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vocational and academic education
backgrounds in Switzerland?**

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What wages do people expect for vocational and academic education backgrounds in Switzerland?*

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October 2022

Abstract

Correctly anticipating the earnings for different educational profiles is pivotal in making informed education decisions. In this paper, leveraging unique survey data, we study the wage expectations for academic and vocational education backgrounds in Switzerland. We find significant heterogeneity in the expected wage distributions for given educational profiles and strong differences in wage beliefs by gender, age, socio-economic status, region of residence, and migration background. Personal reference points seem to matter in forming these wage expectations, and more than half of the respondents overestimate the returns to academic versus vocational education, especially the returns expected at younger ages. The latter is vital for education policy because our analyses show that the expected returns determine preferences for specific educational tracks for the own (hypothetical) child. If education decisions are ill-informed, this likely leads to educational mismatches and related adverse effects later in life.

Keywords: wage expectations, educational preferences, biased beliefs

JEL classification: I20, D84, J31

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1. Introduction

Most of the literature agrees that the perceived returns to education are a central factor for human capital investment (see, for example, Jensen, 2010; Attanasio and Kaufmann, 2014, 2017; Delavande and Zafar, 2019; Boneva and Rauh, 2019; Attanasio et al., 2020; Giustinelli, 2022). Less research has been devoted to the question of how potential wage misconceptions are formed and whether knowledge gaps exist regarding the wages that people can expect for different educational tracks. If a person's wage beliefs do not correspond to the salaries paid in the labor market, this can lead to ill-informed decisions, educational mismatches, and an inefficient allocation of resources. Such a misallocation, in turn, can have long-run consequences for the person and the economy as a whole in terms of lower realized individual and social returns to education.

In this paper, we analyze whether people are aware of the labor market rewards associated with different educational paths, more precisely, the rewards related to academic or vocational education. We leverage novel data from Switzerland on the wage expectations for people of a certain age with either vocational or academic educational backgrounds. First, we analyze the determinants of these wage expectations, focusing on common socio-economic and demographic characteristics. Second, we study the distribution of these wage expectations vis-à-vis actual wages of people with the respective educational backgrounds to understand better the segments of the population that are more likely to have biased wage beliefs. In addition, we investigate whether biased wage beliefs exist for both types of educational pathways. The latter is important insofar as it can shed light on a key decision related to educational tracking made early on in the Swiss education system, and whether particular groups of the population require additional information that can help them make better decisions.

We focus on the wage expectations of the adult population, who have, for the most part, already made their schooling decisions. However, their opinions can still be an indication of future educational choices. It is most likely that adults' beliefs, whether they belong to parents, teachers, counselors, or other mentors, are pivotal in influencing the future plans and expectations of younger generations, for example, by sharing experiences and beliefs about the economic prospects of different options. Using unique data on respondents' preferences regarding the educational path of their own

(hypothetical) child, we examine whether wage expectations and the expected returns to different educational paths are associated with these preferences. Other choice dimensions, like occupational reputation, job security, or a good work-life balance, are, of course, also important in determining educational decisions, but they are not the focus of our analysis.

Switzerland is an interesting case to study wage expectations. First, there is a strong tradition of vocational education embedded in the dual-track system, with about two-thirds of young people choosing the vocational track and one-third choosing an academic route. Only the latter track provides direct access to university education. Decisions for one or the other track are typically made at the ages of 12 to 15. Even though the system allows for permeability between tracks, expectations about potential rewards are formed early on. Second, Switzerland has three geographically segregated language regions, which are culturally distinct and characterized by different education systems and labor markets. All that can influence educational preferences and wage expectations. Third, Switzerland has one of the highest shares of migrants among all OECD countries, with migrants often coming from countries with a less established vocational education system. This fact is expected to influence preferences for different educational paths, and wage expectations for people having a specific background, since wage distributions across occupations may look very different in other countries.

Our findings indicate that wage beliefs differ strongly by gender, age, socio-economic status, region of residence, and migration background. Women, in general, believe that wages are lower than what they actually are for vocational and academic education. This could be a reflection of the lower wages women receive in the labor market or result from a general bias in beliefs about the wage distribution. The potential consequence of these biased wage beliefs is that women might influence their own salaries negatively, for example, by not negotiating enough or accepting jobs with lower pay. However, given that women generally underestimate the wages of both paths, the relative returns to academic education are close to the ones observed in the labor market, and thus educational decisions based on expected returns are not necessarily biased.

We also find a clear age gradient in wage expectations, with younger people under- and older people over-estimating wages, especially for academic education. This translates into expected returns to academic vs. vocational education, which are significantly higher, and not completely aligned with the actual returns to academic education in the age group 40+, i.e., precisely those who may have children at crossroads deciding about their educational path. In addition, individuals with a vocational background are more likely to overestimate the wages of university graduates than individuals with an academic background. And vice versa, the latter are more likely to overestimate the salaries of people with a vocational background. While part of this result may be attributable to socio-economic status, confirmed by the positive income gradient found in the wage expectations, the asymmetric misconceptions may also be related to the own educational background and biased beliefs about the “other” path.

Contrary to this argument, however, we find that people with a migration background have lower wage expectations than natives. This holds especially for academic wages, even though the proportion of individuals with a vocational background is significantly lower in the migrant group. The likely reason for this result is not an underestimation of wages within the migrant group but rather an overestimation of wages of Swiss natives, especially the wages expected for persons with an academic profile. Finally, the results show that the relative expected wages for vocational, as opposed to academic education, are higher in the French- and Italian-speaking parts of Switzerland than in the German-speaking part. This could be indicative that the choice between academic and vocational education is not based on economic considerations only because it contrasts with the proportion of people with an academic education background, which is higher in the French- and Italian-speaking regions. Nevertheless, people in these regions still believe that absolute wages are lower for both types of education, which reflects the real local wages and thus is consistent with a geographical reference point.

The results for women, migrants, and language regions show that people’s answers reflect their own situation and that people do not know or do not take into consideration averages when building their wage beliefs. Age and socio-economic status are also associated with biased wage beliefs. All this is of concern to education policy since our complementary analyses of educational preferences for the own (hypothetical) child indicate that the expected wages and expected returns to academic

education are major determinants of these preferences. This, in turn, could lead to an inefficient resource allocation if the ambition for the child's education does not coincide with the child's abilities and skills, leading to, for example, a low performance, early dropouts, reduced chances in the labor market, and the related long-term consequences.

