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Tastes, ability or expected wages?

The intended choice of college majors by students in Italy

by

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Abstract.

We investigate the factors influencing the intended college major choices of high school students in Italy, ranking the relative importance of expected earnings, perceived ability, and major-specific tastes, that we measure directly using a Coller and Williams game. We find that major-specific tastes and self-assessed ability are significantly more influential in shaping academic intentions than mean expected earnings at age 30. We estimate that a one standard deviation change in the taste for (resp. perceived ability in) a given major increases the odds of choosing that major (relative to Humanities, our benchmark scenario) by 136.4% (resp. 114.1%), far outweighing the 39.3% increase associated with a one standard deviation change in mean expected earnings.

1. Introduction.

The factors influencing a student's choice of college major have long been an important topic in the economics literature. This decision affects future career paths and earnings but may simultaneously contribute to the emergence of skill mismatch in the labour market if it is mainly driven by tastes and attitudes, and is little sensitive to signals coming from the market.

A growing literature, primarily in the U.S., has emphasized the role of subjective expectations by eliciting students' perceived future earnings and non-pecuniary outcomes. These studies generally conclude that tastes and attitudes outweigh expected earnings as the primary determinants of major choice (e.g., Wiswall and Zafar, 2015; Patnaik et al., 2022). However, this conclusion warrants caution: since preferences are not directly observed, their importance is often inferred residually. Consequently, the estimated role of tastes is inherently model-dependent and may be sensitive to bias arising from model misspecification.

This paper assesses the relative importance of expected earnings, self-reported ability, and tastes in shaping students' intended college major choices and contributes to the literature in two ways. First, building on the work of Patnaik et al. (2022), we use a choice-based game à la Coller and Williams (1999) to derive a direct, quantifiable measure of tastes. We combine this measure with a self-assessed indicator of expected ability in each major to disentangle the roles of expected wages, tastes, and ability in shaping intended choices.

Second, while many studies cover the U.S. and rely on relatively small and specific samples of students who have already enrolled in college, our study focuses on a large-scale, unique national survey of 4,142 final-year high school students in Italy that was explicitly designed to study intended choices.

Compared to the U.S., where the choice of college major occurs mainly during the first two years of college, in Italy – and in many European countries – this choice is done at the time of enrolment, after graduating from secondary school. Administered during the final year of secondary school, just before students make their college enrolment decisions, our survey differs from most U.S. based surveys that focus on college freshmen. An advantage of our approach is that we observe students who are still considering all alternatives, including not pursuing higher education, which provides a more comprehensive view of the decision-making process.

We believe that the Italian institutional setup is interesting per se, due to its distinct features, such as highly subsidized public universities where tuition fees are relatively low (as in most continental Europe), and the contemporaneous oversupply of graduates in the humanities and social sciences and undersupply of graduates in STEM fields, especially among females (OECD (2024), Anelli and Peri (2015)).

We show that, while mean expected earnings positively affect intended choices, major-specific tastes and perceived ability are the primary drivers of students' decisions. We estimate that a one standard deviation increase in tastes and perceived ability for major k is associated with a 136.4% and 114.1% increase in the odds of choosing that major relative to Humanities (our benchmark field of study). These effects are substantially larger than those induced by higher expected earnings at age 30 —39.3% (when the standard deviation of future earnings is set at its sample mean).

The relative importance of pecuniary versus non-pecuniary factors in our study differs notably from previous findings. While we find that the ratio of the effect of expected earnings to that of tastes is approximately 1:3, Wiswall and Zafar (2015, p.820) report much higher relative weights for tastes, with ratios ranging from 1:7 to 1:25 depending on the major. Furthermore, we find that the effects of ability and tastes are of comparable magnitude. In contrast, ability in Wiswall and Zafar (2015) exerts a much smaller influence, roughly one-tenth that of tastes.

We investigate several dimensions of heterogeneity, including family background, regional gender norms, and student gender. Our findings indicate that tastes are even more important for students belonging to more affluent families and for female students in more progressive regions. To further understand the sources of the gender gap in major choice, we perform a Blinder–Oaxaca decomposition (Blinder (1973), Oaxaca (1973)). The results suggest that the observed gap is driven primarily by differences in the distribution of characteristics, or "endowments"—such as males' higher perceived ability in STEM fields—rather than by differences in how each gender responds to these factors. Finally, we explore the determinants of tastes and perceived ability and find that factors such as parental educational background and expectations of a good work-life balance and of working abroad have a statistically significant role.

The rest of the paper is organized as follows: Section 2 reviews the relevant literature, Section 3 describes the survey and the data, Section 4 outlines the empirical methods, Section 5 presents the baseline results, Section 6 is dedicated to the heterogeneity analysis, and Section 7 explores the correlates of tastes and ability. Section 8 concludes, with several appendices providing further details.

2. Previous literature.

Our paper contributes to the substantial literature that investigates the role of students' beliefs in the choice of college major, which mainly, but not exclusively, uses data on students already enrolled in U.S. colleges. While this literature has emphasized the role of expected monetary returns associated with specific majors, there is a growing recognition of the importance of non-monetary factors.

For example, Arcidiacono et al. (2012), using data from a survey of Duke undergraduates, find that students consider potential earnings when selecting their majors but also tend to choose majors in which they excel, suggesting an interplay between perceived ability and economic considerations in major selection.[1]

An earlier study by Hilmer and Hilmer (2012) examines the degree to which measures of student tastes and motivations are associated with important higher education decisions and subsequent annual earnings. Using a sample of students from the U.S. Department of Education's Baccalaureate and Beyond (B&B) longitudinal study, they find that these measures are correlated with college type, college major, and highest postgraduate degree earned.

In their study of students at New York University, Wiswall and Zafar (2015) find a positive relationship between students' perceptions of earning potential in different majors and the likelihood of graduating in those majors. They also highlight, however, the role of

[1] Arcidiacono et al. (2020) find that nonpecuniary factors play an important role also in the choice of occupation, with a sizable share of individuals willing to give up substantial amounts of earnings by not choosing the highest-paying occupation.

individual tastes and perceived ability.[2] Zafar (2013) uses a survey of Northwestern University sophomores to emphasize the role of non-pecuniary considerations, such as the importance of enjoying coursework and potential jobs, as well as gaining parental approval, in major selection.

Non-monetary factors may also play a significant role in understanding gender differences in the choice of college major. Patnaik et al. (2022), for instance, incorporate individual-specific measures of time and risk preferences into a life-cycle model of college major choice and find that female students tend to be more risk averse and patient than males, although there is considerable variation within each gender. Wiswall and Zafar (2021) explore how perceptions of the marriage market interact with college major choices and show that both males and females perceive a positive marriage market return to completing a major.[3]

We contribute to this literature both by proposing a new way of measuring major-specific tastes and by considering the Italian context, which is clearly different from the U.S. one, where the majority of studies have been conducted. To our knowledge, only a few studies focus on Italy, and those that do so are primarily concerned with the effects of information or peer effects on intended college choices. Crucially, these studies typically isolate a single factor (e.g., information provision, peer gender composition), and do not directly measure or rank the relative importance of multiple choice determinants simultaneously.

For example, Ballarino et al. (2022) use a randomized field experiment to assess the effects of an information campaign providing relevant labour market information to high school students who may enrol in college after graduation. They document that treated students are less likely to choose majors with low expected labour market returns. On the other hand, Barone et al. (2019) find that information barriers explain why Italian females tend to choose less economically rewarding fields. Their information treatment generates for treated female students a decline in the enrolment in the Humanities and Social Sciences to the advantage of a broad range of more remunerative fields.[4] Finally, Anelli and Peri (2019)

[2] Wiswall and Zafar (2018) document that concerns about job stability influence students' decisions about their majors, with higher perceived job-firing probabilities leading to a decreased likelihood of pursuing certain majors, particularly among females.

[3] Their study suggests that students perceive completing higher-earnings majors as beneficial not only for their own earnings but also because these majors attract higher-earnings spouses.

[4] Barone et al. (2017) show that providing students with high-quality information about university costs and financial aid prompts less privileged students to consider post-secondary vocational courses as an alternative

study whether the gender composition of high school peers affect the choice of college major and find that male students graduating from classes with a large share of male peers are more likely to choose "prevalently male" college majors (Economics, Business and Engineering).

Differently from these contributions, our study analyses the Italian context using a nationally representative survey and with a comprehensive approach that simultaneously measures and compares multiple factors—expected earnings (at both ages 30 and 40), perceived own-ability, and major-specific tastes—within the same analytical framework. This allows us to directly quantify and rank the relative importance of each factor for intended major choice.

Therefore, our approach provides a more complete picture of the decision-making process, revealing that while information about labour market returns matters, non-pecuniary factors - particularly tastes and perceived ability - play an even larger role in shaping students' intentions. This finding has important implications for policy: it suggests that interventions targeting information alone, while valuable, may have limited effectiveness if they do not also address the formation of preferences and beliefs.

3. The survey.

Our data are drawn from a national survey of final-year high school students in Italy attending in the academic track (lyceum), the majority of whom will enrol in tertiary education after graduation.[5] The survey was conducted between November 2023 and May 2024, covering 106 schools and 4,142 students. In each school participating in the survey, we interviewed entire classes.[6]

to leaving education after high school. The treatment also encourages working-class students attending general high schools to reduce their enrolment in less rewarding fields.

[5] According to a report by Alma Diploma (2021), 73.3 percent of lyceum students graduating from high school in 2017 are in college one year after graduation, compared to 41.5 percent of technical high school students and to 21.7 percent of vocational high school students. Lyceums in our sample comprise three curricula: scientific studies (65 percent of students), classical studies (23 percent of students), and other studies, including foreign languages, the arts and human sciences (10 percent of students).

[6] By interviewing entire classes, we can compute classmates' average parental background and average parental and sibling choice of major. A recent literature investigates the role of peers' family background on individuals' choices (Cattan et al. (2024); Anelli and Peri, (2019); Gagete-Miranda, (2019); Black et al. (2013); Bifulco et al. (2011); Mertz et al. (2003)).

The 30-minute-long survey elicited information on the probability of enrolling in different college majors after high school, major-specific expected monetary returns from college, expected probabilities of graduation, individual beliefs about ability in college and non-monetary preferences.[7] We also collected data on students' demographics and parental background, including the major chosen by parents and siblings who graduated or are enrolled in college.[8]

Major-specific information was collected from respondents for six distinct groups of majors and for not attending university at all, so that respondents faced seven hypothetical scenarios. The groups are: 1) Civil engineering, Architecture and Design; 2) Engineering, ICT, Mathematics, Physics, and Other Natural Sciences; 3) Economics, Business, and Law; 4) Medicine, Veterinary Medicine, and Health Professions; 5) Psychology, Political Sciences, and Other Social Sciences; 6) Literature, Philosophy, and Humanities.[9]

We elicited the probability of enrolling in college major *k* by asking respondents to assign to each of the seven groups values ranging from 0 to 100, with the constraint that the sum across groups equals 100.[10] Unfortunately, this probability is missing for close to 20 percent of the original sample. We restrict the working sample to respondents with non-missing values of the intended enrolment probability, 59 percent of whom are females, 36 and 28 percent have a mother and a father with a college degree, and 76 and 89 percent have the mother and the father in employment (Table 1, Panel A). The distribution of respondents in the five macro-areas of the country mimics fairly well the distribution of high school students in the academic track, especially in the South.[11]

The first row in Panel B of Table 1 shows that the most preferred scenario is pursuing a degree in Medicine (probability close to 20 percent on average), closely followed by STEM

[7] Appendix B contains a verbatim transcript of the survey's major-specific questions.

[8] In a companion paper we show that students' intended choice of a college major is affected by the majors selected in the family (see Brunello et al. (2025)).

[9] For brevity, we will refer to them hereafter as: 1) Architecture; 2) STEM; 3) Economics & Law; 4) Medicine; 5) Psychology; 6) Humanities.

[10] Since in the empirical analysis we use the logs of probabilities, we slightly perturb the probability of enrolling in major *k* after high school by replacing the zeros reported in the survey with 0.001 (as in Patnaik et al. (2022)).

[11] The distribution in the working sample is: 20.4 percent in the Northwest, 23.7 percent in the Northeast, 17.5 percent in the Centre, 26.4 percent in the South and 12.1 percent in the Islands. The distribution in the population of lyceum students in the school year 2023/24 is 23.9 percent in the Northwest, 15.1 percent in the Northeast, 22.9 percent in the Centre, 26.3 percent in the South and 11.7 percent in the Islands (source: Italian Ministry of Education, https://dati.istruzione.it/espscu/index.html?area=anagStu).

