is the sum of the father's pre-tax income and the mother's pre-tax income. Deciles are computed 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.

*Source* : Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes.

## G7 Correlates of higher education access gap

FIGURE G7 – Average annual amount of public aid (need-based scholarships, housing benefits, etc.) and financial aid provided by parents according to the parents' pre-tax income



(a) Annual amount of aid (direct and indirect) received by students from their parents

(b) Annual amount of public aid received by student

*Reading :* In the top 1% of the income distribution, students receive about 12,000 euros per year from their parents in direct and indirect financial aid. In the bottom 10% of the income distribution, students receive about 3,000 euros per year in public aid.

*Note :* Figure (a) shows the amount of direct and indirect transfers students receive from their parents over a year, based on parental income. It includes the amount paid for housing, weekly savings from provisions given to the child, expenses for gasoline, car maintenance, insurance, public transportation passes, train tickets, telephone, internet, recreational expenses, and supplemental health insurance. These transfers received from parents are reported by young adults in the survey. Figure (b) shows the annual amount of public aid received by students over a year, based on parental income. For students, public aid is mainly composed of need-based scholarships (*Bourses sur critères sociaux*) and housing benefits (*Aide Personnalisée au Logement*). The parental income used is the sum of the father's pre-tax income and the mother's pre-tax income. Deciles are computed 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.

*Source :* Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes.

TABLE F5 – **Robustness check 3** : Access rate to higher education by parents' household taxable income in year  $t$ ,  $t - 2$ , and the average of the two

| <b>Access rate to higher education</b> |  |  |   |  |
|--|--|--|---|--|
| <i>Parental income variable used :</i> |  |  |   |  |
|  | Household<br>taxable income<br>in year $t$ | Household<br>taxable income<br>in year $t - 2$ | Average of household<br>taxable incomes<br>in years $t$ and $t - 2$ | Parental<br>pre-tax income<br>(main specification) |
| <i>Parental income decile</i>          |  |  |   |  |
| P0-P10                                 | 0.40<br>(0.35, 0.44)                       | 0.45<br>(0.41, 0.49)                           | 0.40<br>(0.36, 0.44)  | 0.36<br>(0.31, 0.40)                               |
| P10-P20                                | 0.37<br>(0.33,0.42)                        | 0.33<br>(0.29, 0.37)                           | 0.37<br>(0.33, 0.41)  | 0.35<br>(0.31, 0.39)                               |
| P20-P30                                | 0.41<br>(0.37,0.46)                        | 0.39<br>(0.35, 0.44)                           | 0.40<br>(0.36, 0.44)  | 0.40<br>(0.36, 0.45)                               |
| P30-P40                                | 0.46<br>(0.42,0.50)                        | 0.51<br>(0.47, 0.55)                           | 0.47<br>(0.43, 0.51)  | 0.47<br>(0.43, 0.51)                               |
| P40-P50                                | 0.54<br>(0.50,0.58)                        | 0.50<br>(0.46, 0.54)                           | 0.51<br>(0.47, 0.55)  | 0.52<br>(0.48, 0.56)                               |
| P50-P60                                | 0.54<br>(0.50,0.58)                        | 0.49<br>(0.45, 0.53)                           | 0.50<br>(0.46, 0.54)  | 0.50<br>(0.46, 0.54)                               |
| P60-P70                                | 0.61<br>(0.57,0.65)                        | 0.62<br>(0.58, 0.67)                           | 0.63<br>(0.59, 0.67)  | 0.60<br>(0.56, 0.64)                               |
| P70-P80                                | 0.66<br>(0.61,0.70)                        | 0.65<br>(0.61, 0.69)                           | 0.66<br>(0.62, 0.69)  | 0.71<br>(0.68, 0.75)                               |
| P80-P90                                | 0.74<br>(0.70,0.78)                        | 0.79<br>(0.75, 0.82)                           | 0.77<br>(0.74, 0.81)  | 0.76<br>(0.72, 0.80)                               |
| P90-P100                               | 0.82<br>(0.79,0.86)                        | 0.82<br>(0.79, 0.86)                           | 0.83<br>(0.80, 0.87)  | 0.88<br>(0.86, 0.91)                               |
| <i>Regression coefficients</i>         |  |  |   |  |
| Full sample                            | 4.9<br>(4.4, 5.3)                          | 4.8<br>(4.4, 5.3)                              | 5.1<br>(4.6, 5.5)   | 5.8<br>(5.3, 6.2)                                  |
| Bottom half                            | 3.7<br>(2.4, 5.0)                          | 2.2<br>(1.0, 3.5)                              | 3.1<br>(1.8, 4.3)   | 4.2<br>(2.9, 5.5)                                  |
| Top half                               | 7.1<br>(5.8, 8.3)                          | 8.1<br>(6.9, 9.3)                              | 7.8<br>(6.6, 9.0)   | 9.3<br>(8.1, 10.0)                                 |