The remainder of the paper is structured as follows. Section 2 presents our hypotheses and the related literature. Section 3 introduces the data and methods. Section 4 reports the results, first looking at the determinants of expected wages and the returns to academic vs. vocational education, and then investigating biased beliefs and implications concerning vocational vs. general education preferences. Section 5 concludes.

2. Hypotheses and previous literature

Human capital theory states that individuals will invest in education if, and only if, the expected rate of return exceeds the costs of investment (Becker, 1962). In reality, educational decisions are complex and made under uncertainty, given that the benefits of completing a particular educational degree are not perfectly known *ex-ante* (Hartog and Bajdechi, 2007; Hanushek et al., 2022; Kunz and Staub, 2020).

In the case of the monetary benefits of vocational or academic education, people who follow a specific path might be unaware of the returns to the other educational path also *ex-post*. If this was the case, parents could unintentionally mislead their children, who are about to choose their educational path, by sharing their labor market misconceptions with them. There is some evidence in the literature that gaps in educational aspirations among young people are due to the fact that individuals whose parents do not have a background in higher education may underestimate the returns to university education and overestimate its costs (Lergetporer et al., 2021). Based on that, we expect people with a vocational education background to underestimate the returns to university education. On the other hand, studies show that university students tend to overestimate the returns to university education (e.g., Fernandes et al., 2021). If these wage perceptions continue beyond graduation, we expect to observe that

respondents with university education are more likely to overestimate earnings for this path, both in relative and absolute terms, compared to people with vocational education.

The pay gap between men and women is one of the most investigated topics in economics (see, for example, Blau et al., 2017). One of the explanations in the literature for this gap is that women have, in general, lower wage expectations (e.g., Filippin and Ichino, 2005; Reuben et al., 2017) and, therefore, might be more likely to accept a low-paying job offer. If this were the case, differences in wages between men and women would not start with realized wages but already before women enter the labor market (Reuben et al., 2017; Kiessling et al., 2019; Fernandes et al., 2021; Briel et al., 2021). In this context, Briel et al. (2021) find that biased beliefs play a major role in explaining gender differences in wage expectations. For this reason, we expect that women are more likely to estimate lower absolute earnings than men. Moreover, given that women tend to underestimate labor market rewards in general, we expect no significant differences in their perception of relative wages for people with vocational and university degrees.

A vast amount of literature shows that immigrants have an earnings disadvantage in the destination country. Explanations mostly revolve around differential returns to completing a degree and acquiring labour market experience in a foreign country (Friedberg, 2000; Bratsberg and Ragan, 2002; Chiswick and Miller, 2009; Sanroma et al., 2015; Basilio et al., 2017), differences in the quality of education among countries (Sweetman, 2004), differences in productivity due to missing language skills (Chiswick and Miller, 1995; Dustmann and Van Soest, 2002), and discrimination (Aydemir and Skuterud, 2008; Bartolucci, 2014). Based on these findings, we expect that people with a migration background will generally estimate lower wages than natives. However, it is less clear what the perceptions about the returns to university education compared to vocational education will be for the migrant group compared to natives. On the one hand, they may expect lower wages for both university and vocational education so that the perception of the relative premium for an academic vs. vocational degree is the same as for natives. On the other hand, studies have shown that migrants prefer academic education for their children (Abrassart et al., 2020). As in Becker's human capital theory, the decision of which educational path to choose, vocational or academic,

is typically based on the expected rate of return of each option, i.e., people with a migration background may have relatively higher wage expectations for university or lower wage expectations for vocational education than natives.

In line with the previous argument, there is also evidence that people in Switzerland's French and Italian-speaking regions are more likely to choose an academic education path (Cattaneo and Wolter, 2022; Abrassart et al., 2020). One possible reason is that residents of these regions expect higher relative earnings after university education. Following this line of thought, we expect residents of these two regions to overestimate the relative returns to university education compared to residents of the German-speaking part, even though absolute wage expectations may be lower.

In general, we expect people's beliefs about the returns to different educational paths to align with what they believe would have been their wages had they chosen that path. Conversely, we expect beliefs to align with what people think would be their children's wages (or any other young adult's) if they chose a particular path. Associated to this, the literature on hypothetical scenarios and beliefs shows that stated expectations and preferences tend to be close to actual realizations and indicative of people's actual choices and behavior (Wiswall and Zafar, 2016; Mas and Pallais, 2017).

The paper adds in general to the literature on the role of expected wages and returns when making educational decisions, including staying at school (Jensen, 2010), starting tertiary education (Attanasio and Kaufmann, 2014, 2017; Boneva and Rauh, 2018; Lergetporer et al., 2021), major and occupational choice (Arcidiacono et al., 2017; Wiswall and Zafar, 2015) or completing a tertiary degree (Wiswall and Zafar, 2016). In particular, it relates to work that analyzes the determinants of people's awareness of labor market prospects and beliefs about personal economic outcomes, such as wage expectations and parental education (Lergetporer et al., 2021) or gender differences (Reuben et al., 2017; Kiessling et al., 2019; Fernandes et al., 2021; Briel et al., 2021).

3. Data and methods

Our analysis builds on data drawn from the *Survey of Public Opinion on Education*, conducted between September and October 2019 (wave 1) and between June and July

2020 (wave 2) by the LINK Institute on behalf of the University of Bern in Switzerland. The survey was conducted online and based on the LINK Internet Panel. The final sample consisted of 9,163 observations from all three language regions (German, French, and Italian) aged between 18 and 74. The sample is representative of Swiss citizens, with quotas for age, gender, region of residence, and education. The Italian-speaking region, the smallest in size (approximately 6% of the population), was oversampled in the data collection to avoid small cell sizes and obtain more accurate estimates. We employ survey weights to ensure the sample's representativeness concerning the Swiss national population in all our analyses. We also control for possible differences between the two waves in the calculations, especially in the wage perceptions, even though the distributions are almost identical despite the different circumstances related to the COVID-19 pandemic coinciding with the timing of the second wave.