(about 17 percent), with the no-college scenario being the least preferred (8 percent). This pattern conceals substantial heterogeneity by gender. Appendix Table A1 shows that the intended probability of enrolling in STEM is about 24% for male students, compared to 12% for female students. Among female students, Medicine has the highest intended enrolment probability (23.56%). The no-college scenario remains at the bottom of both genders' rankings, with probabilities close to 6 and 10 percent for female and male students, respectively.

Since students are uncertain about their future earnings, we followed Attanasio and Kaufmann (2014) and elicited the information required to fit individual wage distributions at age 30, conditional to enrolling and graduating in each major. For each scenario, we asked (i) the minimum and maximum expected monthly earnings and (ii) the probability that expected earnings are greater than or equal to three specific thresholds based on the responses to question (i) (see Appendix B for the exact wording of the question).[12]

We use this data to fit a skew-normal distribution by respondent and major group and compute the mean of expected wages at age 30 and its standard deviation, an indicator of the degree of uncertainty about future income.[13] We also elicited expected earnings at age 40. However, to minimize the burden, we asked respondents to directly indicate expected monthly earnings at that age.

The elicitation of expected earnings at two points in the future using different methods raises the issue of comparability between expected wages at ages 30 and 40. We address this issue by using the results of a follow up survey that we conducted between April and October 2025, covering slightly more than 10 percent of the respondents to the original survey. In the follow up, we elicited expected wages in the chosen major at ages 30 and 40 directly. We use average differences by major between age 30 and 40 to rescale expected earnings at 30 in the original survey, making them more comparable with expected earnings at 40.

We find that expected wages at age 30 range on average from 1,831 euro per month without a college degree to 3,594 euro per month with a degree in Medicine (Table 1, Panel B). Are

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[12] Letting MIN and MAX be the minimum and the maximum values of monthly wages, the thresholds are: a) 0.75MIN+0.25MAX; b) 0.5MIN+0.5MAX; c) 0.25MIN + 0.75MAX.

[13] To limit the influence of extreme values, we winsorize expected values at the 1st and 99th percentiles.

these expectations close to real values? To answer this question, we compare mean (net) wages in all majors *relative* to no college degree both in our survey and in the survey *Participation, Labour and Unemployment (PLUS)*, by the Italian research institute INAPP, which includes information on actual (net) monthly wages for employees aged 29 to 33, who have completed a lyceum, have or have not a college degree and are observed in the period 2018-2021.

After normalizing wages with no college at 1, mean wages by respondents to our survey are equal to 1.248 for Architecture and STEM, 1.447 for Economics and Law, 1.963 for Medicine and 1.021 for Social Sciences and the Humanities. In the PLUS data we estimate that actual wages were equal to 1.182 for employees with a degree in Architecture and STEM, 1.206 for those with a degree in Economics and Law, 1.260 for those with a degree in Medicine, and 1.166 for those with a degree in Social Sciences and the Humanities. We conclude that, with the exception of Social Sciences and Humanities, respondents to our survey have inflated expectations of major-specific future wages at age 30 with respect to jobs without a college degree.

We compute mean expected earnings at age 30 for each scenario (EW_{ik}^{30}), using as weights the self-reported probability of graduating in each major k (G_{ik}):

$$EW_{ik}^{30} = G_{ik}W_{ik}^{30} + (1 - G_{ik})W_{inc}^{30} \quad (1)$$

where W_{ik}^{30} and W_{inc}^{30} are (rescaled) expected earnings at age 30 for major k and the no-college scenario *nc*, respectively, as in Attanasio and Kaufmann (2014). The underlying assumption is that, if a respondent drops out after enrolling in major k, she does not switch to an alternative degree program but enters the labour force with no college qualification. Mean expected earnings at age 40 are computed using the same approach.

The fifth and sixth rows of Table 1, Panel B, show that mean expected earnings at ages 30 and 40 are highest for Medicine, followed by Economics and Law, STEM, Architecture, and Psychology, and lowest for the Humanities and the no-college scenario. Mean earnings at age 30 are lower than at age 40 for Architecture, Economics and Law and STEM and higher for Medicine, Psychology, the Humanities and the no-college scenario. As shown in Appendix Table A1, mean earnings are always higher for males than for females.

According to the literature on the determinants of schooling decisions (see for instance Arcidiacono et al. (2012); Turner and Brown (1999); Paglin and Rufolo (1990)), students sort themselves across majors using their subject-specific perceived ability (Zafar (2013)), a measure of confidence in the field. We asked respondents to rank their ability – relative to potential future college peers - from 1 (lowest) to 100 (highest) in each major group, excluding no college. Table 1, panel B shows that major-specific perceived ability is highest on average for Psychology and lowest for STEM. The gender-specific patterns reported in Appendix Table A1 indicate that the low confidence in STEM is due to female students, who are also responsible for the high values of perceived ability for Psychology. In general, female students are less confident than males in the hard sciences, including Medicine, and more confident in the Humanities and Social Sciences, excluding Economics, Business and Law.

Intended college choice depends also on respondents' major-specific tastes (see, for example, Arcidiacono (2004), Giustinelli (2022), Patnaik et al. (2022), Zafar (2013), and Hilmer and Hilmer (2012)), that we elicited using a Coller and Williams choice-based game (see Patnaik et al. (2022)). In this game, illustrated in Figure 1, respondents repeatedly face the choice between a major in the Humanities with a fixed monthly pay of €1,500, which we use as benchmark, and a major k (including the option "no college") with a monthly pay that ranges between €500 to €2,500.

We use the level of pay at which a respondent switches from preferring the Humanities with €1,500 per month to preferring major k as the measure of major-specific tastes: the higher the switching point, the lower the implied taste for major k, because the respondent requires a larger monetary compensation to consider switching out of the Humanities.

To illustrate how we proceed, consider two extreme cases. In the first case, the respondent prefers the Humanities when STEM pays €2,250 or less but switches to preferring STEM at €2,500, the maximum value in Figure 1. Assuming that her indifference point between the two majors is at midpoint between €2,250 and €2,500 (€2,375), the respondent is as well off with STEM and the Humanities even if the latter carries a pay penalty equal to -€875 (€1,500-€2,375). In the second case, she prefers the Humanities when STEM pays €500, the minimum value in Figure 1, but switches to preferring STEM at €750. Assuming that her indifference point is at midpoint between €500 and €750 (€625), the respondent is as well off with STEM and the Humanities if the Humanities offer a pay premium equal to €875 ((€1,500-€625).

For intermediate values in the figure, we proceed similarly, ending up with a measure of non-monetary tastes for major k relative to the Humanities that ranges between -€875 and €875. If a respondent always prefers STEM (or any major k) to the Humanities, or vice versa, there is no switching point. We assign to these two extreme cases the values -1125 and 1125 (assuming that a switch eventually occurs between €2500 and €2750 and between €250 and €500) and flag them with the binary variables NS_1 and NS_2, equal to 1 when no switching point exists in either direction and to 0 otherwise. We include these variables as additional regressors in our estimates (see Appendix A1 for further details).

Table 1, Panel B shows that, on average, respondents have positive non-monetary tastes for majors other than the Humanities, highest for Medicine (314 euro) and STEM (287 euro), and lowest for the no-college scenario (158 euro).[14] Not reported in the table, a non-trivial number of students (21.8 percent) always prefer the Humanities to any major k or always prefer a major k to the Humanities (18.3 percent). While the percentage of respondents who always prefer any major k to the Humanities is similar for males and females, the percentage who always prefer the Humanities is much higher for females than for males (25.7 versus 15.5 percent).

In principle, respondents may face uncertainty not only about future earnings but also about their perceived ability and tastes. For instance, they may be uncertain about their ability—and thus their confidence—in a specific major, as they cannot fully anticipate the ability composition of their future university peers. Similarly, they may lack clarity regarding their own tastes for specific majors, particularly for Medicine, that is not part of the high school curriculum. We believe, however, that this uncertainty is less important than the one affecting future earnings. Consequently, to minimize the burden to respondents, we decided not to elicit subjective probability distributions for these ability and tastes.

Finally, we collect information on major-specific job attributes associated with the occupation students expect to be employed in after graduation, including the probability of: (i) achieving a good work-life balance; (ii) working remotely; (iii) being self-employed or an

[14] Appendix Table A1 presents these numbers disaggregated by gender.

entrepreneur/freelancer; (iv), working close to/far from home or abroad. The last four rows of Table 1 show the average values of these probabilities by major.

4. The empirical strategy.

To investigate the determinants of major choice intentions, we posit that students choose by comparing the utility of enrolling in each major (e.g., Manski (1993); Wiswall and Zafar (2015); Giustinelli (2022)). We define the expected utility V_{ik} that individual i derives from enrolling in major k as follows:

$$V_{ik} = \gamma_{ik} + \beta A_{ik} + \theta^{30} EW_{ik}^{30} + \boldsymbol{\rho X_{ik}} + \omega_i + \mu_{ik} \quad (2)$$

where γ_{ik} is a major-specific taste parameter which incorporates the enjoyability of coursework (Wiswall and Zafar (2015)) and non-pecuniary aspects of the job associated with the major, including the work–life balance and the possibility of remote working arrangements (Patnaik et al (2022)); A_{ik} is perceived ability in major k; EW_{ik}^{30} are the mean expected monthly earnings associated with major k at age 30 and $\boldsymbol{X_{ik}}$ is a vector of additional individual-by-major controls. Finally, ω_i captures unobserved individual heterogeneity and μ_{ik} is an i.i.d. extreme value error term.

The probability that respondent i chooses to enrol in major k after graduating from high school is equal to the probability that the utility from major k is greater than or equal to the utility from any other alternative major r:

$$P_{ik} = Prob(V_{ik} \geq V_{ir} \ \ \forall\, r) \quad (3)$$

Which, under the distributional assumptions on the error term μ_{ik} becomes:

$$P_{ik} = \frac{exp\ (\gamma_{ik} + \beta A_{ik} + \theta^{30} EW_{ik}^{30} + \boldsymbol{\rho X_{ik}} + \omega_i)}{\sum exp\ (\gamma_{ir} + \beta A_{ir} + \theta^{30} EW_{ir}^{30} + \boldsymbol{\rho X_{ir}} + \omega_i)} \quad (4)$$

Using the major Humanities (*h*) as the base category and taking natural logarithms we obtain the following log-odds ratio specification:

$$\ln\left(\frac{P_{ik}}{P_{ih}}\right) = \gamma_{ik} - \gamma_{ih} + \beta(A_{ik} - A_{ih}) + \theta^{30}(EW_{ik}^{30} - EW_{ih}^{30}) + \boldsymbol{\rho}(\boldsymbol{X_{ik}} - \boldsymbol{X_{ih}}) + e_{ik} \quad (5)$$

where e_{ik} is a measurement error term.

Since the component $\gamma_{ik} - \gamma_{ih}$, which reflects differences in tastes across majors, correlates with expected earnings and beliefs about self-ability, standard estimates of parameters β

and θ^{30} are likely to be biased. Wiswall and Zafar (2015) remove this threat by using an experimental information treatment, which allows them to difference out $\gamma_{ik} - \gamma_{ih}$ by virtue of repeated information for each respondent. Instead, we explicitly measure $\gamma_{ik} - \gamma_{ih}$ using the Coller and Williams choice-based game described in Section 3. This procedure allows us to elicit from each respondent major-specific tastes with respect to the base category Humanities. We thus model the taste component as:

$$\gamma_{ik} - \gamma_{ih} = \delta_i + \delta_k + \boldsymbol{\pi T_{ik}} \quad (6)$$

where $\boldsymbol{T_{ik}}$ is a vector that includes TS_{ik}, or elicited tastes for major k relative to base major h, NS_{1ik} and NS_{2ik} are two binary variables flagging respondents who never switch out of major k or out of the Humanities, and δ_i and δ_k are individual and major fixed effects. After combining equations (5) and (6), and simplifying the notation by using a tilde superscript (~) to denote differences relative to the base major Humanities (e.g., $\tilde{A}_{ik} = A_{ik} - A_{ih}$), we express the baseline estimation equation as follows:

$$ln\tilde{P}_{ik} = \pi \boldsymbol{T_{ik}} + \beta \tilde{A}_{ik} + \theta^{30} \widetilde{EW^{30}}_{ik} + \boldsymbol{\rho \widetilde{X}_{ik}} + \delta_i + \delta_k + \tilde{e}_{ik} \quad (7)$$

The vector $\boldsymbol{\widetilde{X}_{ik}}$ includes a set of major-specific controls both at the family and at the class level. The family-level controls comprise two indicators for whether the student's father and mother graduated in field k, as well as two indicators for whether older sisters and brothers are enrolled in or have graduated in field k. The group of class-level controls includes classmates' average ability and taste for field k, along with the share of classmates whose family members - parents or older siblings - have graduated in (or, in case of older siblings, graduated or enrolled in) field k.[15]

The vector $\boldsymbol{\widetilde{X}_{ik}}$ includes also dummies for missing values in the explanatory variables, which we deal with using a typical approach in the literature: we replace these values with the sample mean of the relevant variable and assign the value "1" to binary indicators that identify observations with imputed values (and 0 otherwise).