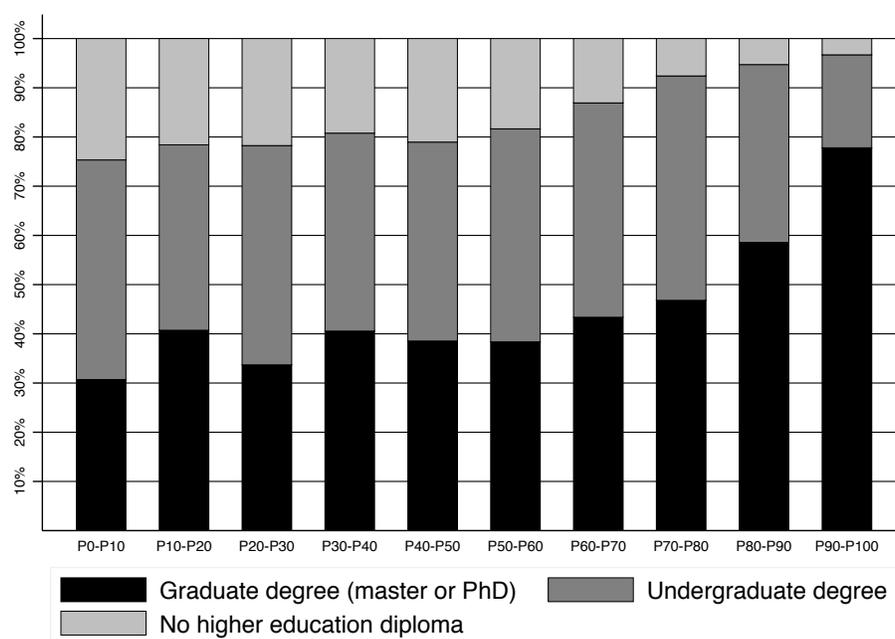
*Reading* : When using the parents' household taxable income in year  $t$ , 82 percent of individuals whose parents belong to the top 10 percent of the income distribution have access to higher education between 18 and 24.

*Note* : The parental income used in our main specification is the sum of the father's pre-tax income and the mother's pre-tax income. To perform this robustness check between year  $t$  and  $t - 2$ , we use a slightly different concept of income. Our data do not include individual tax incomes in year  $t - 2$ , so we rely on the parents' household taxable income that is available for both year  $t$  and  $t - 2$ . In the case where parents are separated and living with a new spouse, we halve the household taxable income of this new household before adding it to the household taxable income of the other parent's household (also halved only in the case where this parent has a new partner). Deciles are calculated based on each income definition. The regression coefficients panel reports estimates of a regression of parental income percentile on access to higher education. They should be interpreted as the average change in the rate of access to higher education for an increase of 10 percentile ranks (i.e., one decile) in the parental income distribution. "Bottom 50" refers to the bottom half of the parental income distribution – with the income variable considered – and "top 50" refers to the top half of the parental income distribution.

Standard errors in parentheses.

*Source* : Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes.

FIGURE G8 – Educational aspirations of individuals aged 18 to 19 based on parental income



*Reading :* By age 18 or 19, around 80% individuals in the top 10% of the income distribution want to obtain a graduate degree (a master or a Ph.D.).

*Note :* 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 to avoid having educational aspirations influenced by completed years of schooling in higher education. The parental income used is the sum of the father's pre-tax income and the mother's pre-tax income. Deciles are computed based on this definition. We further decompose the distribution into the top 10 percent of the income distribution in vintile (x-axis).

*Source :* Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes.

TABLE G6 – Decomposition of differences in access to higher education according to previous educational attainment between individuals whose parents are in the top 10 and bottom 10 percent of the income distribution

| Educational attainment<br>considered | Contribution to the higher<br>education access gap<br>(in percent) |
|--------------------------------------|--|
| Middle school graduation             | 18   |
| High school graduation               | 54   |
| Residual access to higher education  | 29   |

*Reading :* Among young adults aged 20 to 24, inequalities in access to middle school graduation contribute to 18 percent of the differences in access to higher education between individuals in the top and bottom 10 percent of the income distribution.

*Note :* The table shows 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 between individuals in the top and bottom 10 percent of the income distribution (in percent). To decompose the contribution of different factors, we rely on Gupta decomposition methods (Das Gupta, 1991). See section 3.5 and appendix C3 for more details.

*Source :* Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes.

## H8 Profession of parents

TABLE H7 – Grouping of occupations into four SES categories

| Socioeconomic statuses (SES)  | Corresponding occupations   |
|-------------------------------|---|
| <b><u>High SES</u></b>        |   |
| 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   |
| <b><u>Medium-high SES</u></b> |   |
| 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                                     |
| <b><u>Medium-low SES</u></b>  |   |
| 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  |
| <b><u>Low SES</u></b>         |   |
| 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  |

*Note* : This grouping corresponds to the official grouping of the Department of Education's statistical service (*DEPP*).