Given that we are interested in individuals' perceived labor market outcomes for different educational paths, we elicit wage perceptions for two different scenarios. Specifically, the survey asked respondents what wage they believe a 30-year-old person with a vocational education degree earns and what these earnings are for a person with a university degree. In addition, we unveil the perceived long-term development of the university premium relative to vocational education by asking respondents about the same wage perceptions for a 50-year-old person. The two questions were²:

How much do you think people with a university degree aged 30(50) earn on average in Switzerland? Please estimate the gross monthly salary.

and

How much do you think people who follow vocational education after compulsory school earn on average in Switzerland at age 30(50)? Please estimate the gross monthly salary.

² There were only 4 to 14 missing values per question, i.e., negligible non-response in the stated wage expectations. However, there were several implausible answers, probably due to people not having read the question correctly and providing an estimate for the annual instead of monthly wages. We corrected this in the 2019 wave by transforming large values into monthly salaries. In the 2020 wave, the survey design restricted respondents' answers to be below a maximum value and alerted them to think again if their initial answer was below a lower or above an upper threshold.

In addition to the wage expectations, the survey contained questions on respondents' demographic and socio-economic backgrounds. Apart from gender and age (included in four age groups: 18-29, 30-39, 40-49, 50+), we consider the person's educational background (obligatory, vocational, academic), monthly household income (categorical: less than 6,000 Swiss Francs, between 6,000 and 10,000 Swiss Franc, and more than 10,000 Swiss Francs; plus a missing income category as defined by the LINK panel), the region of living (German-, French-, Italian-speaking), whether the respondent has children (yes/no), and whether the respondent has a migration background (yes/no)³. The survey also gathered information on the respondents' political orientation, risk and time preferences, and non-cognitive skills and traits, such as GRIT. In secondary analyses, we also investigated these variables as predictors of wage expectations, but none of them was significantly associated with the expected returns.

Table 1 shows basic summary statistics of the data. On average, respondents expect a monthly wage of approximately 7,600 Swiss Francs for persons with an academic degree at age 30. In comparison, respondents expect wages to be about 5,300 Swiss Francs for persons of this age with a vocational degree. These numbers can be compared to the 7,100 and 5,600 Swiss Francs for the median monthly wages in this age group for the two educational groups, respectively, as inferred from full-time wages in the *Swiss Labor Force Survey 2019*. Even though the median wages are below the mean wages due to the skewness of the distribution, the order of magnitude is comparable, and people tend to overestimate the wages for persons with an academic degree and underestimate the wages for persons with a vocational degree. For persons aged 50, respondents expect approximately 10,800 Swiss Francs with an academic degree and 6,700 Swiss Francs with a vocational degree, on average. Median wages in the *Swiss Labor Force Survey* show values of 10,900 and 7,000, respectively, which is relatively close to respondents' expectations of wages for the two educational profiles for this age.

--- *Insert Table 1 about here* ---

The summary statistics show the anticipated distributions for gender, age, and region of residence. The data is also representative of educational background, with around 5%

³ Only people with Swiss citizenship were included in the survey. Therefore, we define persons as having a migration background if they were born abroad, or if they were born in Switzerland but have foreign-born parents (country of birth and country of birth of parents were included in the survey).

having an obligatory school degree, almost 69% with a vocational degree, and 26% with an academic degree. The income distribution also corresponds to our expectations, although it should be noted that approximately 15% of the respondents in the sample have missing income information. For this reason and to avoid losing a large fraction of the data, we include a dummy variable for missing income along with dummies for the other observed income categories in the regression models below. Finally, almost 60% of the respondents have children, and nearly 30% have a migration background.

In a first attempt to investigate our hypotheses stated in Section 2, Table 2 describes the data by showing the means of expected wages for persons with an academic or vocational education background, and the associated short-cut estimates of the returns to academic vs. vocational education, for different subgroups of the sample. Following the approach discussed in Psacharopoulos (1981), we use the ratio of the expected wage for an academic to the expected wage for a vocational background as the short-cut estimate of what an individual would expect in terms of the returns to academic vs. vocational education. The descriptive statistics show that men, on average, expect higher wages than women, which holds for academic wages in particular, and, as a consequence, expected returns to academic education are higher for men than for women. We also observe an age gradient, with the older age groups (40+) expecting higher wages and returns.

--- Insert Table 2 about here ---

Educational background influences wage expectations as well. On the one hand, people with a particular background seem to be better at estimating the wages of persons with the same profile, with smaller deviations observed between expected and actual wages. On the other hand, people tend to estimate higher (and partly too high) wages of persons with another educational background. That the personal context matters in forming wage expectations is also confirmed by the other subgroups, with higher income groups, non-migrants, people with children, and from the German-speaking region on average expecting higher wages for both educational profiles than their counterparts.

In general, people seem to overestimate the returns to academic vs. vocational education. Using the median wages from the Swiss Labor Force Survey, the short-cut

estimate would be approximately 28% at age 30 and 56% at age 50. Looking at the mean estimates in total in Table 1, or by subgroup in Table 2, we see that the average expected returns are higher than the actual returns at both ages, and deviations are particularly striking for age 30, with expected returns overestimated by 10-20 percentage points.

Building on these descriptive statistics, we will aim in the following sections to better understand the distribution of wage expectations, the expected returns, and who is more likely to overestimate the actual wages for the two education profiles. Methodologically, we will consider log-linear regressions for the expected wages for each education background, and linear regressions for the short-cut estimates of the returns to academic vs. vocational education. In the regression models, we include the respondents' background characteristics shown in Table 1 as explanatory variables, i.e., instead of the simple bivariate comparisons by subgroup shown in Table 2, we regression-adjust the mean comparisons. More formally, we specify the models as follows:

$$\log(\textit{expected wage}) = x'\beta + u \quad (1)$$

with x denoting the vector of explanatory variables, β denoting the vector of parameters that describe the association of the background characteristics with the expected wages (interpreted in relative terms when multiplied by 100% due to the log-linear functional form), and u denoting an error term. We run the regression shown in (1) separately for the wage expectations respondents have for persons with an academic or a vocational education background at ages 30 and 50, i.e., four regressions in total.

For the expected returns, we specify the same type of regression model, replacing the dependent variable with the short-cut estimate of the return, i.e.,

$$\frac{\textit{expected wage} | \textit{academic}}{\textit{expected wage} | \textit{vocational}} - 1 = x'\beta + u \quad (2)$$

where $\textit{expected wage} | \textit{academic}$ and $\textit{expected wage} | \textit{vocational}$ denote respondents' wage expectations for persons with an academic or vocational education background, respectively. Equation (2) uses the same explanatory variables in x as in model (1), and

the parameters β show how the expected returns differ on average by the background characteristics described in x . Similar to equation (1), we estimate equation (2) once for the expected returns at age 30 and once for the expected returns at age 50, allowing for age-specific heterogeneity in the parameters to describe expected returns. In further analyses (results available upon request), we estimated a pooled version of equation (2) by calculating an average of the expected returns at ages 30 and 50. The results are robust to this alteration of the definition of the dependent variable.