Our identification strategy exploits the within-student variation of beliefs about expected earnings, perceived own ability, and elicited tastes across majors. By comparing alternative

[15] Classmates' average ability and the share of their family members who have graduated in, or are enrolled in, field k are expressed as differences relative to the base category Humanities. Since we interview entire classes, these variables are calculated using survey answers directly collected from individuals' classmates.

scenarios for the same respondent, we account for unobserved heterogeneity at the individual level. The identification of parameters π, β, and θs relies on the assumption that, conditional on the set of major-specific family and classmates' controls $\widetilde{\boldsymbol{X}_{ik}}$, as well as individual fixed effects δ_i and major fixed effects δ_k, the error term $\widetilde{e_{ik}}$ is mean independent of the explanatory variables. This implies that, after conditioning on observed covariates and fixed effects, the variation in students' subjective expectations, perceived ability and tastes is exogenous to unobserved factors influencing major choice intentions.[16]

Since mean expected earnings at age 30 refer to expected labour market conditions close to ten years in the future, the estimated parameter θ could reflect not only the relative weight attributed to expected future earnings but also the inner uncertainty of these expectations. We capture the effect of this uncertainty on individual intended choices by adding to the right-hand side of equation (7) both the estimated standard deviation of the difference between expected earnings at age 30 in major k and in the Humanities ($\widetilde{SDW^{30}}_{ik}$) and the interaction of $\widetilde{SDW^{30}}_{ik}$ with $\widetilde{EW^{30}}_{ik}$.[17]

We therefore estimate

$$ln\tilde{P}_{ik} = \pi\boldsymbol{T_{ik}} + \beta\tilde{A}_{ik} + \theta\widetilde{EW^{30}}_{ik} + \varphi\widetilde{SDW^{30}}_{ik} + \gamma\widetilde{EW^{30}}_{ik} \times \widetilde{SDW^{30}}_{ik} + \boldsymbol{\rho\widetilde{X}_{ik}} + \delta_i + \delta_k + \tilde{e}_{ik} \quad (8)$$

5. Results.

5.1 Baseline estimates.

Since the number of survey respondents is 4,142 and for each respondent we use information on six major groups (including no college), using the Humanities as benchmark, the resulting sample consists of 24,852 observations. Due to the presence of missing values in the probability of selecting a major after high school, our sample has 19,673 valid observations for 3,292 students (Sample A). If we further exclude missing values in expected earnings, the sample is further reduced to 13,159 observations (Sample B). We consider

[16] In our regressions we always cluster standard errors at the student level.

[17] We compute the standard deviation of the difference as $\widetilde{SDW^{30}}_{ik} = \sqrt{(SDW_{ik}^{30})^2 + (+SDW_{ih}^{30})^2}$ where SDW_{ik}^{30} and SDW_{ih}^{30} are the standard deviation of expected earnings at age 30 in major k and in the Humanities.

Sample A as the working sample. However, we also report in the Appendix the estimates based on Sample B for comparison.

Table 2 reports the results from the estimation of equation (8).[18] Columns (1) to (3) show the estimates for both genders combined. Column (1) includes as regressors the mean expected earnings at age 30, the standard deviation $\widetilde{SDW^{30}}_{ik}$, the interaction between these two variables and the controls in vector $\widetilde{\boldsymbol{X}}_{\boldsymbol{ik}}$. Column (2) adds to these regressors major-specific perceived ability, both at the individual and at the class level, and column (3) further includes individual and classmates' major-specific tastes. Results in columns (4) and (5) replicate the specification in column (3) separately for males and females.[19] To ease the comparison across point estimates, mean expected earnings, individual and classmates' perceived ability and tastes are standardized, so that their coefficient represents the effect of a standard deviation change in the variable on the log-odds of enrolling in major k relative to the benchmark major (Humanities).

The explanatory power of the empirical model increases substantially as we move from column (1) (R-squared: 0.601) to column (3) (R-squared: 0.718), indicating that both perceived ability and tastes contribute to a sizeable portion of the variation in major choice intentions. Not surprisingly, mean expected earnings are positively associated with intended choices, but the strength of this association declines with the standard deviation $\widetilde{SDW^{30}}_{ik}$, as students give lower weight to more uncertain expectations.

The importance of earnings declines when we include both perceived ability and tastes. For instance, the coefficient on mean expected earnings at age 30 declines by approximately 50%, from 0.842 in column (1) to 0.417 in column (3), suggesting that ability and tastes account for much of the correlation between expected earnings and intended major choice, as already pointed out by Wiswall and Zafar (2015).[20] The point estimates in column (3) imply that, evaluating the standard deviation $\widetilde{SDW^{30}}_{ik}$ at its mean value (0.677), a one

[18] Table A2 in the Appendix reports the estimates based on Sample B.

[19] The regressions in columns (3)-(5) include also the binary variables NS_1 and NS_2. The sum of observations in columns (4) and (5) is smaller than the number of observations in columns (1)-(3) because of missing values in the gender variable.

[20] Using a Shapley-Owen decomposition of the R-squared we find that mean expected earnings at age 30 contribute about 4% to the explained outcome variance, compared to 38% and 39% for perceived ability and tastes. See Table A8 and Appendix A.2 for further details.

standard deviation change in expected earnings at age 30 is associated with a 39.3 percent (0.417-0.035×0.677) increase in the odds of choosing major k relative to the Humanities.[21]

Perceived ability and tastes turn out to be powerful predictors of intended choice. If we consider the full model in column (3) of Table 2, we find that a one standard deviation increase in perceived ability is associated with a 114.1 percent increase in the odds of choosing a major k over Humanities. On the other hand, a one standard deviation change in tastes is associated with an increase in the odds of 136.4 percent. These findings unveil the prominent role of perceived ability and tastes, compared to earnings expectations, in shaping students' intention regarding their academic pathways.

Our estimates also reveal a significant influence of family background on major choice intentions, although to a lesser extent if compared to ability and taste. The odds of choosing a major k over Humanities increase by 21 percent if the student has a mother or a father who graduated in the same major. The intention to enrol in a major also depends on the presence of older siblings who studied or are currently pursuing the same major also matters.[22]

Column (4) for females and column (5) for males confirm across genders the patterns discussed above for expected earnings, perceived ability and major-specific tastes. We highlight the different effects on intended choice of parental education by gender. While the major chosen by mothers and older sisters affect mainly females (26 and 32 percent for a one standard deviation increase), males are affected more by the major chosen by fathers and older brothers (35 and 45 percent respectively), suggesting gender patterns in role models within families.[23]

As a robustness check, we re-estimate equation (8) by replacing major fixed effects with the more demanding set of major-by-macro-area fixed effects.[24] This specification controls for macro-area specific factors that vary across majors, including local differences in labour

[21] Table A3 in the Appendix reports the results of an augmented regression which adds both expected earnings at 40 and their interaction with the standard deviation $\widetilde{SDW}^{30}{}_{ik}$, our only measure of uncertainty in the prediction of future earnings.

[22] The odds increase by 24 percent for older sisters and by 26 percent for older brothers. While exposure to a one standard deviation increase in peers' ability and tastes influence individual intentions about college majors by 5.6 and 0.1 percent respectively, the share of classmates with family members in a given major has weak or inconsistent effects.

[23] Notice however that these differences across gender are not statistically significant.

[24] There are five macro-areas: Northwest, Northeast, Centre, South and Islands.

demand for certain occupations, which may affect the intention to enrol in majors that facilitate access to these occupations, as well as local variation in the quality of university programs across majors. The results, reported in Table A4 in the Appendix, are similar to those reported in Columns (3) to (5) of Table 2.

Finally, the estimated impacts of perceived ability and major-specific tastes on intended college choice reported in Table 2 are direct effects. However, there are also indirect effects, because ability and individual tastes are likely to affect both mean expected earnings and their standard deviation. We show in Appendix Table A5 that these effects are small compared to the direct effects.

6. Heterogeneities.

In this section we investigate three dimensions of heterogeneity: family background, regional gender norms, and student's gender.

6.1 Heterogeneity by parents' education and gender norms.

Table 3 looks at heterogeneous effects along two dimensions: parental education and region-specific (NUTS 2) gender norms. First, we investigate how students with different socioeconomic backgrounds respond to expected economic returns, perceived ability, and tastes by dividing our sample in two: a group with at least one parent who attained tertiary education ("college parents") and a group whose parents did not attend college ("no college parents").

It is not clear ex-ante which group would place greater weight on mean expected earnings. On the one hand, students without college parents may be more financially constrained and therefore attach greater importance on the pecuniary returns of tertiary education. On the other hand, students with college educated parents may have receive more accurate information about labour market outcomes after college graduation and be more responsive to expected earnings.

In terms of perceived ability, students with highly educated parents may benefit from better early-life family inputs and support, which can result in higher ability and confidence in academic skills. As for tastes, it is plausible that parental education influences preferences for specific academic majors. At the same time, students from less educated families might be more sensitive to stimuli from siblings or peers when forming such preferences.

We find that students in the "no college parents" group are much more responsive to mean expected earnings at age 30. Evaluated at the sample mean value of the $\widetilde{SDW^{30}}_{ik}$, a one standard deviation increase in these earnings raises the intended probability of enrolling by 68.9 percent for students without college-educated parents and by 26.7 percent for students with college-educated parents. On the other hand, we do not detect any significant difference across the two groups in the effect of perceived ability and major-specific tastes.

We find that ability peer effects matter exclusively for the "no college parents" group, suggesting that non-monetary factors at the peers' level are more relevant in shaping preferences about academic specialization when students lack a parental academic background. Likewise, the effects of having older siblings graduated or enrolled in a certain major are only significant for the "no college parents" group.

A growing body of research documents that gender-related social norms affect individual aspirations and educational investment - see Giuliano (2020) for a comprehensive review of this literature. It is therefore worth investigating whether local attitudes toward gender roles affect the importance of factors influencing major choice intentions. In contexts where more conservative gender norms prevail, female students may respond differently to key determinants of academic choice. To test this possibility, columns (3)-(6) of Table 3 present separate estimates, by gender, for students residing in regions characterized by either traditional or progressive gender norms. The classification is based on six questions on gender attitudes from the 2017–2021 waves of the European Values Survey, as detailed in Appendix Section C.

When comparing the estimates across regions with different gender norms, we find that females in progressive regions are more responsive to major-specific tastes than their counterparts in traditional areas,[25] suggesting that, in contexts characterized by more liberal societal gender norms, females are more likely to plan pursuing academic majors that are more aligned with their personal preferences.[26]

[25] The effect of a one standard deviation increase in major-specific taste is 154.8 percent in progressive regions and 131.0 percent in traditional regions.

[26] Evaluated at the mean value of the standard deviation, the effect of expected earnings at age 30 is larger for females in traditional regions (59.8 percent) than for those in progressive regions (37.7 percent). For females, the coefficient associated with mothers' major is significantly higher in traditional regions (37.7 percent) than in progressive regions (16.0 percent), highlighting that mothers may play a stronger role in less gender-equal

6.2 Gender differences in major choice intentions.

The descriptive statistics in Appendix Table A1 show marked gender differences in respondents' intended major choices. Although male students exhibit a higher average probability of not enrolling into college - almost twice as high than women (10.2% vs 6%) - they are more likely to choose more economically rewarding majors, including STEM (24% vs. 12.2% for females) and Economics and Law (19.2% vs. 15.3% for females). An important exception is Medicine, with females more inclined to choose this major than males (23.5% vs. 15.7%). Females are instead more likely to enrol in the Humanities (14.7% vs. 10.1%) and Psychology (16.3% vs. 9.7%).[27]

To further understand the sources of the gender gap in intended major choice, we perform a Blinder–Oaxaca decomposition (Blinder (1973); Oaxaca (1973)) based on the estimates in Table 2 and report the results both in Table 4 and, more visually, in Figure 2.[28] This procedure decomposes the predicted gap into two components: the gap in observed average characteristics (or endowments) and the gap in the estimated parameters associated with these characteristics.[29]

The predicted gender gap in the intentions to enrol is the largest in STEM among all majors, with a total predicted difference of 1.632 log-points, indicating a strong male advantage. This gap is mainly explained by differences in endowments, which account for over 80% of

contexts. While older brothers' major exerts a significant influence in traditional regions (39.5 percent), this effect is close to zero in progressive ones. Finally, the influence of older sisters' major is stronger in progressive regions (52.5 percent) than in traditional ones (14.4).