TABLE H8 – Correlation of pre-tax income variables with the occupation and the degree of the parents

|                              | Father pre-tax income | Mother pre-tax income | Father occupation (4 groups) | Mother occupation (4 groups) | Father diploma (6 groups) | Mother diploma (6 groups) |
|------------------------------|-----------------------|-----------------------|------------------------------|------------------------------|---------------------------|---------------------------|
| Father pre-tax income        | 1.00                  |                       |                              |                              |                           |                           |
| Mother pre-tax income        | 0.12                  | 1.00                  |                              |                              |                           |                           |
| Father occupation (4 groups) | 0.38                  | 0.27                  | 1.00                         |                              |                           |                           |
| Mother occupation (4 groups) | 0.23                  | 0.50                  | 0.46                         | 1.00                         |                           |                           |
| Father diploma (6 groups)    | 0.41                  | 0.25                  | 0.60                         | 0.42                         | 1.00                      |                           |
| Mother diploma (6 groups)    | 0.29                  | 0.46                  | 0.47                         | 0.62                         | 0.58                      | 1.00                      |
| <i>N</i>                     | 5197                  |                       |                              |                              |                           |                           |

*Readings* : The correlation between father pre-tax income and mother pre-tax income is 0.12. The correlation between father's occupation in four groups and father's pre-tax income is 0.38.

*Note* : This table presents the correlation between the different parental control variables included in our analysis. The pre-tax income variables are weakly correlated with occupation and degree, this is particularly true for fathers (for whom the correlation coefficients are 0.38 and 0.41 respectively versus 0.50 and 0.46 for mothers).

*Sources* : Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes.

## I9 Regression results for access to masters' degrees and selective programs

TABLE I9 – Access to master’s degree by parental pre-tax income percentile rank

| <b>Access to master’s degree</b>     | (1)      | (2)      | (3)      | (4)      | (5)      |
|--------------------------------------|----------|----------|----------|----------|----------|
| Baseline                             | 0.12     | 0.12     | 0.12     | 0.12     | 0.12     |
| <b>Parents’ income quintile</b>      |          |          |          |          |          |
| Parents’ income quintile=1           | -0.028*  | -0.025*  | -0.020   | 0.023    | -0.0035  |
| Parents’ income quintile=2           | -0.034** | -0.032** | -0.035** | -0.011   | -0.016   |
| Parents’ income quintile=3           | 0        | 0        | 0        | 0        | 0        |
| Parents’ income quintile=4           | 0.064*** | 0.062*** | 0.033**  | 0.047*** | 0.032*   |
| Parents’ income quintile=5           | 0.20***  | 0.20***  | 0.079*** | 0.11***  | 0.064*** |
| <b>Control variables included</b>    |          |          |          |          |          |
| Log of potential financial transfers |          | X        |          |          | X        |
| Father Profession (26 categories)    |          |          | X        |          | X        |
| Mother Profession (26 categories)    |          |          | X        |          | X        |
| Father Diploma (6 categories)        |          |          |          | X        | X        |
| Mother Diploma (6 categories)        |          |          |          | X        | X        |
| Family situation                     |          |          |          |          | X        |
| Urban unit size                      |          |          |          |          | X        |
| Observations                         | 5,197    | 4,455    | 4,801    | 4,094    | 4,078    |

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

*Readings* : When no controls are included, having parents in the 4th quintile of the income distribution relative to the 3rd quintile increases the proportion of individuals with a master’s degree or holding a master’s degree by 6.4 percentage points (out of a baseline probability of having a master’s degree or being enrolled in a master’s degree of 12 percent). Having parents in the 5th quintile of the income distribution relative to the 3rd quintile increases the proportion of individuals with a master’s degree or holding a master’s degree by 20 percentage points

*Note* : In this table, we regress a categorical variable of parental income quintile (with the 3rd quintile as the reference category) on access to master’s degree (1) and observe how this coefficient varies when we successively include controls for potential financial transfers (2), parental occupation (3), parental education (4), and all these controls simultaneously with family status and urban unit size. The potential financial transfer variable represents what a young adult would have received from his or her parents, if he or she were studying, based on 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 size of urban unit where the young adult lives). The parental income used is the sum of the father’s pre-tax income and the mother’s pre-tax income. These regressions show that the effect of income on access to master’s degree is not linear. The coefficient on income is much higher at the top of the income distribution than at the bottom half or top middle of the income distribution. In the bottom half of the income distribution, coefficients are much smaller and many coefficients are not significant once controls are included, which is not the case in the top half of the income distribution. The coefficient does not change much with the inclusion of the potential financial transfer variable. In the upper half of the income distribution, the coefficients are reduced by about two when controls for parental occupation or degree are included, and by a factor of two to three when all controls are included simultaneously.

*Sources* : Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes.

TABLE I10 – Access to selective programs by parental pre-tax income percentile rank

| <b>Access to selective programs</b>  | (1)      | (2)      | (3)      | (4)      | (5)      |
|--------------------------------------|----------|----------|----------|----------|----------|
| Baseline                             | 0.10     | 0.10     | 0.10     | 0.10     | 0.10     |
| <b>Parents' income quintile</b>      |          |          |          |          |          |
| Parents' income quintile=1           | -0.019   | -0.014   | -0.029** | -0.011   | -0.032*  |
| Parents' income quintile=2           | -0.021*  | -0.017   | -0.017   | -0.0067  | -0.013   |
| Parents' income quintile=3           | 0        | 0        | 0        | 0        | 0        |
| Parents' income quintile=4           | 0.040*** | 0.037*** | 0.025**  | 0.020    | 0.016    |
| Parents' income quintile=5           | 0.18***  | 0.17***  | 0.094*** | 0.083*** | 0.057*** |
| <b>Control variables included</b>    |          |          |          |          |          |
| Log of potential financial transfers |          | X        |          |          | X        |
| Father Profession (26 categories)    |          |          | X        |          | X        |
| Mother Profession (26 categories)    |          |          | X        |          | X        |
| Father Diploma (6 categories)        |          |          |          | X        | X        |
| Mother Diploma (6 categories)        |          |          |          | X        | X        |
| Family situation                     |          |          |          |          | X        |
| Urban unit size                      |          |          |          |          | X        |
| Observations                         | 5,197    | 4,455    | 4,801    | 4,094    | 4,078    |