Finally, to compare wage beliefs to actual wages in Switzerland, we use the *Swiss Labor Force Survey* for the year 2019 and estimate the median wages for people in the same age group as considered in the questions of the *Survey of Public Opinion on Education*, with university and vocational education degrees in total (as reported above) and by region. We use the latter to calculate the deviations between expected wages and actual wages for each respondent, again by the two educational profiles (academic/vocational) and the two ages (30/50). From this, we create a simple indicator for the overestimation of actual wages, i.e., the variable *overestimate* equals one if the respondent's expected wages are larger than actual wages for a person with a certain educational profile at a certain age, and zero else. Similarly, we create an indicator of whether expected returns are higher (or not) compared to actual returns to academic vs. vocational education, as inferred from the *Swiss Labor Force Survey*. We then specify logistic regression models to analyze the probability of overestimating actual wages or returns, formally

$$P(\textit{overestimate} = 1|x) = \Lambda(x'\beta) \tag{3}$$

with x again denoting the vector of explanatory variables as it was used in equations (1) and (2), and $\Lambda(\cdot) = \exp(\cdot)/(1 + \exp(\cdot))$ denoting the cumulative probability function of the logistic distribution. To facilitate the interpretation of the coefficients in the logistic regression models, we calculate average discrete probability changes, i.e., evaluating (3) at a specific subgroup indicated by the variables included in x , compared to a reference group, and then averaging over all observations in the sample. We decided against using a multinomial logit model, differentiating between over- and underestimation of wages or returns as opposed to a correct estimation, since almost nobody in the sample reported an expectation that corresponded precisely to the median salaries or returns

as inferred from the *Swiss Labor Force Survey* and selecting a bandwidth for a “correct” estimation would likely be arbitrary and potentially influence the results of such a regression.

4. Results

We will first present the results of the regressions described by equation (1) on the respondents’ expected wages and how any potential differences in the wage expectations by subgroups of the population translate into differences in the expected returns to academic vs. vocational education. In a second step, we will consider the overestimation of wages, as seen in Tables 1 and 2, and aim to understand better which groups of the population are more likely to have misconceptions about the wages one can expect in different educational paths. In a final step, we will explore the potential implications of these biased wage beliefs in determining educational preferences.

How do wage expectations differ by subgroups of the population?

Table 3 shows that women expect between 14% and 25% lower wages than men for persons with a vocational or an academic education background. This result holds conditional on the other covariates in the model, i.e., the differences are not driven by, for example, differences in educational achievements or household income. It is also stable when personality factors such as GRIT or political orientation are included in the regression model. However, even though the relative gender differences are more considerable in the wage expectations for persons with an academic background, the differences are not big enough on the individual level to translate into significant differences in the expected returns to academic vs. vocational education.

--- Insert Table 3 about here ---

Regarding age, we confirm the gradient found descriptively above. People in the age groups 40-49 and 50+ have significantly higher wage expectations for people with an academic background than the younger age groups. However, when looking at the expectations for a vocational education profile, this gradient basically disappears or

becomes much weaker and is mostly insignificant. Therefore, and in contrast to the gender gap in wage expectations, these results translate into a significant age gradient in the expected returns to academic vs. vocational education.

A potential explanation for the gradient in expected wages could be an age or returns-to-experience effect, with older individuals typically having higher wages until age 50 when earnings profiles flatten out. However, this does not necessarily explain the age gradient in expected *returns* because earnings profiles could be similar in both educational paths. Another explanation could be a cohort effect, with a trend observed in more recent years toward academic education. If the personal context matters, then the older age groups may be more likely to have biased wage beliefs and overestimate wages for the academic profile. At the same time, the younger age groups may be more likely to have biased views of the vocational profile. This explanation is at least partly confirmed in the regressions when looking at the respondents' education, household income, or parental background. For example, for education, we find that respondents with a vocational, as opposed to academic background, expect wages for persons with an academic profile to be around three percentage points higher. In contrast, they expect wages to be about 2-4 percentage points lower for persons with a vocational education profile. The asymmetry in the wage expectations translates into expected returns to academic education, which are significantly higher for individuals with a vocational background.

Additionally, consistent with our hypothesis, we find significantly lower wage expectations in the French- and Italian-speaking parts of Switzerland than in the German-speaking part, irrespective of the education profiles. However, in contrast to our expectations based on revealed preferences through educational choices (academic education being the more prominent path in the French- and Italian-speaking parts), we find that the expected returns to academic vs. vocational education are highest in the German-speaking part. A comparison to median wages in the three language regions by education background and age obtained from the *Swiss Labor Force Survey* suggests that at least part of the differences is not due to an underestimation of returns to academic education by respondents from the French- and Italian-speaking parts but rather due to the significant *overestimation* of expected returns in the German-speaking part.

Finally, concerning migration background, we confirm our hypothesis that migrants, on average, have lower wage expectations than natives for both education profiles, but more so for persons with an academic profile. For this reason, we also find significantly lower expected returns to academic education for migrants than for natives. Note that the regression models control for other socio-economic and demographic backgrounds, i.e., differences in these characteristics between the migrant and native populations cannot explain the differences estimated in the expected returns by migration background. However, a potential explanation for the misconceptions could lie in the comparison to realized returns, where the factors mentioned above related to migrant-native wage differences, such as quality and acknowledgment of foreign education, or discrimination, translate into actual returns paid in the labor market. If migrants have internalized those factors, they may also express biased beliefs about the expected returns.

Who is overestimating the wages for different educational profiles?

The results of the previous section highlight which subgroups of the population have higher or lower wage expectations for persons with different education profiles. However, the analysis is not informative about the potential over- or underestimation of wages or the returns to academic vs. vocational education. To shed light on this question, we first consider the distributions of expected wages and returns relative to the benchmark median wages and returns inferred from the *Swiss Labor Force Survey*.