[27] These patterns are broadly confirmed by regressions where the dependent variable is the log-probability of enrolling in major k and the covariates include both major and student fixed effects, as well as the set of family educational background indicators and classmates' variables already included in the baseline model (7) – see Table A6 in the Appendix.

[28] We group the predictors of intended choice as follows: (i) earnings, which include mean expected earnings at age 30 and the interaction of mean earnings with $\widetilde{SDW^{30}}_{ik}$; (ii) perceived own-ability; (iii) major-specific tastes; (iv) family educational background indicators; (v) peers' effects; (vi) other indicators, including missing values and $\widetilde{SDW^{30}}_{ik}$; (vii) student and major fixed effects.

[29] Letting $lnP_{gk} = \beta_g X_{gk} + e_{gk}$, where P is the probability of enrolment, X is the vector of characteristics, β the vector of parameters, e the error term and the indices k and g are for major and gender (g = m for males, f for females), the decomposition implies that:

$$\widehat{lnP_{mk}} - \widehat{lnP_{fk}} = \beta_f\left(X_{mk} - X_{fk}\right) + X_{mk}(\beta_m - \beta_f)$$

where $\hat{X}$ is a predicted value and the two components on the right-hand side represent the gap accounted by differences in (average) characteristics and by differences in the parameters associated with these characteristics. To clearly separate endowments and parameters, we fix $\widetilde{SDW^{30}}_{ik}$ at its sample mean.

the gap, and especially in perceived ability, which alone explains 0.625 log-points of the gap, and major-specific tastes, which explain 0.573 log-points. The gap accounted by differences in the parameters is instead negative and substantially smaller (-0.201 log-points), indicating that female students are slightly more responsive to the same endowments, and to peer effects in particular (-0.066 log-points).

Architecture and Economics and Law, display a similar pattern to the one observed for STEM. In the case of Medicine, the total gender gap is negligible and slightly negative (-0.073 log-points), i.e., female students are marginally more likely than males to enrol in this major. However, the decomposition shows that this small gap is the net result of two opposing forces. On the one hand, there is a sizable positive endowment effect in favour of males (0.388 log-points), mostly driven by ability (0.211 log-points). Unlike the case of STEM, the contribution of tastes to the difference in endowments is close to zero (0.032 log-points). On the other hand, the contribution of the difference in parameters is negative and of similar size (-0.228 log-points), implying that female students are more responsive than males to the same endowments. We find similar patterns, albeit to a lesser extent, for Psychology.[30]

7. Exploring the drivers of tastes and ability.

We have shown that major-specific perceived ability and tastes are the key factors accounting for respondents' intended major choice after high school. In this sub-section, we explore some of their possible determinants. As for tastes, a strand of literature emphasizes that students' preferences over college majors are affected by the expected non-pecuniary characteristics of both majors and their associated occupations, including the enjoyment of coursework, job satisfaction and prestige, workplace flexibility, work-family balance and the implications for fertility, particularly among females (see for instance Altonji et al., (2012); Zafar (2013); Buser et al. (2014); Wiswall and Zafar (2021)).

We regress our (standardized) measure of major-specific tastes on respondents' expectations about the major-specific (standardized) probabilities of achieving a good work-

[30] Regarding the intentions not to pursue any college education, the positive gender gap is primarily driven by differences in parameters, particularly in the domain of peer-related variables (0.471 log-points), suggesting that males are more responsive than females to classmates' preferences for not enrolling into college.

life balance, having access to remote work arrangements, working abroad and being self-employed, in addition to the parental background and peer-related variables included in previous regressions.

The results in column (1) of Table 5 indicate that the probability of a good work-life balance, working abroad and being their own boss (self-employed or entrepreneur) are positively associated with major-specific tastes, while the probability of remote working is not. We estimate that one standard-deviation increase in the expected probability of working abroad after graduating in major k is associated with a 0.04 standard deviation increase in reported tastes for major k. A similar increase in the probability of a good work-life balance is associated with a 0.03 standard deviation increase in tastes. The probability of being self-employed or an entrepreneur also shows a statistically significant positive relationship with major–specific tastes, although with a smaller effect size (0.001). Family background plays a non-negligible role: having a mother or father who graduated major k is consistently associated with stronger tastes for that major, suggesting an intergenerational transmission of educational preferences.[31] Overall, these effects are modest in magnitude and most of the explained variation is accounted for by student and major fixed effects.

We also examine the determinants of major-specific perceived ability. Since this variable captures respondents' perceptions of their academic skills, it conceptually precedes, rather than results from, job considerations. We therefore do not include as covariates individual expectations about occupational characteristics, as they are potentially endogenous with respect to students' ability. Furthermore, we exclude the no-college scenario from the analysis, as the academic ability variable was not elicited in this case.

As shown in column (2) of Table 5, we find a statistically significant relationship between ability and parents' educational background. Having a father who graduated in major k is associated with a 0.19 standard deviation increase in perceived ability in that major, while mother's education exhibits a slightly smaller but still statistically significant effect (0.15). We also find that a one standard-deviation increase in classmates' average ability is

[31] Classmates' average major-specific ability is also positively associated with respondents' tastes.

associated with a 0.17 standard deviation increase in own perceived ability. Siblings' educational choices instead play a limited role.[32]

8. Conclusions.

This study has investigated the factors influencing the intended college major choices of high school students in Italy, and ranked the relative importance of mean expected earnings, perceived ability, and major-specific tastes. Our analysis, based on a unique national survey, reveals that, while mean expected earnings play a role in students' decisions, their primary drivers are non-pecuniary. Specifically, we have found that major-specific tastes and perceived ability are significantly more influential in shaping their academic intentions than the economic returns they expect to receive.

A one standard deviation change in the taste for (resp. perceived ability in) a given major increases the odds of choosing that major (relative to Humanities) by 136.4% (resp. 114.1%), far outweighing the 39.3% increase associated with a one standard deviation change in mean expected earnings at age 30. Extrapolating from our estimates, even under perfect certainty regarding future earnings ($\widetilde{SDW^{30}}_{ik} = 0$), a one standard deviation increase in mean expected earnings would increase the probability of selecting a given major by 41.7%. This suggests that subjective uncertainty is not the primary factor limiting the impact of mean expected returns on the college major choice.

Our analysis of heterogeneity underscores the importance of family background and regional gender norms in mediating intended choices. For instance, we show that tastes are even more crucial for students from college-educated families, and for females residing in more progressive regions. Furthermore, our Blinder–Oaxaca decomposition of the gender gap in intended major choice for STEM fields suggests that the disparity is primarily due to differences in endowments rather than a differential response to characteristics.

As tastes and perceived ability play a dominant role in students' choices, the risk of skill mismatch in the labour market becomes a substantial concern. When student choices are insulated from wage signals, the supply of graduates in certain fields may not keep pace with the demand for those skills in the economy. This misalignment can lead to an

[32] Table A7 in the Appendix presents the estimates of the determinant of self-reported tastes and ability by gender.

oversupply of graduates in fields with lower occupational returns and a scarcity of qualified workers in high-demand sectors like STEM.

A key reason for the pre-eminence of tastes and ability over expected income may lie in how adolescents perceive the value and reality of future earnings. As Amartya Sen highlighted, income is a fundamental enabler of human capabilities, allowing for freedoms that range from accessing quality healthcare to securing personal independence. However, young students may not fully internalize this relationship. Their lived experience can lead them to perceive that earning an income is a relatively easy endeavour, a view that, incidentally, is reflected in the substantial overestimation of future earnings that we observe in our study.

Moreover, drawing on the psychological literature, the higher weight assigned to tastes and ability over future income can be understood through the concept of "present bias", with adolescents undervaluing future rewards due to their brain's developmental stage, which prioritizes immediate gratification over long-term consequences (Steinberg (2008)). In this context, the enjoyment of studying a beloved subject may dominate other considerations related to future rewards.

In this context, labour policies aimed at aligning educational outcomes with labour market needs face a significant challenge. Given our findings, it would take large, and potentially unsustainable, wage differentials across majors to substantially influence students' choices. Therefore, a more effective approach is to focus on interventions that precede career decisions. Policymakers should promote early exposure to high-demand majors through engaging curricula, internships, and mentorship programs. These initiatives can build knowledge and self-confidence while, most importantly, helping students develop a genuine taste for these majors. Conversely, policies aimed solely at informing teenagers about future earnings may be less effective due to the inherent present bias that leads them to undervalue long-term rewards.

Tables and Figures.

Table 1. Descriptive statistics for the working sample.

Panel A: Demographic characteristics

	% of students
Female	58.87
North	44.08
Centre	17.47
South and islands	38.46
Mother has college degree	36.06
Father has college degree	28.55
Mother employed	76.06
Father employed	89.19
Number of observations	3,292

Panel B: Major-specific descriptive statistics

	Architecture and Civil Engineering	STEM and Natural Sciences	Economics, Business and Law	Medicine and Health Professions	Psychology and Social Sciences	Literature, Philosophy, and Humanities	No-college
Intended enrolment probability (%)	12.02	17.18	16.80	20.21	13.62	12.95	7.843
Expected earnings at age 30 (thousand €)	2.231	2.340	2.649	3.594	2.100	1.635	1.831
Std. dvt. of exp. earnings at 30 (thousand €)	0.535	0.551	0.754	0.991	0.454	0.266	0.511
Probability of graduating	62.68	54.75	61.74	54.39	67.27	64.07	-
Mean expected earnings at age 30 (thousand €)	2.029	2.082	2.338	2.788	1.983	1.709	1.831
Mean expected earnings at age 40 (thousand €)	2.171	2.104	2.435	2.674	1.956	1.671	1.607
Major-specific perceived ability	44.02	39.55	45.60	42.49	51.84	49.30	-
Major-specific taste (€)	282.32	287.36	252.87	313.68	260.65	-	157.76

Pr. of good work-life balance (%)	59.11	56.55	53.51	39.30	59.77	65.42	54.11
Pr. of remote working (%)	61.20	54.24	49.93	14.88	40.37	36.41	31.78
Pr. of working as entrepreneur (%)	63.19	46.83	60.76	53.01	58.39	33.51	41.94
Pr. of working abroad (%)	21.621	22.211	18.980	20.064	17.627	15.494	17.487

Note: Std. dvt.: standard deviation.

Table 2. The effect of expected earnings, ability rank and tastes on the probability of enrolling in college major k (relative to enrolling in the Humanities). Dependent variable: logarithm of (Pr. of enrolling in major k/Prob. of enrolling in Humanities).

	(1) All students	(2) All students	(3) All students	(4) Women	(5) Men
Mean exp. earnings at age 30	0.842***	0.576***	0.417***	0.498***	0.330***
	(0.096)	(0.064)	(0.053)	(0.086)	(0.069)
Std deviation of difference $\widetilde{SDW^{30}}_{ik}$	-0.003	0.036	0.033	0.002	0.082*
	(0.046)	(0.040)	(0.040)	(0.066)	(0.048)
Interaction of mean exp. earnings and $\widetilde{SDW^{30}}_{ik}$	-0.070***	-0.051***	-0.035***	-0.042***	-0.031***
	(0.012)	(0.009)	(0.008)	(0.012)	(0.011)
Major-specific perceived ability		1.584***	1.141***	1.086***	1.290***
		(0.033)	(0.032)	(0.041)	(0.056)
Major-specific tastes			1.364***	1.430***	1.157***
			(0.048)	(0.063)	(0.076)
Mother graduated in field	0.386***	0.274***	0.212***	0.259***	0.197*
	(0.069)	(0.067)	(0.062)	(0.077)	(0.102)
Father graduated in field	0.417***	0.283***	0.212***	0.158*	0.346***
	(0.071)	(0.067)	(0.062)	(0.081)	(0.097)
Older sister/s graduated in field	0.417***	0.317***	0.241**	0.316**	0.098
	(0.122)	(0.111)	(0.103)	(0.132)	(0.168)
Older brother/s graduated in field	0.313***	0.332***	0.258***	0.175	0.453***
	(0.115)	(0.108)	(0.099)	(0.124)	(0.160)
Classmates' average major-specific perceived ability		0.189***	0.055*	0.102**	0.049
		(0.030)	(0.032)	(0.040)	(0.054)
Classmates' average major-specific tastes			0.001**	0.000	0.001**
			(0.000)	(0.000)	(0.000)
Sh. of classmates' mothers grad. in field	0.179***	0.117**	0.077	-0.024	0.202***
	(0.053)	(0.051)	(0.047)	(0.059)	(0.077)
Sh. of classmates' fathers grad. in field	0.050	0.023	-0.011	-0.001	0.004
	(0.057)	(0.056)	(0.051)	(0.066)	(0.084)
Sh. of classmates' older sisters grad. in field	0.087***	0.047**	0.025	0.058**	-0.008
	(0.021)	(0.019)	(0.017)	(0.024)	(0.026)
Sh. of classmates' older brothers grad. in field	0.043*	0.045**	0.020	0.027	0.017
	(0.023)	(0.022)	(0.020)	(0.026)	(0.032)
Observations	19,673	19,673	19,673	11,579	7,780
R-squared	0.601	0.675	0.718	0.739	0.685
Student FE	Yes	Yes	Yes	Yes	Yes
Major FE	Yes	Yes	Yes	Yes	Yes

Notes: each regression includes a constant and dummies for missing values. Mean expected earnings, major-specific perceived ability and tastes and classmates' major-specific perceived ability and tastes are standardized. Standard errors clustered at the respondent level. The sum of observations in the regressions by gender is lower than the total number of observations because of missing values in the gender variable. $\widetilde{SDW^{30}}_{ik}$: standard deviation of the difference between expected earnings at age 30 in major k and in the Humanities.