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

*Readings* : When no controls are included, having parents in the 4th quintile of the income distribution relative to the 3rd quintile increases the proportion of individuals enrolled in a selective program (preparatory courses, elite graduate schools, medical school, or doctorate) or holding a degree from a selective program by 4.0 percentage points (out of a baseline probability of being enrolled in one of these programs or holding a degree from one of these programs of 10 percent). Having parents in the 5th quintile of the income distribution relative to the 3rd quintile increases the proportion of individuals enrolled in a selective program or holding a degree from a selective program by 18 percentage points.

*Note* : In this table, we regress a categorical variable of parental income quintile (with the 3rd quintile as the reference category) on access to selective programs (1) and observe how this coefficient varies when we successively include controls for potential financial transfers (2), parental occupation (3), parental education (4), and all these controls simultaneously with family status and urban unit size. The potential financial transfer variable represents what a young adult would have received from his or her parents, if he or she were studying, based on 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 size of urban unit where the young adult lives). The parental income used is the sum of the father's pre-tax income and the mother's pre-tax income. These regressions show that the effect of income on access to master's degree is not linear. The coefficient on income is much higher at the top of the income distribution than at the bottom half or top middle of the income distribution. In the bottom half of the income distribution, coefficients are much smaller and many coefficients are not significant, which is not the case in the top half of the income distribution. The coefficient does not change much with the inclusion of the potential financial transfer variable. In the upper half of the income distribution, the coefficients are reduced by about two when controls for parental occupation or degree are included, and by around three when all controls are included simultaneously (in this case, only the coefficient of the 5th quintile compared to the 3rd quintile remains significant).

*Sources* : Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes.

TABLE I11 – Access to master’s degree based on parents’ income, profession and diploma

|   | (1)     | (2)     | (3)      | (4)      | (5)      | (6)       |
|---|---------|---------|----------|----------|----------|-----------|
| <b>Parent’s income percentile rank</b>      | 0.28*** | 0.27*** | 0.14***  | 0.12***  | 0.085*** | 0.084***  |
| Log of potential financial transfers        |         | 0.0031  |          |          |          | -0.0015   |
| Father Primary school                       |         |         | 0        |          | 0        | 0         |
| Father Middle School                        |         |         | -0.013   |          | -0.024   | -0.025    |
| Father High School                          |         |         | 0.021    |          | 0.020    | 0.025     |
| Father Two-year degree                      |         |         | 0.079*** |          | 0.054**  | 0.059**   |
| Father Bachelor or Master degree            |         |         | 0.12***  |          | 0.075*** | 0.070***  |
| Father Ph.D.                                |         |         | 0.21***  |          | 0.16***  | 0.16***   |
| Mother Primary school                       |         |         | 0        |          | 0        | 0         |
| Mother Middle School                        |         |         | -0.0028  |          | -0.0066  | -0.0042   |
| Mother High School                          |         |         | 0.011    |          | 0.0076   | 0.013     |
| Mother Two-year degree                      |         |         | 0.12***  |          | 0.098*** | 0.10***   |
| Mother Bachelor or Master degree            |         |         | 0.099*** |          | 0.062**  | 0.060**   |
| Mother Ph.D.                                |         |         | 0.18***  |          | 0.13***  | 0.12**    |
| Father Low SES                              |         |         |          | 0        | 0        | 0         |
| Father Medium-low SES                       |         |         |          | 0.049*** | 0.032**  | 0.031**   |
| Father Medium-high SES                      |         |         |          | 0.035**  | 0.017    | 0.017     |
| Father High SES                             |         |         |          | 0.16***  | 0.099*** | 0.097***  |
| Mother Low SES                              |         |         |          | 0        | 0        | 0         |
| Mother Medium-low SES                       |         |         |          | 0.0018   | -0.0051  | -0.0062   |
| Mother Medium-high SES                      |         |         |          | 0.068*** | 0.031    | 0.032     |
| Mother High SES                             |         |         |          | 0.11***  | 0.055**  | 0.056**   |
| Parents live together                       |         |         |          |          |          | 0         |
| Separated parents                           |         |         |          |          |          | -0.031**  |
| Parisian area                               |         |         |          |          |          | 0         |
| Urban unit of more than 100,000 inhabitants |         |         |          |          |          | -0.018    |
| Urban unit of less than 100,000 inhabitants |         |         |          |          |          | -0.049*** |
| Observations                                | 5197    | 5197    | 4094     | 4427     | 4065     | 4022      |
| $R^2$                                       | 0.055   | 0.055   | 0.100    | 0.092    | 0.108    | 0.112     |

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

*Readings* : When no controls are included, a 10-percentile increase in parental income is associated with a 2.8 percentage point increase in the proportion of individuals accessing master’s degree. When controls for parental potential financial transfers, parental education, parental occupation, family status, and urban unit size are included, a 10-percentile increase in parental income is associated with a 0.8 percentage point increase in the proportion of individuals accessing master’s degree. When only the percentile rank controls for parental income are included, having a mother with a PhD compared to a primary school degree or no degree increases access to master’s degree by 18 percentage points. Having a mother in a very favored occupation (professionals, managers, CEOs, teachers, professionals and artists) versus a disadvantaged occupation (blue-collar and non-working) increases access to master’s degree by 11 percentage points.