Figure 1 displays the distributions of expected wages for the two educational profiles (academic/vocational) and the two reference ages (30/50) in boxplots. Several striking patterns can be inferred from the graphs. First, expected wage distributions have a much wider spread for the academic than the vocational education profile, indicating a high degree of uncertainty in the wage expectations, especially for persons with an academic profile. Second, wage beliefs for persons with a vocational education profile seem to be downward biased. The median and most of the box are located below the zero line, even though there are also respondents in the sample who overestimate wages for this group. These biased beliefs do not change when comparing expectations for people at age 30 or 50. If anything at all, wage beliefs are even more negatively

biased for the latter age. Third, and in contrast to the expectations for a vocational education profile, wage beliefs for persons with an academic profile at age 30 seem to be positively biased, with more than half of the expectations above the zero line. This pattern of expectations for the two education profiles translates into upward biased returns to academic vs. vocational education at age 30, as shown in the left boxplot in Figure 2 for the distribution of expected returns relative to the benchmark from the *Swiss Labor Force Survey*. The result changes at age 50, when the expected wage distribution shifts downwards, even though more than 25% of the respondents still overestimate returns for this age.

--- *Insert Figures 1 & 2 about here* ---

In the next step, we consider the results of the logistic regression models described by equation (3) to learn more about the heterogeneity in the distributions in Figures 1 and 2. Table 4 summarizes the results. Confirming our above arguments, we find that women are more likely to underestimate wages than men, but only the gender difference in the overestimation of university wages is significant. Individuals over 40 are more likely to overestimate wages, especially academic wages, than their younger counterparts, which translates into a significantly higher share of individuals in the 40+ age range who tend to overestimate the returns to academic vs. vocational education. A similar gradient is observed for household income, although the gradient is stronger here for the expected wages of persons with a vocational profile, and thus differences between income groups in the overestimation of expected returns are smaller and partly insignificant.

--- *Insert Table 4 about here* ---

The asymmetry by educational background (academic vs. vocational) observed in the log-linear regressions for expected wages spills over to the likelihood of overestimating wages in the respective other educational profile, consistent with the idea that knowledge about wages in different educational pathways than the own one is biased. This is particularly important because it translates into biased beliefs about the expected returns to academic education, which are significantly more likely overestimated by people with a vocational than an academic education background.

Parents and natives, on average, are approximately 3.5-4 percentage points more likely to overestimate academic wages than non-parents and migrants. At the same time, there are no significant differences in over- or underestimation of vocational wages, and thus parents and natives also are more likely to overestimate the returns.

For the region of residence, we find some heterogeneity in the results. While people from the French- and Italian-speaking parts underestimate wages when compared to the national median inferred from the *Swiss Labor Force Survey*, using median wages by the three language regions for reference (as in Figures 1 & 2 and the regressions in Table 5) shows a less clear picture. While people from the French-speaking region tend to be more likely to underestimate wages at age 30 and academic wages at age 50, they are more likely to overestimate vocational wages at age 50 than people from the German-speaking region. A similar pattern is observed for respondents from the Italian-speaking region for wages at age 50. Still, they tend to overestimate wages at age 30 compared to respondents from the German-speaking part. However, even though the survey questions expressly referred to the country, it may not have been entirely clear to respondents whether they should take the national or a more regional perspective, which is rather common in public opinion surveys in Switzerland. For this reason, we will not discuss this point further, but it should be noted that the results for the other group comparisons are not sensitive to the choice of reference wage, and the general patterns in Table 4 remain.

Are wage expectations associated with preferences for educational pathways?

Building on the literature that studies the role of wage expectations in determining educational decisions, we use respondents' stated preferences for academic vs. vocational education. More specifically, respondents were asked in the 2019 wave of the survey whether they would prefer general or vocational education for their children (hypothetically for those without children). Answer categories were: 1) baccalaureate schools, 2) rather baccalaureate schools, 3) rather apprenticeship, or 4) apprenticeship. Based on this information, we created a simple binary variable indicating categories 1) or 2) (academic) vs. 3) or 4) (vocational), as in Cattaneo and Wolter (2022), and we used this variable as a dependent variable in logistic regression models similar to

equation (3). Since the question was embedded in an information experiment, we only used the subsample of the data in the control group, without additional information to influence respondents' preferences. As regressors, we used the socio-economic and demographic characteristics shown in Table 1. In addition, we included the expected returns or the expected wages for persons with an academic or vocational education profile to study whether these wage beliefs were associated with educational preferences.

Table 5 summarizes the results. Column (1) shows the average probability changes for the subgroups listed in the rows relative to the reference group for all background variables, i.e., without including wage beliefs. Consistent with earlier results of Cattaneo and Wolter (2022), there is no indication of differences in educational preferences by gender, region of living, income, and family background. However, older individuals, those with an academic background, and migrants prefer academic over vocational education for their children. Adding the expected returns to academic vs. vocational education to the regression (column (2)) shows a significant and positive coefficient; an increase in the expected returns by one percentage point is associated with an increase in the probability of preferring academic education by about 0.07 percentage points. While this association seems small, the distribution of expected returns in Figure 2 highlights that the median expectation of the returns is around 14 percentage points above the actual short-cut estimate of the returns at age 30, and the third quartile is even 36 percentage points above the benchmark. Thus, the order of magnitude for changes in educational preferences with biased beliefs about expected returns is between 1 and 2.5 percentage points and hence comparable to the differences in educational preferences between age groups 40-49 vs. 30-39, i.e., in that age range when respondents likely provide most guidance to their children in terms of educational decisions.

--- Insert Table 5 about here ---

Disentangling the expected returns into wage expectations for academic and vocational education profiles shows that it is mainly the former driving educational preferences. This is particularly relevant since it confirms that wage expectations, especially for the academic track, play a major role in determining educational preferences. Even though

the expected returns at age 50, at least for the median respondent, correspond almost exactly to the actual returns, the distribution of expected returns at age 50 (Figure 2) highlights a significant amount of heterogeneity in these expectations. Combined with the results of Table 5, this implies that biased wage beliefs can have a major influence on educational decisions now and in the future if biases are persistent.