Table 3. Heterogeneous effects by parents' education and regional gender norms. Dependent variable: logarithm of (Pr. of enrolling in major k/Prob. of enrolling in Humanities).

	(1)	(2)	(3)	(4)	(5)	(6)
	Outcome: log (Pr. of enrolling in major k/Prob. of enrolling in Humanities)					
	Estimates by parents' education		Estimates by regional gender norms			
	College parents	No college parents	Traditional Female	Traditional Male	Progressive Female	Progressive Male
Mean exp. earnings at age 30	0.280***	0.746***	0.629***	0.358***	0.404***	0.316***
	(0.056)	(0.104)	(0.130)	(0.092)	(0.107)	(0.104)
Std deviation of difference $\widetilde{SDW^{30}}_{ik}$	0.036	0.031	0.052	0.060	-0.032	0.102
	(0.050)	(0.066)	(0.110)	(0.068)	(0.077)	(0.067)
Interaction of mean exp. earnings and $\widetilde{SDW^{30}}_{ik}$	-0.019**	-0.080***	-0.045***	-0.036*	-0.040***	-0.031**
	(0.009)	(0.016)	(0.016)	(0.020)	(0.015)	(0.014)
Major-specific perceived ability rank	1.182***	1.096***	1.112***	1.267***	1.052***	1.305***
	(0.048)	(0.047)	(0.057)	(0.079)	(0.057)	(0.078)
Major-specific tastes	1.404***	1.337***	1.310***	1.090***	1.548***	1.233***
	(0.067)	(0.071)	(0.094)	(0.107)	(0.083)	(0.107)
Mother graduated in major *k*	0.334***		0.377***	0.093	0.160	0.338**
	(0.075)		(0.108)	(0.135)	(0.111)	(0.155)
Father graduated in major *k*	0.312***		0.171	0.397***	0.136	0.291**
	(0.071)		(0.115)	(0.134)	(0.114)	(0.143)
Older sister/s grad. or enrol. in major *k*	0.207	0.337**	0.144	-0.285	0.525***	0.506**
	(0.152)	(0.149)	(0.181)	(0.228)	(0.191)	(0.244)
Older brother/s grad. or enrol. in major *k*	0.158	0.260*	0.395**	0.611***	-0.038	0.347
	(0.142)	(0.146)	(0.177)	(0.225)	(0.173)	(0.228)
Classmates' average major-specific perceived ability	-0.025	0.109**	0.045	0.005	0.144***	0.089
	(0.049)	(0.045)	(0.057)	(0.074)	(0.056)	(0.079)
Classmates' average major-specific tastes	0.000	0.001**	0.001	0.000	-0.000	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Sh. of classmates' mothers grad. in major *k*	0.151**	0.029	-0.097	0.131	0.036	0.342***
	(0.069)	(0.069)	(0.083)	(0.102)	(0.086)	(0.118)
Sh. of classmates' fathers grad. in major *k*	-0.016	-0.004	0.065	0.082	-0.066	-0.118
	(0.072)	(0.078)	(0.096)	(0.112)	(0.091)	(0.125)
Sh. of classmates' older sister/s grad. or enroll. in major *k*	0.063**	-0.011	0.081**	-0.004	0.021	-0.014
	(0.026)	(0.025)	(0.034)	(0.035)	(0.032)	(0.040)
Sh. of classmates' older brother/s grad. or enroll. in major *k*	0.026	0.010	0.073*	0.014	-0.005	0.021
	(0.030)	(0.029)	(0.038)	(0.044)	(0.036)	(0.047)
Observations	8,933	9,515	5,659	4,296	5,920	3,484
R-squared	0.706	0.733	0.731	0.658	0.749	0.717
Student FE	Yes	Yes	Yes	Yes	Yes	Yes
Major FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: each regression includes a constant and dummies for missing values. Mean expected earnings, major-specific perceived ability and tastes and classmates' major-specific perceived ability and tastes are standardized. Standard errors clustered at the respondent level. $\widetilde{SDW^{30}}_{ik}$: standard deviation of the difference between expected earnings at age 30 in major k and in the Humanities. The sum of observations in the regressions by parental background and gender norms is lower than the total number of observations in Table 2 because of missing values.

Table 4. Blinder-Oaxaca decomposition of gender gap in intention to enrol by major and predictors.

	Architecture and Civil Eng.	STEM and Natural Sciences	Economics, Business and Law	Medicine and Health Professions	Psychology and Social Sciences	No college
Total difference	0.641	1.632	0.962	-0.073	-0.238	1.148
Total difference in endowments	0.788	1.370	0.843	0.388	0.025	0.443
Mean exp. earnings at age 30	0.024	0.057	0.054	0.05	0.004	0.04
Major-specific perceived ability	0.378	0.625	0.418	0.211	0.047	0
Major-specific tastes	0.312	0.573	0.322	0.032	-0.053	0.447
Family educ. background	0.003	0.002	0.005	0	0.001	-0.027
Peers' effects	0.066	0.106	0.051	0.072	0.017	0.008
Other indicators	-0.045	-0.08	-0.048	-0.029	-0.015	-0.054
Fixed effects	0.054	0.463	0.288	-0.233	-0.035	-0.534
Total difference in prices	-0.201	-0.201	-0.169	-0.228	-0.228	1.239
Mean exp. earnings at age 30	0.067	0.06	0.062	0.044	0.069	0.09
Major-specific perceived ability	0.04	0.046	0.054	0.015	0.042	0
Major-specific tastes	-0.014	-0.009	-0.011	-0.002	-0.006	-0.006
Family educ. background	0.008	0.02	0.015	0.002	-0.003	0.09
Peers' effects	-0.012	-0.066	-0.002	-0.014	-0.02	0.471
Other indicators	0.046	0.053	0.063	0.08	0.042	0.907
Constant	-0.246	-0.246	-0.246	-0.246	-0.246	-0.246

Table 5. The determinants of major-specific taste and perceived ability.

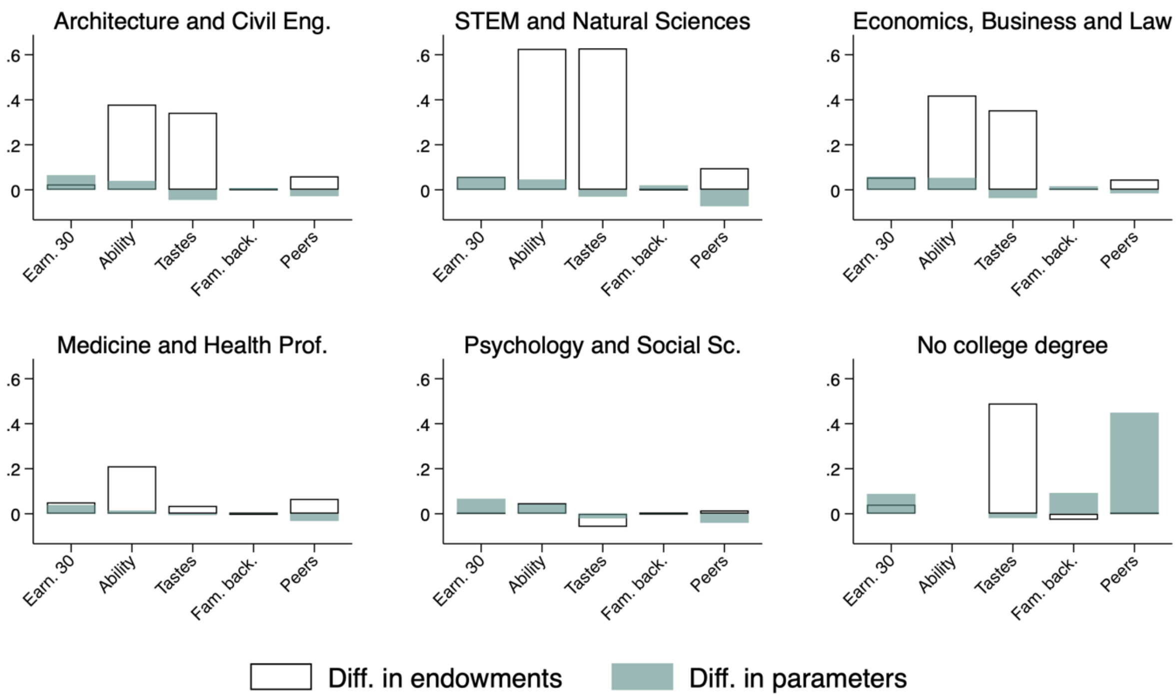
	(1) Major-specific taste	(2) Major-specific perceived ability
Prob. of good work-life balance	0.028***	
	(0.005)	
Prob. of remote working	0.001	
	(0.005)	
Prob. of working abroad	0.035***	
	(0.005)	
Prob. of self-employment	0.001***	
	(0.000)	
Mother graduated in major *k*	0.027**	0.151***
	(0.011)	(0.026)
Father graduated in major *k*	0.027**	0.187***
	(0.011)	(0.026)
Older sister/s grad. or enrol. in major *k*	0.035**	0.048
	(0.017)	(0.035)
Older brother/s grad. or enrol. in major *k*	0.028*	0.019
	(0.016)	(0.036)
Classmates' average ability rank	0.008	0.171***
	(0.005)	(0.014)
Classmates' average major-specific taste	0.000***	0.000
	(0.000)	(0.000)
Sh. of classmates' mothers grad. in major *k*	0.006	0.022
	(0.008)	(0.022)
Sh. of classmates' fathers grad. in major *k*	0.004	0.009
	(0.009)	(0.024)
Sh. of classmates' older sister/s grad. or enrol. in major *k*	0.002	0.011*
	(0.003)	(0.006)
Sh. of classmates' older brother/s grad. or enrol. in major *k*	0.002	-0.009
	(0.003)	(0.008)
Observations	19,673	15,574
R-squared	0.883	0.680
Student FE	Yes	Yes
Major FE	Yes	Yes

Notes: each regression includes a constant and dummies for missing values. Standard errors clustered at the respondent level.

Figure 1. The Coller and Williams elicitation game.

	Humanities (column 1)	Major *k* (column 2)
1	1.500 € ○	500 € ○
2	1.500 € ○	750 € ○
3	1.500 € ○	1.000 € ○
4	1.500 € ○	1.250 € ○
5	1.500 € ○	1.500 € ○
6	1.500 € ○	1.750 € ○
7	1.500 € ○	2.000 € ○
8	1.500 € ○	2.250 € ○
9	1.500 € ○	2.500 € ○

Figure 2. Blinder-Oaxaca decomposition of gender gap in intention to enrol by major and predictors.



Appendix

Table A1. Summary statistics by major and gender.