*Note* : In this table, we regress the percentile rank of parental income on access to master’s degree (1) and include controls for potential financial transfers (2), parental education (3), parental occupation (4), parental education and occupation (5) and all of these controls simultaneously with family status and urban unit size. The parental income used is the percentile rank calculated from the sum of the father’s pre-tax income and the mother’s pre-tax income.

*Sources* : Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes.

TABLE I12 – Access to selective programs based on parents’ income, profession and diploma

|   | (1)     | (2)       | (3)      | (4)      | (5)      | (6)       |
|---|---------|-----------|----------|----------|----------|-----------|
| <b>Parent’s income percentile rank</b>      | 0.23*** | 0.21***   | 0.12***  | 0.10***  | 0.087*** | 0.081***  |
| Log of potential financial transfers        |         | 0.0056*** |          |          |          | 0.0019    |
| Father Primary school                       |         |           | 0        |          | 0        | 0         |
| Father Middle School                        |         |           | -0.025   |          | -0.027   | -0.028    |
| Father High School                          |         |           | -0.015   |          | -0.013   | -0.010    |
| Father Two-year degree                      |         |           | 0.051*** |          | 0.039**  | 0.043**   |
| Father Bachelor or Master degree            |         |           | 0.11***  |          | 0.083*** | 0.077***  |
| Father Ph.D.                                |         |           | 0.13***  |          | 0.10***  | 0.10***   |
| Mother Primary school                       |         |           | 0        |          | 0        | 0         |
| Mother Middle School                        |         |           | 0.0086   |          | 0.0084   | 0.011     |
| Mother High School                          |         |           | 0.0040   |          | 0.0051   | 0.0091    |
| Mother Two-year degree                      |         |           | 0.090*** |          | 0.087*** | 0.091***  |
| Mother Bachelor or Master degree            |         |           | 0.075*** |          | 0.054*** | 0.055***  |
| Mother Ph.D.                                |         |           | 0.18***  |          | 0.14***  | 0.14***   |
| Father Low SES                              |         |           |          | 0        | 0        | 0         |
| Father Medium-low SES                       |         |           |          | 0.020*   | 0.0014   | -0.000075 |
| Father Medium-high SES                      |         |           |          | 0.017    | -0.0030  | -0.0044   |
| Father High SES                             |         |           |          | 0.12***  | 0.053*** | 0.050***  |
| Mother Low SES                              |         |           |          | 0        | 0        | 0         |
| Mother Medium-low SES                       |         |           |          | 0.0039   | 0.0012   | 0.0024    |
| Mother Medium-high SES                      |         |           |          | 0.041*** | 0.0055   | 0.0059    |
| Mother High SES                             |         |           |          | 0.10***  | 0.041**  | 0.043**   |
| Parents live together                       |         |           |          |          |          | 0         |
| Separated parents                           |         |           |          |          |          | -0.048*** |
| Parisian area                               |         |           |          |          |          | 0         |
| Urban unit of more than 100,000 inhabitants |         |           |          |          |          | -0.0037   |
| Urban unit of less than 100,000 inhabitants |         |           |          |          |          | -0.031**  |
| Observations                                | 5197    | 5197      | 4094     | 4427     | 4065     | 4022      |
| $R^2$                                       | 0.056   | 0.057     | 0.110    | 0.090    | 0.115    | 0.121     |