5. Conclusion

In this paper, we investigate wage expectations for academic and vocational education backgrounds in Switzerland. Our results suggest significant heterogeneity in the expected wage distributions for given educational profiles. Wage beliefs differ strongly by gender, age, socio-economic status, language region, and migration background. The formation of wage expectations seems to be related to reference points, i.e., context (demographic, personal, social, economic) matters for biased wage beliefs. One of the most striking results is that more than half of the respondents overestimate the returns to academic versus vocational education, especially those expected at age 30. The latter is important for education policy because our analyses of educational preferences for the own (hypothetical child) show that the expected returns heavily influence them in the direction of the bias in wage beliefs. This has implications regarding mismatches in the education system if, for example, the ambition for the child's education does not coincide with the child's abilities and skills but is misled by too high (or too low) wage expectations for the one or the other education path. This, in turn, can lead to poor school performance, early dropouts, reduced labor market chances, and related long-term impacts at the individual and societal levels. Policy-makers, therefore, should have an interest in increasing wage transparency to avoid biased wage beliefs, a misallocation of resources, and to empower people to make better-informed decisions.

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Tables and Figures

Table 1: Description of variables and basic summary of the data

	Mean	Std.Dev.
<i>Main outcome variables</i>		
Expected wage at age 30 with academic education	7602.75	2380.69
Expected wage at age 30 with vocational education	5308.96	1434.97
Expected return at age 30 (short-cut estimate)	0.463	0.461
Expected wage at age 50 with academic education	10817.13	4016.08
Expected wage at age 50 with vocational education	6715.15	1839.58
Expected return at age 50 (short-cut estimate)	0.646	0.608
<i>Demographic and socio-economic background</i>		
Female (yes/no)	0.492	
Age		
18-29	0.214	
30-39	0.135	
40-49	0.277	
50+	0.374	
Educational background		
Obligatory	0.046	
Vocational	0.690	
Academic	0.264	
Monthly household income		
Less than 6,000	0.246	
6,001-10,000	0.334	
More than 10,000	0.263	
Missing	0.157	
Parent (yes/no)	0.595	
Migration background (yes/no)	0.272	
Region of living		
German	0.721	
French	0.238	
Italian	0.041	
Number of observations	9163	

Source: Survey of Public Opinion on Education 2019-2020.

Notes: The table reports mean values of the variables shown. The expected wages are respondents' expectations of the wage for persons with academic or vocational education background at age 30 or 50. Short-cut estimates of expected returns are calculated as the ratio of the expected wage for an academic over a vocational background. Educational background is based on the highest education achieved or current education attended. A GRIT personality trait is low when the score is 3.4 or lower on a 5-point scale, medium for scores between 3.4 and 4, and high for scores 4 and higher. Willingness to take risks is measured on a 0-10 scale where zero means not willing and 10 means completely willing. Low is defined as responses 4 or lower, medium as responses 5 or 6, and high as 7 or higher. Household income is surveyed in categorical form, as shown.

Table 2: Expected wages and returns by selected subgroups

	Age 30			Age 50		
	Academic	Vocational	Return	Academic	Vocational	Return
Gender						
Male	7723	5360	0.471	10972	6774	0.654
Female	7478	5256	0.454	10657	6654	0.637
Age						
18-29	7172	5250	0.389	9843	6577	0.530
30-39	7163	5120	0.421	10159	6567	0.563
40-49	7753	5317	0.485	11159	6739	0.685
50+	7897	5405	0.503	11359	6830	0.713
Educational background						
Obligatory	6901	5094	0.438	9241	5966	0.597
Vocational	7752	5293	0.494	11105	6671	0.698
Academic	7336	5387	0.385	10340	6961	0.519
Monthly household income						
Less than 6,000	7267	5050	0.468	10123	6321	0.647
6,001-10,000	7791	5320	0.495	11196	6702	0.701
More than 10,000	7806	5552	0.434	11263	7155	0.605
Family status						
Non-parents	7344	5262	0.425	10299	6619	0.588
Parents	7779	5341	0.488	11169	6780	0.685
Migration background						
Non-migrants	7725	5350	0.476	11005	6749	0.666
Migrants	7275	5199	0.426	10315	6625	0.593
Region of living						
German	7955	5461	0.490	11284	6867	0.683
French	6759	4970	0.390	9785	6419	0.556
Italian	6307	4607	0.409	8584	5759	0.515
Reference values from <i>Swiss Labor Force Survey</i> (median monthly wages)						
Total	7100	5600	0.268	10900	7000	0.557
German	7200	5700	0.263	11250	7100	0.585
French	6700	5400	0.241	10000	6800	0.471
Italian	5700	4900	0.163	8700	5800	0.500

Source: Survey of Public Opinion on Education 2019-2020.

Notes: The table reports mean values of expected wages for persons with academic or vocational education background at age 30 or 50 and related returns for academic vs. vocational education (short-cut estimates) by subgroup indicated in the first column.

Table 3: Linear regressions for expected wages and returns

	Age 30			Age 50		
	Academic	Vocational	Return	Academic	Vocational	Return
Female	-0.0251*** (0.0061)	-0.0167*** (0.0046)	-0.0137 (0.0101)	-0.0244*** (0.0071)	-0.0139** (0.0047)	-0.0110 (0.0132)
Age (reference: 18-29)						
30-39	-0.0202 (0.0106)	-0.0303*** (0.0080)	0.0086 (0.0168)	0.0061 (0.0125)	-0.0010 (0.0086)	-0.0005 (0.0216)
40-49	0.0456*** (0.0103)	0.0026 (0.0076)	0.0665*** (0.0182)	0.0885*** (0.0116)	0.0198* (0.0081)	0.1140*** (0.0223)
50+	0.0596*** (0.0102)	0.0135 (0.0077)	0.0808*** (0.0168)	0.1029*** (0.0115)	0.0290*** (0.0082)	0.1391*** (0.0212)
Educational background (reference: obligatory)						
Vocational	0.0923*** (0.0188)	0.0422** (0.0157)	0.0318 (0.0366)	0.1434*** (0.0201)	0.0921*** (0.0143)	0.0670 (0.0386)
Academic	0.0643*** (0.0192)	0.0611*** (0.0161)	-0.0512 (0.0361)	0.1107*** (0.0206)	0.1317*** (0.0148)	-0.0750 (0.0391)
Monthly household income (reference: less than 6,000)						
6,001-10,000	0.0708*** (0.0085)	0.0500*** (0.0060)	0.0184 (0.0141)	0.0969*** (0.0099)	0.0578*** (0.0064)	0.0407* (0.0187)
More than 10,000	0.0825*** (0.0088)	0.0904*** (0.0064)	-0.0285 (0.0147)	0.1161*** (0.0103)	0.1153*** (0.0068)	-0.0318 (0.0195)
Parent	0.0233** (0.0076)	0.0088 (0.0057)	0.0201 (0.0133)	0.0261** (0.0086)	0.0124* (0.0058)	0.0194 (0.0164)
Migration background	-0.0252*** (0.0069)	-0.0104* (0.0051)	-0.0234* (0.0106)	-0.0277*** (0.0079)	-0.0093 (0.0055)	-0.0296* (0.0144)
Region of living (reference: German)						
French	-0.1588*** (0.0074)	-0.0976*** (0.0056)	-0.0889*** (0.0113)	-0.1293*** (0.0084)	-0.0661*** (0.0057)	-0.1097*** (0.0150)
Italian	-0.2245*** (0.0107)	-0.1772*** (0.0087)	-0.0736*** (0.0149)	-0.2591*** (0.0120)	-0.1758*** (0.0085)	-0.1570*** (0.0184)
Number of observations	9163	9163	9163	9163	9163	9163