	Architecture and Civil Engineering	STEM and Natural Sciences	Economics, Business and Law	Medicine and Health Professions	Psychology and Social Sciences	Literature, Philosophy, and Humanities	No-college
Enrolment probability (%) - Males	11.59	23.99	19.26	15.71	9.65	10.16	10.23
Enrolment probability (%) - Females	12.33	12.24	15.32	23.56	16.30	14.69	5.99
Mean expected earnings at 30 (thousand €) - Males	2.300	2.452	2.766	3.178	2.199	1.903	2.221
Mean expected earnings at 30 (thousand €) - Females	1.831	1.822	2.046	2.497	1.828	1.567	1.549
Mean expected earnings at 40 (thousand €) - Males	2.395	2.365	2.720	2.912	2.069	1.796	1.779
Mean expected earnings at 40 (thousand €) - Females	2.010	1.907	2.229	2.503	1.867	1.573	1.454
Probability of graduating - Males	64.81	61.01	65.02	54.42	64.27	59.86	-
Probability of graduating - Females	61.47	50.72	60.05	54.90	69.54	67.12	-
Perceived own-ability (rank) - Males	48.87	49.95	51.56	43.78	49.25	45.78	-
Perceived own-ability (rank) - Females	40.72	32.60	41.84	41.86	53.58	51.77	-
Major-specific taste (standardized) - Males	314.56	337.07	276.35	264.21	221.06	-	226.47
Major-specific taste (standardized) - Females	253.69	243.86	230.89	351.61	287.91	-	101.80
Pr. of good work-life balance (%) - Males	58.81	56.85	54.75	41.62	58.97	62.87	53.83
Pr. of good work-life balance (%) - Females	59.47	56.55	52.89	38.01	60.51	67.32	54.38
Pr. of remote working (%) - Males	61.13	54.75	51.87	15.68	38.62	34.86	27.87
Pr. of remote working (%) - Females	61.42	53.92	48.70	14.30	41.58	37.37	34.38
Pr. of working as self-employed (%) - Males	59.42	45.46	59.13	49.14	54.53	31.21	41.70
Pr. of working as self-employed (%) - Females	65.80	47.74	61.93	55.82	61.12	35.01	42.01
Pr. of working abroad (%) - Males	20.78	22.69	19.07	19.29	16.30	14.92	16.10
Pr. of working abroad (%) - Females	21.89	21.61	18.57	20.29	18.19	15.52	18.07

Table A2. The effect of expected earnings, ability rank and tastes on the probability of enrolling in college major k (relative to enrolling in the Humanities). Dependent variable: logarithm of (Pr. of enrolling in major k/ Prob. of enrolling in Humanities). Omitting missing values for expected wages (Sample B).

	(1) All students	(2) All students	(3) All students	(4) Women	(5) Men
Mean exp. earnings at age 30	0.897***	0.620***	0.455***	0.581***	0.333***
	(0.105)	(0.069)	(0.058)	(0.101)	(0.072)
$\widetilde{SDW}^{30}{}_{ik}$	-0.012	0.030	0.030	-0.014	0.119*
	(0.055)	(0.046)	(0.047)	(0.072)	(0.062)
Interaction of mean exp. earnings and $\widetilde{SDW}^{30}{}_{ik}$	-0.074***	-0.055***	-0.039***	-0.048***	-0.035***
	(0.012)	(0.009)	(0.008)	(0.013)	(0.012)
Major-specific perceived ability		1.573***	1.130***	1.049***	1.310***
		(0.041)	(0.040)	(0.051)	(0.066)
Major-specific taste			1.304***	1.327***	1.156***
			(0.056)	(0.075)	(0.086)
Mother graduated in field	0.351***	0.249***	0.168**	0.208**	0.163
	(0.081)	(0.080)	(0.074)	(0.092)	(0.120)
Father graduated in field	0.404***	0.300***	0.241***	0.216**	0.286**
	(0.082)	(0.077)	(0.072)	(0.094)	(0.113)
Older sister/s graduated in field	0.367**	0.257*	0.204	0.153	0.269
	(0.149)	(0.137)	(0.127)	(0.163)	(0.207)
Older brother/s graduated in field	0.347**	0.349***	0.283**	0.172	0.537***
	(0.137)	(0.130)	(0.120)	(0.151)	(0.192)
Classmates' average ability rank		0.192***	0.059	0.119**	0.032
		(0.037)	(0.039)	(0.049)	(0.065)
			0.001**	0.000	0.001*
			(0.000)	(0.000)	(0.000)
Sh. of classmates' mothers grad. in field	0.180***	0.110*	0.066	-0.044	0.202**
	(0.062)	(0.062)	(0.057)	(0.072)	(0.093)
Sh. of classmates' fathers grad. in field	0.007	0.003	-0.012	0.002	-0.017
	(0.065)	(0.064)	(0.060)	(0.076)	(0.098)
Sh. of classmates' older sisters grad. in field	0.082***	0.044**	0.022	0.061**	-0.018
	(0.025)	(0.023)	(0.021)	(0.028)	(0.032)
Sh. of classmates' older brothers grad. in field	0.040	0.046*	0.017	0.028	0.015
	(0.027)	(0.027)	(0.024)	(0.032)	(0.038)
Observations	13,159	13,159	13,159	7,585	5,407
R-squared	0.611	0.682	0.723	0.746	0.682
Student FE	Yes	Yes	Yes	Yes	Yes
Major FE	Yes	Yes	Yes	Yes	Yes

Notes: each regression includes a constant and dummies for missing values. Standard errors clustered at the respondent level. The sum of observations in the regressions by parental background and gender norms is lower than the total number of observations because of missing values. $\widetilde{SDW}^{30}{}_{ik}$: standard deviation of the difference between expected earnings at age 30 in major k and in the Humanities.

Table A3. The effect of mean expected earnings, ability rank and tastes on the probability of enrolling in college major k (relative to enrolling in the Humanities). Dependent variable: logarithm of (Pr. of enrolling in major k/Prob. of enrolling in Humanities). Including mean expected earnings at age 40.

	(1) All students	(2) All students	(3) All students	(4) Women	(5) Men
Mean exp. earnings at age 30	0.435***	0.331***	0.232***	0.242***	0.195***
	(0.081)	(0.059)	(0.050)	(0.079)	(0.066)
Mean exp. earnings at age 40	0.799***	0.506***	0.391***	0.449***	0.343***
	(0.066)	(0.049)	(0.043)	(0.060)	(0.061)
$\widetilde{SDW^{30}}_{ik}$	-0.029	0.017	0.019	0.005	0.054
	(0.042)	(0.038)	(0.038)	(0.065)	(0.045)
Interaction of mean exp. earnings at age 30 and $\widetilde{SDW^{30}}_{ik}$	-0.029***	-0.028***	-0.019**	-0.017	-0.021*
	(0.011)	(0.009)	(0.009)	(0.015)	(0.011)
Interaction of mean exp. earnings at age 40 and $\widetilde{SDW^{30}}_{ik}$	-0.061***	-0.032***	-0.023**	-0.033*	-0.013
	(0.014)	(0.011)	(0.010)	(0.018)	(0.013)
Major-specific perceived ability		1.503***	1.091***	1.028***	1.244***
		(0.034)	(0.032)	(0.040)	(0.056)
Major-specific taste			1.339***	1.407***	1.128***
			(0.048)	(0.063)	(0.075)
Mother graduated in field	0.373***	0.272***	0.211***	0.272***	0.175*
	(0.068)	(0.066)	(0.062)	(0.077)	(0.101)
Father graduated in field	0.362***	0.252***	0.190***	0.135*	0.324***
	(0.069)	(0.066)	(0.062)	(0.080)	(0.096)
Older sister/s graduated in field	0.350***	0.279**	0.213**	0.289**	0.082
	(0.121)	(0.110)	(0.103)	(0.131)	(0.166)
Older brother/s graduated in field	0.273**	0.307***	0.240**	0.155	0.431***
	(0.114)	(0.107)	(0.099)	(0.124)	(0.160)
Classmates' average ability rank		0.179***	0.052*	0.100**	0.049
		(0.030)	(0.031)	(0.039)	(0.054)
Classmates' average major-specific taste			0.000**	0.000	0.001**
			(0.000)	(0.000)	(0.000)
Sh. of classmates' mothers grad. in field	0.162***	0.110**	0.072	-0.025	0.188**
	(0.052)	(0.051)	(0.047)	(0.059)	(0.077)
Sh. of classmates' fathers grad. in field	0.010	-0.005	-0.031	-0.024	-0.010
	(0.056)	(0.055)	(0.051)	(0.065)	(0.083)
Sh. of classmates' older sisters grad. in field	0.091***	0.052***	0.030*	0.063***	-0.003
	(0.020)	(0.019)	(0.017)	(0.023)	(0.026)
Sh. of classmates' older brothers grad. in field	0.031	0.038*	0.015	0.019	0.014
	(0.023)	(0.022)	(0.020)	(0.026)	(0.032)
Observations	19,673	19,673	19,673	11,579	7,780
R-squared	0.617	0.681	0.722	0.742	0.689
Student FE	Yes	Yes	Yes	Yes	Yes
Major FE	Yes	Yes	Yes	Yes	Yes

Notes: each regression includes a constant and dummies for missing values. Standard errors clustered at the respondent level. The sum of observations in the regressions by parental background and gender norms is lower than the total number of observations because of missing values. $\widetilde{SDW^{30}}_{ik}$: standard deviation of the difference between expected earnings at age 30 in major k and in the Humanities.

Table A4. The effect of expected earnings, ability rank and tastes on the probability of enrolling in college major k (relative to enrolling in the Humanities). Dependent variable: logarithm of (Pr. of enrolling in major k/Prob. of enrolling in Humanities). With major by macro area fixed effects.

	(1) All students	(2) All students	(3) All students	(4) Women	(5) Men
Mean exp. earnings at age 30	0.841***	0.577***	0.419***	0.499***	0.335***
	(0.095)	(0.064)	(0.053)	(0.086)	(0.068)
$\widetilde{SDW}^{30}{}_{ik}$	-0.005	0.035	0.032	0.001	0.080*
	(0.046)	(0.040)	(0.040)	(0.066)	(0.048)
Interaction of mean exp. earnings and $\widetilde{SDW}^{30}{}_{ik}$	-0.070***	-0.051***	-0.035***	-0.042***	-0.032***
	(0.012)	(0.009)	(0.008)	(0.012)	(0.011)
Major-specific perceived ability		1.582***	1.142***	1.086***	1.285***
		(0.033)	(0.032)	(0.041)	(0.056)
Major-specific taste			1.365***	1.431***	1.160***
			(0.048)	(0.063)	(0.075)
Mother graduated in field	0.391***	0.282***	0.219***	0.267***	0.208**
	(0.069)	(0.067)	(0.062)	(0.077)	(0.102)
Father graduated in field	0.417***	0.284***	0.211***	0.159*	0.341***
	(0.071)	(0.067)	(0.062)	(0.081)	(0.097)
Older sister/s graduated in field	0.410***	0.315***	0.240**	0.320**	0.089
	(0.122)	(0.111)	(0.103)	(0.132)	(0.168)
Older brother/s graduated in field	0.320***	0.339***	0.264***	0.174	0.453***
	(0.115)	(0.108)	(0.099)	(0.124)	(0.159)
Classmates' average ability rank		0.184***	0.057*	0.101**	0.057
		(0.031)	(0.032)	(0.040)	(0.054)
Classmates' average major-specific taste			0.001**	0.000	0.001**
			(0.000)	(0.000)	(0.000)
Sh. of classmates' mothers grad. in field	0.183***	0.134**	0.097**	-0.008	0.244***
	(0.053)	(0.052)	(0.048)	(0.061)	(0.078)
Sh. of classmates' fathers grad. in field	0.051	0.029	-0.011	0.008	-0.019
	(0.057)	(0.057)	(0.052)	(0.068)	(0.085)
Sh. of classmates' older sisters grad. in field	0.079***	0.042**	0.022	0.059**	-0.016
	(0.021)	(0.019)	(0.018)	(0.024)	(0.026)
Sh. of classmates' older brothers grad. in field	0.044*	0.048**	0.024	0.032	0.014
	(0.023)	(0.022)	(0.021)	(0.026)	(0.032)
Observations	19,673	19,673	19,673	11,579	7,780
R-squared	0.603	0.675	0.718	0.739	0.687
Student FE	Yes	Yes	Yes	Yes	Yes
Major FE x Macro area FE	Yes	Yes	Yes	Yes	Yes

Notes: each regression includes a constant and dummies for missing values. Standard errors clustered at the respondent level. The sum of observations in the regressions by parental background and gender norms is lower than the total number of observations because of missing values. . $\widetilde{SDW}^{30}{}_{ik}$: standard deviation of the difference between expected earnings at age 30 in major k and in the Humanities.

Table A5. Direct and indirect effects of ability and taste through expected earnings. Sub-sample with non-missing observations on expected wages.