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

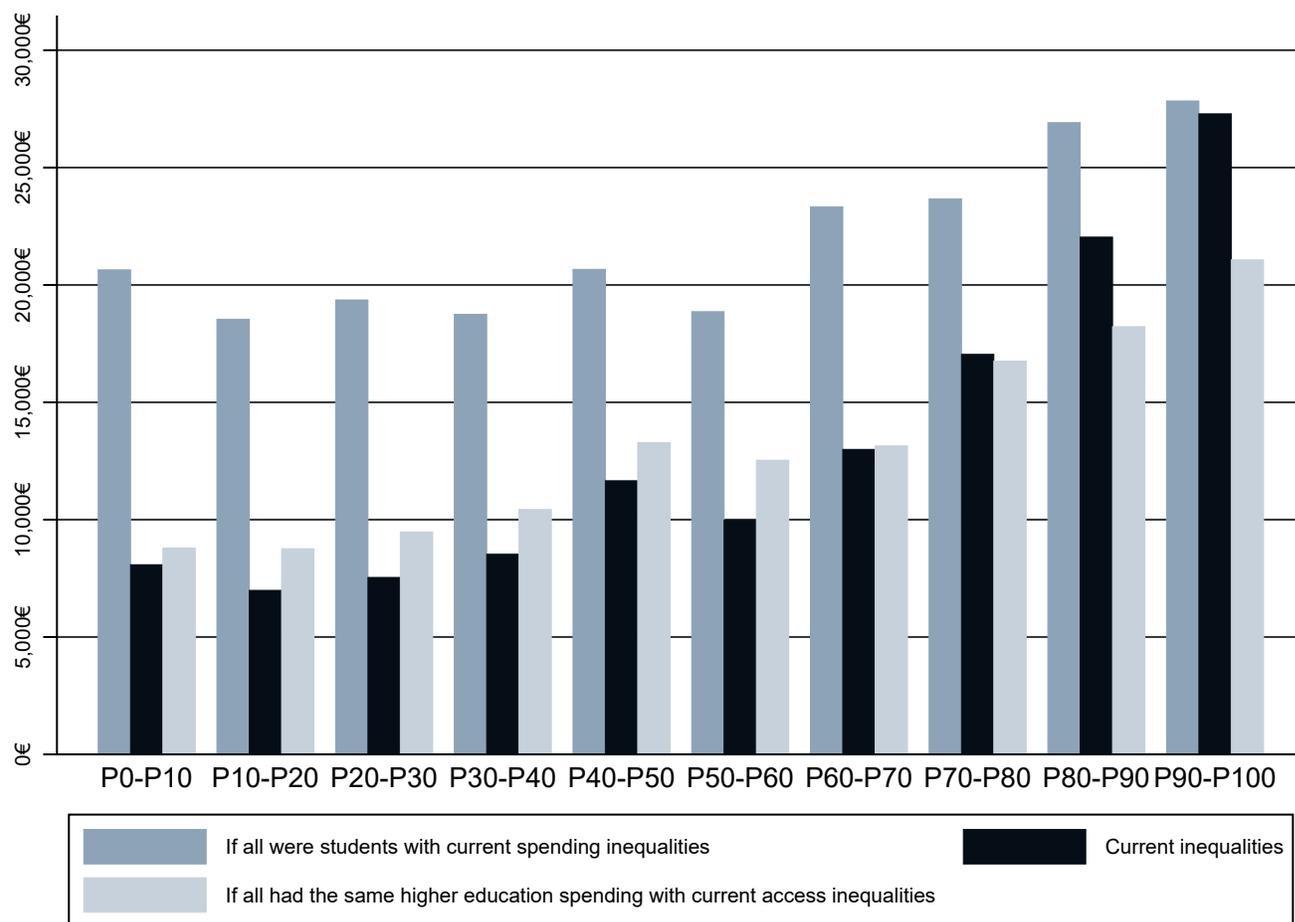
*Readings* : When no controls are included, a 10-percentile increase in parental income is associated with a 2.3 percentage point increase in the proportion of individuals accessing selective programs. When controls for parental potential financial transfers, parental education, parental occupation, family status, and urban unit size are included, a 10-percentile increase in parental income is associated with a 0.81 percentage point increase in the proportion of individuals accessing selective programs. When only the percentile rank controls for parental income are included, having a mother with a PhD compared to a primary school degree or no degree increases access to selective programs by 18 percentage points. Having a mother in a very favored occupation (professionals, managers, CEOs, teachers, professionals and artists) versus a disadvantaged occupation (blue-collar and non-working) increases access to selective programs by 10 percentage points.

*Note* : In this table, we regress the percentile rank of parental income on access to selective programs (1) and include controls for potential financial transfers (2), parental education (3), parental occupation (4), parental education and occupation (5) and all of these controls simultaneously with family status and urban unit size. The parental income used is the percentile rank calculated from the sum of the father’s pre-tax income and the mother’s pre-tax income.

*Sources* : Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes.

## J10 Decompositions of inequalities in public spending on higher education

FIGURE J9 – Decomposition between the extensive margin (access to higher education) and the intensive margin (differences in the cost of higher education) - individuals aged 22-24



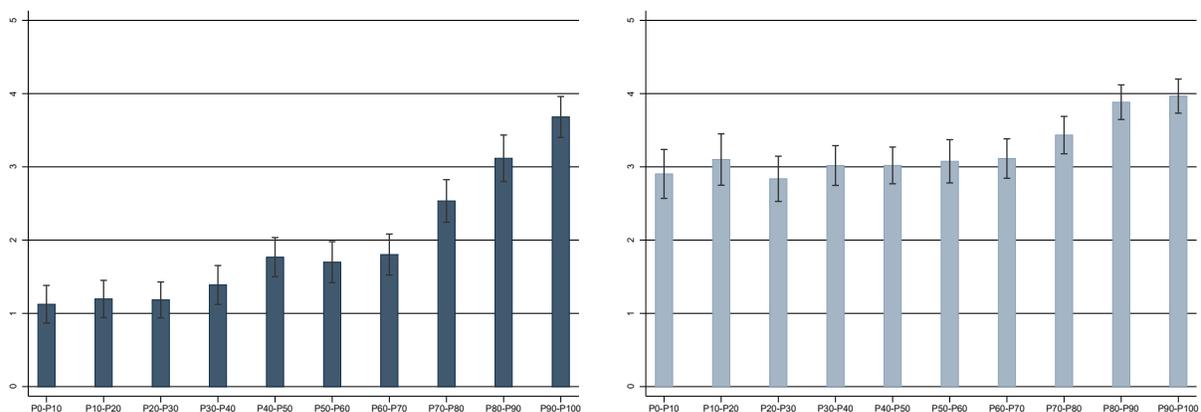
*Reading :* Currently, individuals (aged 22-24) whose parents belong to the top 10% of the income distribution have around 27,000 euros of spending in higher education on average. If all individuals of this category were to have the same spending as all students (aged 22-24), their average spending would be of around 20,000 euros.