Source: Survey of Public Opinion on Education 2019-2020.

Notes: The table reports estimated coefficients from linear regression models for the log of expected wages for persons with an academic or vocational background at age 30 or 50 (as indicated in the column headers) and for the related returns for academic vs. vocational education (short-cut estimates) as dependent variables. All regressions control for a year effect (2020 vs. 2019) and missing income information. Robust standard errors are in parentheses. Significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

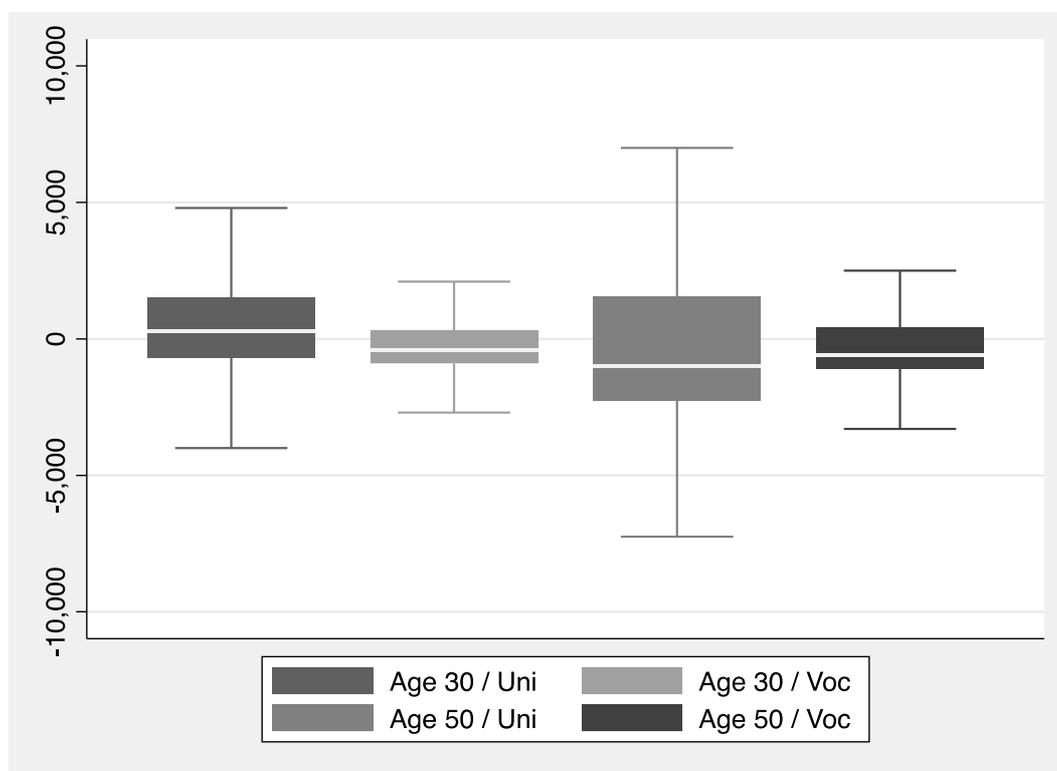
Table 4: Logistic regressions for the overestimation of expected wages and returns

	Age 30			Age 50		
	Academic	Vocational	Return	Academic	Vocational	Return
Female	-0.0488*** (0.0106)	-0.0166 (0.0101)	-0.0131 (0.0101)	-0.0370*** (0.0104)	-0.0140 (0.0100)	-0.0206 (0.0107)
Age (reference: 18-29)						
30-39	-0.0401* (0.0188)	-0.0639*** (0.0187)	-0.0021 (0.0176)	0.0324 (0.0194)	0.0124 (0.0184)	0.0213 (0.0196)
40-49	0.0573*** (0.0173)	0.0009 (0.0166)	0.0493** (0.0163)	0.1155*** (0.0174)	0.0319 (0.0167)	0.1014*** (0.0177)
50+	0.0803*** (0.0170)	0.0370* (0.0163)	0.0449** (0.0161)	0.1406*** (0.0170)	0.0501** (0.0165)	0.1363*** (0.0173)
Educational background (reference: obligatory)						
Vocational	0.1146*** (0.0255)	0.0411 (0.0263)	0.0737** (0.0228)	0.1238*** (0.0280)	0.0773** (0.0276)	0.0582* (0.0255)
Academic	0.0721** (0.0270)	0.1042*** (0.0272)	0.0068 (0.0240)	0.0415 (0.0296)	0.1550*** (0.0284)	-0.0571* (0.0270)
Monthly household income (reference: less than 6,000)						
6,001-10,000	0.0942*** (0.0137)	0.0715*** (0.0138)	0.0547*** (0.0133)	0.0863*** (0.0137)	0.0852*** (0.0137)	0.0527*** (0.0139)
More than 10,000	0.1397*** (0.0149)	0.1702*** (0.0142)	0.0231 (0.0143)	0.1153*** (0.0147)	0.2027*** (0.0139)	0.0056 (0.0153)
Parent	0.0410** (0.0128)	0.0040 (0.0123)	0.0303* (0.0122)	0.0419*** (0.0124)	0.0100 (0.0122)	0.0451*** (0.0129)
Migration background	-0.0341** (0.0120)	-0.0021 (0.0116)	-0.0160 (0.0114)	-0.0375** (0.0119)	0.0125 (0.0112)	-0.0248* (0.0122)
Region of living (reference: German)						
French	-0.1000*** (0.0123)	-0.0631*** (0.0124)	-0.0496*** (0.0117)	-0.1168*** (0.0125)	0.0435*** (0.0117)	0.0093 (0.0128)
Italian	0.0493** (0.0184)	0.0187 (0.0170)	0.0940*** (0.0189)	-0.0427* (0.0177)	0.1441*** (0.0158)	-0.0343 (0.0185)
Number of observations	9163	9163	9163	9163	9163	9163

Source: Survey of Public Opinion on Education 2019-2020.