	(1)	(2)	(3)
	Major choice intentions	Exp. earnings at age 30	$\widetilde{SDW^{30}}_{ik}$
Mean exp. earnings at age 30	0.455***		
	(0.037)		
$\widetilde{SDW^{30}}_{ik}$	0.030		
	(0.038)		
Interaction between mean exp. Earnings and $\widetilde{SDW^{30}}_{ik}$	-0.039***		
	(0.006)		
Major-specific perceived ability	1.130***	0.106***	0.029***
	(0.030)	(0.012)	(0.010)
Major-specific taste	1.304***	0.106***	0.036**
	(0.048)	(0.019)	(0.017)
Observations	13,159	13,159	13,159
R-squared	0.326	0.030	0.010
Student FE	Yes	Yes	Yes
Major FE	Yes	Yes	Yes
Family educational background indicators	Yes	Yes	Yes
Peers-related variables	Yes	Yes	Yes
	Indirect effects		
Indirect effect of ability through exp. earnings at age 30	0.0482***		
	(0.0066)		
Indirect effect of taste through exp. earnings at age 30	0.0482***		
	(0.0093)		
Indirect effect of ability through std. dev. wages at 30	0.0009		
	(0.0011)		
Indirect effect of taste through std. dev. wages at 30	0.0011		
	-0.0014		

Notes: each regression includes a constant and dummies for missing values. Standard errors clustered at the respondent level. $\widetilde{SDW^{30}}_{ik}$: standard deviation of the difference between expected earnings at age 30 in major k and in the Humanities.

Table A6. Major – specific probabilities of enrolling in college. By gender.

	(1)	(2)	(3)
	Outcome: log (Pr. of enrolling in major *k*)		
	Females	Males	Females -Males t-tests
Architecture and Civil Eng.	0.107	0.814***	-0.707***
	(0.0974)	(0.102)	(0.1412)
STEM and Natural Sciences	-0.202*	1.474***	-1.677***
	(0.110)	(0.127)	(0.1684)
Economics, Business and Law	0.0757	1.084***	-1.008***
	(0.0996)	(0.108)	(0.1467)
Medicine and Health Professions	0.681***	0.662***	0.019
	(0.114)	(0.109)	(0.1577)
Psychology and Social Sciences	0.530***	0.430***	0.099
	(0.0816)	(0.0775)	(0.1125)
No college	-2.173***	-1.297***	-0.876***
	(0.191)	(0.208)	(0.2821)
Observations	9,729	6,977	
R-squared	0.265	0.285	
Student FE	Yes	Yes	
Family educational background indicators	Yes	Yes	
Peers’ controls	Yes	Yes	

Notes: each regression includes a constant and dummies for missing values. Standard errors clustered at the respondent level.

Table A7. Determinants of self-reported tastes and perceived ability, by gender.

	Females	Males	Females	Males
	Major-specific taste	Major-specific taste	Major-specific ability	Major-specific ability
Prob. of good work-life balance	0.016***	0.048***		
	(0.006)	(0.007)	-	-
Prob. of remote working	-0.001	0.006	-	-
	(0.006)	(0.008)	-	-
Prob. of working abroad	0.035***	0.034***	-	-
	(0.006)	(0.009)	-	-
Prob. of self-employment	0.001***	0.001***	-	-
	(0.000)	(0.000)	-	-
Mother graduated in major *k*	0.035***	0.017	0.167***	0.060*
	(0.013)	(0.017)	(0.035)	(0.034)
Father graduated in major *k*	0.014	0.038**	0.140***	0.181***
	(0.014)	(0.017)	(0.035)	(0.034)
Older sister/s grad. or enrol. in major *k*	0.048**	0.011	0.024	0.051
	(0.021)	(0.027)	(0.045)	(0.049)
Older brother/s grad. or enrol. in major *k*	0.011	0.055**	-0.015	0.045
	(0.022)	(0.025)	(0.047)	(0.050)
Classmates' average ability rank	0.011	0.007	0.151***	0.117***
	(0.007)	(0.009)	(0.017)	(0.023)
Classmates' average major-specific taste	0.000***	0.000**	0.000***	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Sh. of classmates' mothers grad. in major *k*	0.011	0.004	-0.006	0.047
	(0.010)	(0.013)	(0.028)	(0.029)
Sh. of classmates' fathers grad. in major *k*	0.000	0.009	0.012	0.012
	(0.011)	(0.014)	(0.031)	(0.033)
Sh. of classmates' older sister/s grad. or enroll. in major *k*	0.004	-0.000	0.010	0.006
	(0.004)	(0.004)	(0.008)	(0.009)
Sh. of classmates' older brother/s grad. or enroll. in major *k*	-0.006	0.013**	-0.021**	0.009
	(0.004)	(0.005)	(0.010)	(0.010)
Observations	11,579	7,780	9,157	6,175
R-squared	0.893	0.861	0.708	0.699
Student FE	Yes	Yes	Yes	Yes
Major FE	Yes	Yes	Yes	Yes

Notes: each regression includes a constant and dummies for missing values. Standard errors clustered at the respondent level.

Table A8. Shapley-Owen decomposition of the R-squared.

	Group of regressors	Coefficient	Std. Error	Single regressor's R-squared (%)	Group of regressor's R-squared (%)
Mean expected earnings at age 30	1	0.416	0.045	3.128	4.110
$\widetilde{SDW^{30}}_{ik}$		0.033	0.035	0.342	
Interaction between mean exp. earnings and $\widetilde{SDW^{30}}_{ik}$		-0.035	0.007	0.639	
Ability rank	2	1.141	0.026	36.062	37.601
Classmates' average ability rank		0.054	0.028	1.539	
Major-specific taste	3	1.365	0.040	34.029	35.823
Classmates' average specific taste		0.000	0.000	1.793	
Mother graduated in major *k*		0.210	0.055	0.588	2.363
Father graduated in major *k*		0.210	0.056	0.671	
Older sister graduated or enrolled in major *k*		0.240	0.092	0.205	
Older brother graduated or enrolled in major *k*	4	0.257	0.089	0.206	
Share of classmates' mothers in major *k*		0.078	0.043	0.271	
Share of classmates' fathers in major *k*		-0.008	0.046	0.127	
Share of classmates' older sisters grad/enr in major *k*		0.024	0.015	0.194	
Share of classmates' older brothers grad/enr in major *k*		0.020	0.018	0.097	
Other regressors	5				20.102
Observations					19,673
Overall R squared					0.320

Table A9. Drivers of expected earnings and the standard deviation of expected earnings at age 30.

	Mean expected earnings at 30	Mean expected earnings at 30 - Females	Mean expected earnings at 30- Males	$\widetilde{SDW^{30}}_{ik}$	$\widetilde{SDW^{30}}_{ik}$- Females	$\widetilde{SDW^{30}}_{ik}$- Males
Ability rank	0.106***	0.099***	0.126***	0.029***	0.018	0.051**
	(0.015)	(0.017)	(0.031)	(0.011)	(0.012)	(0.022)
Major-specific taste	0.106***	0.059***	0.170***	0.036**	-0.007	0.095***
	(0.021)	(0.020)	(0.041)	(0.018)	(0.020)	(0.031)
Mother graduated in major k	-0.008	-0.008	-0.000	0.006	0.044	-0.023
	(0.034)	(0.033)	(0.066)	(0.031)	(0.036)	(0.055)
Father graduated in major k	0.131***	0.116***	0.162**	0.102***	0.063*	0.151***
	(0.038)	(0.043)	(0.067)	(0.032)	(0.036)	(0.055)
Older sister/s graduated in major k	0.013	0.049	-0.078	-0.016	0.061	-0.148*
	(0.051)	(0.051)	(0.106)	(0.045)	(0.056)	(0.076)
Older brother/s graduated in major k	0.144***	0.150***	0.133*	0.115***	0.094*	0.137**
	(0.046)	(0.053)	(0.081)	(0.044)	(0.057)	(0.068)
Classmates' average ability rank	0.006	0.012	0.011	0.019	0.009	0.043
	(0.016)	(0.015)	(0.034)	(0.014)	(0.013)	(0.030)
Classmates' average major - specific taste	-0.000*	-0.000	-0.000	-0.000*	-0.000*	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Sh. of classmates' mothers grad. in major k	-0.018	-0.011	-0.035	-0.019	-0.005	-0.040
	(0.020)	(0.022)	(0.035)	(0.019)	(0.021)	(0.034)
Sh. of classmates' fathers grad. in major k	0.020	0.027	0.011	0.026	0.013	0.036
	(0.026)	(0.025)	(0.049)	(0.023)	(0.026)	(0.042)
Sh. of classmates' older sisters grad. in major k	0.000	0.013	-0.018	-0.006	0.006	-0.024**
	(0.008)	(0.009)	(0.013)	(0.007)	(0.008)	(0.012)
Sh. of classmates' older brothers grad. in major k	0.002	0.005	-0.003	0.005	-0.000	0.013
	(0.007)	(0.008)	(0.013)	(0.008)	(0.009)	(0.014)
Observations	13,159	7,585	5,407	13,159	7,585	5,407
R-squared	0.483	0.503	0.463	0.591	0.589	0.580
Student FE	Yes	Yes	Yes	Yes	Yes	Yes
Major FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: each regression includes a constant and dummies for missing values. Standard errors clustered at the respondent level. $\widetilde{SDW^{30}}_{ik}$: standard deviation of the difference between expected earnings at age 30 in major k and in the Humanities

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Appendix.

A1. Definition of the dummies NS_{1ik} *and* NS_{2ik}.

Let T_{ik} and T_{ik}^{*} be observed and true tastes, and T_{min} and T_{max} the minimum and maximum values at which a switch can occur. The presence of a minimum and a maximum implies that switches occurring below the minimum or above the maximum cannot be observed. We therefore have

$T_{ik} = T_{ik}^{*}$ when $T_{min} \leq T_{ik}^{*} \leq T_{max}$

$T_{ik} = T_{min}$ when $T_{min} \geq T_{ik}^{*}$

$T_{ik} = T_{max}$ when $T_{max} \leq T_{ik}^{*}$

Observed T_{ik} is a censored version of T_{ik}^{*}. To control for censoring in our empirical analysis, we define the binary variable NS_1 as equal to 1 when $T_{min} \geq T_{ik}^{*}$ and to 0 otherwise, and the binary variable NS_2 as equal to 1 when $T_{max} \leq T_{ik}^{*}$ and to 0 otherwise. In Figure 1, NS_1 is equal to 1 when the respondent always chooses major k rather than the Humanities, and NS_2 is equal to 1 when he/she always chooses the Humanities rather than major k.

In our empirical analysis of the effects of non-monetary tastes on the intended probability of choosing major k we always include the two dummies as additional controls.

A2. The decomposition of the R – squared in Table 2.

We assess the contribution of the variables in Table 2 to explaining students' intended major choices by performing a Shapley-Owen decomposition of the R-squared. Table A8 reports the results, distinguishing the contributions of five groups of explanatory variables: economic expectations (at age 30), ability, tastes and family academic background – with all these three groups including variables measured both at the individual and peers' level – and the rest of regressors (including the missing value flag indicators).

We find that the variables associated with economic expectations contribute marginally (4.11 percent) to the R-squared. The group of factors explaining the largest shares of variance are major-specific perceived ability and major-specific tastes. These two groups alone account for almost 80 percent of the model's explanatory power across all specifications. Within these groups, the single most important factor are students' major-specific tastes, explaining almost 40 percent of the total variation. Own perceived ability also contributes significantly (38 percent), while classmates' ability and taste matter much less. Family academic background variables, both at the individual and class level, minimally contribute to explaining the variation in major choice intentions.

A3. The direct and indirect effects of ability and tastes on intended choice.

We have examined the relative importance for intended college choice of three factors: expected wages, perceived ability, and tastes. However, it is plausible that expected wages are not independent of both perceived ability and tastes, and that the effects of the latter on intended major choice may be mediated by the former. Perceived ability is an obvious predictor of future earnings capacity, and higher tastes for a major may inflate expected earnings due to a desirability bias.