*Note :* This figure shows the decomposition of inequalities in public investment in 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 access it, linked to both the unequal duration of studies and the unequal spending per year). The dark curve represents the current level of public spending inequality in higher education (corresponding to figure 5a). The left-hand curve plots the level of inequality that would be obtained if all individuals accessed higher education with the current level of spending inequality. The right-hand curve displays the level of inequality that would be obtained if everyone had the same spending (computed on 22-24 years old) on higher education with the current level of access inequality. The parental income used is the sum of the father's pre-tax income and the mother's pre-tax income. Deciles are computed based on this definition (x-axis).

*Source :* Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes, MENESR-DEPP (2021), and *Connaissance des coûts* (2016-2019) data.

## K11 Potential students

FIGURE J10 – Unequal lengths of study



(a) All individuals (22-24)

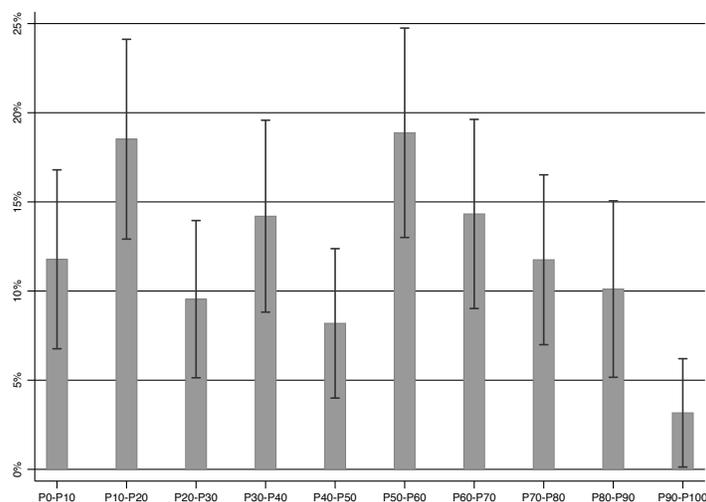
(b) Students or former students (22-24)

*Reading* : Individuals (ages 22-24) whose parents are in the top 10 percent of the income distribution have an average of 3.7 years of study.

*Note* : The figure (a) shows the average numbers of years of studies of individuals aged 22-24, by parental income. The figure (b) shows the average numbers of years of studies for 22-24 year olds with access to higher education, by parental income. The parental income used is the sum of the father's pre-tax income and the mother's pre-tax income. Deciles are computed based on this definition. The black line represents the standard errors.

*Source* : Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes.

FIGURE K11 – Proportion of individuals aged 22 to 24 holding a high school certification but who never acceded higher education



*Reading* : In the bottom decile of the parental income distribution (P0-P10), about 12% of individuals hold a high school certification that would give them access to higher education but have never entered a higher education program.

*Note* : The figure shows the proportion of individuals aged 22-24 holding a high school certification but who never acceded higher education, by parental income. The parental income used is the sum of the father's pre-tax income and the mother's pre-tax income. Deciles are computed based on this definition. The black line represents the standard errors.

*Source* : Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes.

## L12 Public spending in higher education for various programs and fields of study

TABLE L13 – Public cost in higher education computed based on *Connaissance des coûts* data