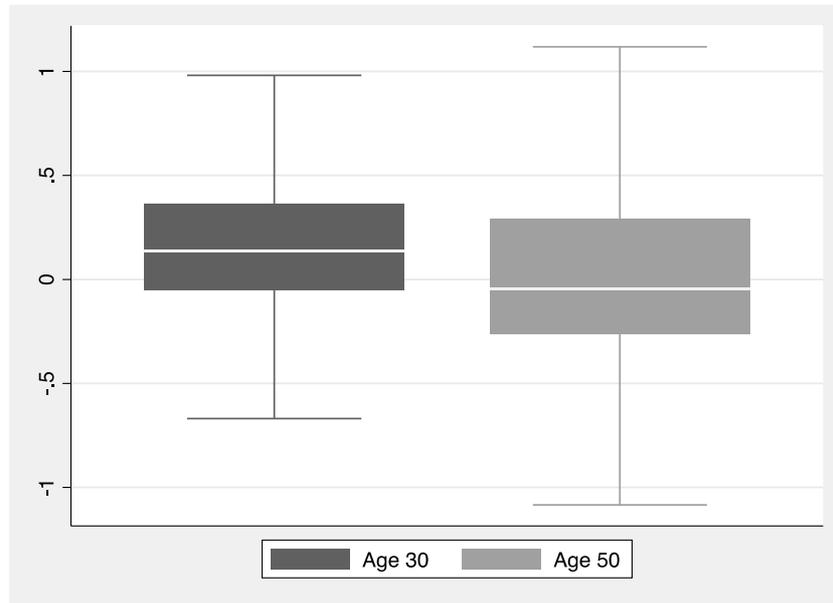
Notes: The table reports average discrete probability changes after logistic regressions for the probability of a positive difference between expected wages for persons with an academic or vocational background at age 30 or 50 and the actual mean wages of these groups calculated from the Swiss Labor Force Survey 2019 as well as a positive difference between expected returns and actual returns (short-cut estimates); see also Figures 1 and 2 for the distributions of these differences. All regressions control for a year effect (2020 vs. 2019) and missing income information. Robust standard errors are in parentheses. Significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 1: Distribution of differences between expected and actual mean wages



Source: Survey of Public Opinion on Education 2019-2020. Notes: The figure shows boxplots of the differences between the responses regarding expected wages for persons with academic or vocational education background at age 30 or 50 and the actual mean wages of these groups calculated from the Swiss Labor Force Survey 2019.

Figure 2: Distribution of differences between expected and actual returns to academic vs. vocational education



Source: Survey of Public Opinion on Education 2019-2020. Notes: The figure shows the differences between the expected returns to academic vs. vocational education at age 30 or 50 and the actual return to academic vs. vocational education calculated from the Swiss Labor Force Survey 2019 (short-cut estimates of returns).

Table 5: Logistic regressions for preferences for academic vs. vocational education

	(1)	(2)	(3)	(4)	(5)
Female	0.0003 (0.0254)	-0.0004 (0.0254)	0.0004 (0.0253)	-0.0023 (0.0253)	0.0001 (0.0252)
Age (reference: 18-29)					
30-39	0.1377** (0.0451)	0.1340** (0.0452)	0.1361** (0.0450)	0.1384** (0.0448)	0.1391** (0.0445)
40-49	0.1656*** (0.0413)	0.1572*** (0.0415)	0.1529*** (0.0417)	0.1564*** (0.0414)	0.1464*** (0.0415)
50+	0.2025*** (0.0414)	0.1924*** (0.0416)	0.1889*** (0.0418)	0.1906*** (0.0415)	0.1836*** (0.0415)
Educational background (reference: obligatory)					
Vocational	-0.1275* (0.0578)	-0.1412* (0.0580)	-0.1544** (0.0593)	-0.1455* (0.0577)	-0.1583** (0.0582)
Academic	0.1639** (0.0601)	0.1569** (0.0603)	0.1455* (0.0616)	0.1600** (0.0599)	0.1492* (0.0605)
Monthly household income (reference: less than 6,000)					
6,001-10,000	0.0179 (0.0340)	0.0196 (0.0340)	0.0141 (0.0341)	0.0143 (0.0338)	0.0037 (0.0338)
More than 10,000	0.0450 (0.0365)	0.0514 (0.0366)	0.0450 (0.0370)	0.0485 (0.0365)	0.0313 (0.0371)
Parent	0.0007 (0.0318)	0.0013 (0.0318)	-0.0005 (0.0319)	-0.0007 (0.0316)	-0.0027 (0.0315)
Migration background	0.0925*** (0.0280)	0.0922*** (0.0279)	0.0936*** (0.0279)	0.0930*** (0.0280)	0.0966*** (0.0279)
Region of living (reference: German)					
French	0.0337 (0.0302)	0.0408 (0.0301)	0.0507 (0.0308)	0.0412 (0.0300)	0.0524 (0.0302)
Italian	0.0703 (0.0439)	0.0756 (0.0437)	0.0896* (0.0451)	0.0811 (0.0441)	0.1066* (0.0454)
<i>Age 30</i>					
Expected return		0.0691* (0.0275)			
Log(Expected wage academic)			0.1614*** (0.0488)		
Log(Expected wage vocational)			-0.0911 (0.0617)		
<i>Age 50</i>					
Expected return				0.0654** (0.0200)	
Log(Expected wage academic)					0.1822*** (0.0418)
Log(Expected wage vocational)					-0.0596 (0.0587)
Number of observations	1511	1511	1511	1511	1511

Source: Survey of Public Opinion on Education 2019.

Notes: The table reports average discrete probability changes for all explanatory variables after logistic regressions for the respondent's probability of preferring academic versus vocational education. All regressions control for a year effect (2020 vs. 2019) and missing income information. Robust standard errors are in parentheses. Significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$