We explore the role of mean expected earnings at age 30 and the standard deviation $\widetilde{SDW^{30}}_{ik}$ as potential mediators of the relationship between ability, major-specific tastes, and major choice intentions by re-estimating the baseline model (8) in combination with two additional equations where the outcomes are mean expected earnings at age 30 and $\widetilde{SDW^{30}}_{ik}$. These equations feature the same set of explanatory variables and fixed effects as the baseline model and are specified as follows:

$$\widetilde{EW_{ik}^{J}} = \psi^1 T_{ik} + \alpha^1 \widetilde{A_{ik}} + \boldsymbol{\lambda^1} \widetilde{\boldsymbol{X_{ik}}} + \phi_i^1 + \phi_k^1 + \widetilde{\varepsilon_{ik}^1} \quad \text{(A1)}$$

$$\widetilde{SDW}_{ik}^{j} = \psi^{j2} T_{ik} + \alpha^2 \widetilde{A_{ik}} + \boldsymbol{\lambda^2} \widetilde{\boldsymbol{X_{ik}}} + \phi_i^2 + \phi_k^2 + \widetilde{\varepsilon_{ik}^2} \quad \text{(A2)}$$

While parameters β and π in equation (8) are the direct effects, the products $\alpha^j \times \theta^j$ and $\psi^j \times \theta^j$ – with θ^j included in (8) - are the indirect effects of ability and tastes via expected earnings.

The identification of these indirect effects relies on the following set of conditional sequential independence assumptions (Huber (2019)), that we assume to hold in our context: (i) conditional independence, i.e., conditional on $\widetilde{\boldsymbol{X_{ik}}}$ and fixed effects, there are no unobserved confounders jointly affecting the treatment (ability and taste), the mediators (earnings average and standard deviation at age 30) and the outcome (major choice intentions); (ii) conditional independence of mediators, i.e., conditional on $\widetilde{\boldsymbol{X_{ik}}}$, fixed effects and treatment, no unobserved confounders jointly affect the mediators and the outcome; (iii) common support, i.e., the probability of observing a particular level of the treatment, conditional on $\widetilde{\boldsymbol{X_{ik}}}$ and fixed effects, is not equal to zero.

Given that expected earnings directly enter equation (8), a mechanical correlation arises between the errors of the three equations. We thus adopt a Seemingly Unrelated Regression Equations (SURE) model, as originally proposed by Zellner (1962), which enables joint estimation while allowing the error terms across equations to be correlated. To ensure consistency across the three models, we retain observations that have non-missing values for all three outcome variables.

Columns (2) and (3) in the top panel of Table A5 show that both ability and major-specific tastes have a positive and statistically significant effect on mean expected earnings at age 30 and $\widetilde{SDW}^{30}{}_{ik}$. The bottom panel reports the estimates of the indirect effects. More in detail, the indirect effect of ability via expected earnings at age 30 is equal to 4.8 percent (for a one standard deviation increase). Similarly, the indirect effect of tastes via expected earnings at age 30 is 6 percent. Both effects are much smaller than the direct effects.

Further details on the determinants of economic expectations are provided in Appendix Table A9, where we also report gender-disaggregated estimates. The results confirm that both perceived ability and major-specific tastes are strong and significant predictors of earnings expectations across the board.

Appendix B. Main survey items.

Expected monthly monetary returns at 30.

Imagine that you have enrolled and graduated in one of the courses in each of the categories in the table below, or that you are not graduated. Imagine in each scenario being 30 years old and working full-time. Based on the information you have, how much do you believe your monthly MINIMUM and MAXIMUM earnings could be in euros?

	MINIMUM monthly earnings	MAXIMUM monthly earnings
Civil engineering, Architecture, and Design	*Q30[1,1]*	*Q30[1,2]*
Engineering, ICT, Mathematics, Physics, and other Natural Sciences	*Q30[2,1]*	*Q30[2,2]*
Economics, Business, and Law	*Q30[3,1]*	*Q30[3,2]*
Medicine, Veterinary Medicine, and Health Professions	*Q30[4,1]*	*Q30[4,2]*
Psychology, Political Sciences, and Other Social Sciences	*Q30[5,1]*	*Q30[5,2]*
Literary Studies, Philosophy, and Humanities	*Q30[6,1]*	*Q30[6,2]*
Not graduated	*Q30[7,1]*	*Q30[7,2]*

In the following questions, you will often be asked to indicate the probability of an event happening in the future on a scale from 0% (impossible) to 100% (certain). To become more familiar with the concept of probability, imagine being asked the question, “What is the likelihood that it will rain tomorrow?” Respond with 0% if you are certain that it will not rain tomorrow. If you think it is possible but unlikely that it will rain, you might indicate a probability of, for example, 10%. If you believe it is equally likely to rain or be clear, you could indicate a probability of 50%, or 60% if you think it is slightly more likely to rain than be clear. Finally, if you are certain that it will rain tomorrow, indicate a probability of 100%.

In the next 7 questions, you will be asked, for each education scenario, what you think the probability is that your monthly earnings will be greater than or equal to three specific values in euros. Keep in mind that the probabilities you indicate should decrease as the value of earnings increases. For example, the probability that your monthly earnings are greater than or equal to €2000 is necessarily lower than the probability that it is greater than or equal to €1000, as it becomes more difficult (and therefore less likely) to achieve higher amounts.

Imagine having obtained a university degree in the group of courses “[*scenarios are shown here in turn*]”, to be 30 years old and work full-time. Based on the information you have, what is the percentage probability (from 0 to 100) that YOUR monthly earnings are greater than or equal to the values in euros in the table below?

	Probability that YOUR monthly earnings are greater than or equal to:
*0.75*Q30[1,1]+0,25*Q30[1,2] €*	
*0.5*Q30[1,1]+0,5*Q30[1,2] €*	
*0.25*Q30[1,1]+0,75*Q30[1,2] €*	

Probability of graduating.

Imagine enrolling and graduating in one of the degree programs from each group in the table below, or not graduating. Based on the information you have about job opportunities available in various scenarios, what do you think is the percentage probability (from 0 to 100) that you will be able to find stable employment, compatible with the skills and competencies acquired up to that point, by the age of 30?

	Probability (0-100) to find stable employment compatible with competences acquired
Civil engineering, Architecture, and Design	
Engineering, ICT, Mathematics, Physics, and other Natural Sciences	
Economics, Business, and Law	
Medicine, Veterinary Medicine, and Health Professions	
Psychology, Political Sciences, and Other Social Sciences	
Literary Studies, Philosophy, and Humanities	
Not graduated	

Expected monthly monetary returns at 40.

Imagine that you have enrolled and graduated in one of the courses in each of the categories in the table below, or that you are not graduated. Imagine in each scenario being 40 years old and working full-time. Based on the information you have, how much do you believe your monthly AVERAGE earnings could be in euros?

	AVERAGE monthly earnings
Civil engineering, Architecture, and Design	
Engineering, ICT, Mathematics, Physics, and other Natural Sciences	
Economics, Business, and Law	
Medicine, Veterinary Medicine, and Health Professions	
Psychology, Political Sciences, and Other Social Sciences	
Literary Studies, Philosophy, and Humanities	
Not graduated	

Self-assessed ability.

Imagine being enrolled in one of the degree programs from each group in the table below. On a scale from 1 to 100, where do you believe you stand compared to other students in terms of skills in the subjects of the degree programs in each group? Indicate 1 if you believe you are at the bottom of this potential ranking, indicate 100 if you believe you are at the top.

	Skill ranking position (1-100)

Civil engineering, Architecture, and Design	
Engineering, ICT, Mathematics, Physics, and other Natural Sciences	
Economics, Business, and Law	
Medicine, Veterinary Medicine, and Health Professions	
Psychology, Political Sciences, and Other Social Sciences	
Literary Studies, Philosophy, and Humanities	

Preferences.

We now ask you to choose an alternative between the pairs of alternatives below. Do you prefer to study "Literary Studies, Philosophy, and Humanities" and earn 1500 € per month or to study "Civil engineering, Architecture, and Design" and earn X € per month (with X varying in each row of the table below)?

Literary Studies, Philosophy, and Humanities	"[*scenarios are shown here in turn*]"
1.500 € ○	500 € ○
1.500 € ○	750 € ○
1.500 € ○	1.000 € ○

1.500 € ○	1.250 € ○
1.500 € ○	1.500 € ○
1.500 € ○	1.750 € ○
1.500 € ○	2.000 € ○
1.500 € ○	2.250 € ○
1.500 € ○	2.500 € ○

Work-life balance.

Imagine enrolling and graduating in one of the degree programs from each group in the table below, or not graduating. Based on the information you have about job opportunities available in various scenarios, what do you think is the percentage probability (from 0 to 100) that it is easy to balance your interests and personal life with your career?

Probability (0-100) to balance personal life and

	interests with career
Civil engineering, Architecture, and Design	
Engineering, ICT, Mathematics, Physics, and other Natural Sciences	
Economics, Business, and Law	
Medicine, Veterinary Medicine, and Health Professions	
Psychology, Political Sciences, and Other Social Sciences	
Literary Studies, Philosophy, and Humanities	
Not graduated	

Remote working.

Imagine enrolling and graduating in one of the degree programs from each group in the table below, or not graduating. Based on the information you have about job opportunities available in various scenarios, what do you think is the percentage probability (from 0 to 100) that you will be given the opportunity to work remotely (smart working) at least a few days a week?

	Probability (0-100) to work remotly

Civil engineering, Architecture, and Design	
Engineering, ICT, Mathematics, Physics, and other Natural Sciences	
Economics, Business, and Law	
Medicine, Veterinary Medicine, and Health Professions	
Psychology, Political Sciences, and Other Social Sciences	
Literary Studies, Philosophy, and Humanities	
Not graduated	

Working as self-employed.

Imagine enrolling and graduating in one of the degree programs from each group in the table below, or not graduating. Based on the information you have about job opportunities available in various scenarios, what do you think is the percentage probability (from 0 to 100) that in the future you may work as a freelancer or entrepreneur?

	Probability (0-100) to work as freelancer or entrepreneur
Civil engineering, Architecture, and Design	
Engineering, ICT, Mathematics, Physics, and other Natural Sciences	

Economics, Business, and Law	
Medicine, Veterinary Medicine, and Health Professions	
Psychology, Political Sciences, and Other Social Sciences	
Literary Studies, Philosophy, and Humanities	
Not graduated	

Working abroad.

Imagine enrolling and graduating in each of the groups of degree programs in the table below, or not graduating. What is the probability that you would choose to settle for work near home (less than 150 km), far from home (more than 150 km) but in Italy, or abroad?

	Work within 150 km from home	Work farther than 150 km from home	Work abroad	Total
Civil engineering, Architecture, and Design				
Engineering, ICT, Mathematics, Physics, and other Natural Sciences				
Economics, Business, and Law				
Medicine, Veterinary Medicine, and Health Professions				

Psychology, Political Sciences, and Other Social Sciences				
Literary Studies, Philosophy, and Humanities				
Not graduated				

Appendix C. Definition of region-level gender norms from European Value Survey

To construct the gender norms variables, we use data from the 2017–2021 waves of the European Values Survey (EVS). Drawing on a set of questions related to individual attitudes toward gender roles and gender equality - within the family, in the labor market and, more broadly, in society - we build a measure of gender norms at the regional level (NUTS2). Specifically, we consider six EVS items in which respondents indicate their level of agreement with the following statements:

1. "When jobs are scarce, men have more right to a job than women" (3-point scale)
2. "On the whole, men make better political leaders than women do" (5-point scale)
3. "On the whole, men make better business executives than women do" (5-point scale)
4. "A preschool child suffers if the mother works" (5-point scale)
5. "University is more important for a boy than for a girl" (5-point scale)
6. "Women have the same rights as men" (10-point scale)

For items 1 through 5, we create binary indicators equal to 1 if the respondent agrees or strongly agrees with the statement.[33] For item 6, we define a dummy equal to 1 for responses between 5 and 10, representing stronger endorsement of gender equality.[34]

We then compute an individual-level gender norms index as the share of these six dummies with a value of 1. Based on this, we calculate the regional mean and national median of the index. Regions are classified as "Traditional" if their regional mean exceeds the national median, and as "Progressive" otherwise. Appendix Table C1 lists Italian regions by their value on the gender norms indicator.

Table C1. Categorization of regions according to gender norms

[33] Specifically, we create one indicator variable for a response of 1 ("Agree") on item 1, and four additional indicators for responses of either 1 ("Strongly agree") or 2 ("Agree") on items 2 through 5.

[34] The minimum value for this item is 1, corresponding to the response "Not at all an essential characteristic of democracy", while the maximum is 10, corresponding to the response "An essential characteristic of democracy".

Region	Traditional	Progressive
Abruzzo	1	0
Basilicata	1	0
Calabria	1	0
Campania	1	0
Emilia Romagna	0	1
Friuli-Venezia Giulia	0	1
Lazio	0	1
Liguria	0	1
Lombardia	1	0
Marche	0	1
Molise	1	0
Piemonte	0	1
Puglia	1	0
Sardegna	0	1
Sicilia	1	0
Toscana	0	1
Trentino-Alto Adige	1	0
Umbria	1	0
Valle D'Aosta	0	1
Veneto	0	1