| Program   | Field of study                        | Public cost over one year (in euros) |
|---|---------------------------------------|--------------------------------------|
| Vocational track ( <i>STS</i> )                                 |                                       | 12372                                |
| Preparatory courses ( <i>CPGE</i> )                             |                                       | 13401                                |
| Bachelor degree (non vocational) ( <i>Licence</i> )             | Humanities, Arts, Languages           | 3428                                 |
|   | Markets & Organizations               | 2974                                 |
|   | Math, Engineering, Computer science   | 5327                                 |
|   | Law                                   | 2450                                 |
|   | Material, Earth and Universe Sciences | 6232                                 |
|   | Social Sciences                       | 3486                                 |
|   | Life Sciences                         | 4919                                 |
|   | Various                               | 3648                                 |
| Bachelor degree (vocational) ( <i>Licence professionnelle</i> ) | Humanities, Arts, Languages           | 4892                                 |
|   | Markets & Organizations               | 5401                                 |
|   | Math, Engineering, Computer science   | 7727                                 |
|   | Law                                   | 5373                                 |
|   | Material, Earth and Universe Sciences | 9437                                 |
|   | Social Sciences                       | 5327                                 |
|   | Life Sciences                         | 7044                                 |
|   | Various                               | 6383                                 |
| Technical training ( <i>IUT</i> )                               | Markets & Organizations               | 7541                                 |
|   | Math, Engineering, Computer science   | 11278                                |
|   | Law                                   | 7025                                 |
|   | Material, Earth and Universe Sciences | 11663                                |
|   | Social Sciences                       | 7545                                 |
|   | Life Sciences                         | 10055                                |
|   | Various                               | 9514                                 |
| Master degrees  | Humanities, Arts, Languages           | 5393                                 |
|   | Markets & Organizations               | 4764                                 |
|   | Math, Engineering, Computer science   | 7332                                 |
|   | Law                                   | 4021                                 |
|   | Material, Earth and Universe Sciences | 8894                                 |
|   | Social Sciences                       | 4734                                 |
|   | Life Sciences                         | 6478                                 |
| Engineering Schools   | Math, Engineering, Computer science   | 10441                                |
|   | Material, Earth and Universe Sciences | 11968                                |
|   | Social Sciences                       | 11318                                |
|   | Life Sciences                         | 11858                                |
|   | Various                               | 10584                                |
| First year of medical studies ( <i>PACES</i> )                  | Medicine                              | 2437                                 |
| Medical studies (except first year)                             | Medicine                              | 4361                                 |
| Paramedical Trainings   | Medicine                              | 2728                                 |
| Institute of Political Studies ( <i>IEP</i> )                   |                                       | 4033                                 |
|   | Business schools                      | 389                                  |
| Other elite graduate schools                                    |                                       | 10584                                |

*Readings* : On average, students enrolled in a law bachelor degree have 2,450 euros of public spending per year.

*Notes* : This table presents higher education public expenditures, for different degrees and fields of higher education, for programs under the supervision of the Department of Education (vocational tracks and preparatory courses) or the Department of Higher Education and Research (all other programs). The costs are calculated from the data of the survey *Knowledge of costs*, by weighting the courses by the number of registered students.

*Sources* : *Connaissance des coûts* data and MENESR-DEPP (2021) for higher education costs.

## M13 Robustness check : matching richer individuals to better-endowed programs

The adjusted R-squared of the regression of student costs on all combinations of programs and fields is about 25 percent, meaning that there is still variance 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 regression of 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 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. 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 2.3 more public investment in higher education than those in the bottom decile (table M14). When richer programs are associated with richer individuals, individuals in the top 10 percent of the income distribution benefit 3.0 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 euros per student per year – and an access rate that remains very unequal (Bonneau et al. (2021)). In a final specification, 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. 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 3.4 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 at least half of total spending differences (see table 6).

TABLE M14 – Sensitivity of results on public spending on higher education by parental income to the student-program matching

|                             |     | (1)                | (2)   | (3)  |
|-----------------------------|-----|--------------------|---|--|
| Decile of parental income   |     | Main specification | Association of wealthier individuals to better-endowed programs | Assumption (2) + assumptions on the cost of elite graduate schools |
| All individuals             | D1  | 7,807              | 7,107   | 7,107  |
|                             | D2  | 6,444              | 6,029   | 6,029  |
|                             | D3  | 6,958              | 6,749   | 6,749  |
|                             | D4  | 8,031              | 8,031   | 8,031  |
|                             | D5  | 10,768             | 10,768  | 10,768   |
|                             | D6  | 8,669              | 8,669   | 8,669  |
|                             | D7  | 11,813             | 11,813  | 11,813   |
|                             | D8  | 15,180             | 15,897  | 15,897   |
|                             | D9  | 20,103             | 21,629  | 21,629   |
|                             | D10 | 18,106             | 21,182  | 24,258   |
| D10/D1 Ratio                |     | 2.3                | 3.0   | 3.4  |
| Students or former students | D1  | 20,163             | 18,355  | 18,355   |
|                             | D2  | 16,693             | 15,616  | 15,616   |
|                             | D3  | 16,672             | 16,171  | 16,171   |
|                             | D4  | 17,467             | 17,467  | 17,467   |
|                             | D5  | 18,484             | 18,484  | 18,484   |
|                             | D6  | 15,698             | 15,698  | 15,698   |
|                             | D7  | 20,398             | 20,398  | 20,398   |
|                             | D8  | 20,563             | 21,534  | 21,534   |
|                             | D9  | 25,039             | 26,940  | 26,940   |
|                             | D10 | 19,505             | 22,819  | 26,134   |
| D10/D1 Ratio                |     | 1.0                | 1.2   | 1.4  |

*Readings* : When we match the wealthiest individuals to the best-endowed programs, individuals whose parents belong to the wealthiest 10 percent of the income distribution benefit from about 21,179 euros of public investment in higher education, while those in the bottom 10 percent benefit from 7,107 euros.

*Notes* : This table presents public spending on higher education by parental income decile under different assumptions. 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. Column (3) represents the same specification with assumptions about the cost of highly selective elite graduate schools. The parental income used is the sum of the father's pre-tax income and the mother's pre-tax income. Deciles are computed based on this definition.

*Source* : Drees-Insee 2014, Enquête Nationale sur les Ressources des Jeunes, MENESR-DEPP (2021), and *Connaissance des coûts* (2016-2019) data.