To teach or not to teach? Working conditions, information and the supply of teachers

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June 2023

Abstract

Addressing teacher shortages and increasing the quality of the teacher workforce requires a thorough understanding of how potential (high quality) teachers decide whether or not to pursue a teaching career. This paper employs survey experiments to quantify the role of perceived working conditions, alternative career opportunities and social information in the career choice of students of teacher-training programs, of whom many opt for a different profession. We find that increasing career advancement opportunities and curricular autonomy would particularly increase the attractiveness of teaching to the best-performing teachers-in-training. Increasing curricular autonomy however might not be compatible with the commonly advocated pay-for-performance incentives based on standardized tests. Second, we find that the large heterogeneity in perception of teachers' working conditions plays a decisive role in teachers-in-trainings' career choice. Finally, an information treatment about the appreciation of teachers by the general public increased teachers-in-training' willingness to become a teacher over their preferred alternative career by 3.6% of a teacher's salary.

Keywords: Teacher supply, teacher quality, working conditions, discrete choice experiment, information experiment

1 Introduction

Education systems across the globe face persistent shortages of teachers (OECD, 2018). Nearly one out of three 15-year-old students in OECD countries is enrolled in a school faced with a shortage of teachers that is harming students' learning (OECD, 2018). While not all education systems face general teacher shortages, most do in specific fields such as STEM and special education, and in the most disadvantaged communities (James and Wyckoff, 2022). Additionally, teacher quality is recognized to be be the most important input to a quality education, but heterogeneity in teacher quality is high (Chetty et al., 2014; Gilraine & Pope, 2021; Hanushek, 2011). Multiple years of below average teachers sets a student back the equivalent of a full learning year, while above averages teachers can fully compensate the disadvantage associated with a lower socio-economic background

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(Hanushek, 2011). Improving the working conditions of the teaching profession is considered an important intervention to address these shortages in (quality) teachers (Chetty et al., 2014; Gilraine & Pope, 2021). Effectively designing these interventions however requires a thorough understanding of how potential (high quality) teachers decide whether or not to become a teacher. This paper quantifies how perceived working conditions, alternative career opportunities and social information influence the career choice of potential teachers.

A sizeable economic literature using large scale administrative data has emphasized the importance of the salary in alternative career opportunities in shaping the decision to become and stay a teacher (Boyd et al., 2013; Loeb and Page, 2000; Murnane and Olsen, 1989; Neugebauer, 2015). However, this literature is limited in its ability to consider the importance of other working conditions than salary, either because they are difficult to measure using administrative data or because they vary little between schools due to the almost uniform nature of teacher contracts (Johnston, 2020). A more recent strand of literature tackles this limitation by employing discrete choice experiments to quantify the preferences of in-service teachers for various working conditions (Ansyari et al., 2022; Burge et al., 2021; Burke et al., 2015; Fuchsman et al., 2023; Johnston, 2020). However, by focusing on the preferences of in-service teachers for different teaching jobs, their results pertain to the choice of schools rather than the decision to become a teacher. To understand how to increase the selection of high quality potential teachers into teaching requires studying a population which has not decided to become a teacher and on which we have data on their preference for working conditions, their alternative career opportunities and their quality as a teacher.

This paper contributes to this literature in two major ways. First, we carry out a series of discrete choice experiments on the preferences for different general and teaching-specific working conditions among more than 600 students in teacher-training programs. These teachers-in-training are an insightful population, as their relative performance in teaching internships provides a proxy for teacher quality while many of them opt for a different career (Carlo et al., 2013; Hanushek, 1997; Kyriacou et al., 2003). Additionally, increasing their entrance rate into the teaching profession would be particularly cost-effective as sizeable investments in their training have already been made. We also use the results of the discrete choice experiment to simulate how a range of concrete policy measures would influence the attractiveness of the teaching profession. Second, we combine the willingness-to-pay estimates for different working conditions from the discrete choice experiment with teachers-in-training perceptions of these working conditions both in a career as a teacher and in their preferred alternative career. Taking into account the individual-specific nature of alternative career opportunities allows us to quantify the extent to which different working conditions influence teachers-in-trainings' career choice.

A career is however not only chosen by rationally trading off different working conditions. The effect of a career on one's social image and identity matter as well, particularly to students (Damgaard & Nielsen, 2018). In a second part of the paper, we design and carry out an information experiment to estimate the effect of informing teachers-in-training about the appreciation of teachers by the general public, which teachers tend to underestimate (OECD, 2014). As an outcome variable, we use both teachers-in-training' willingness-to-pay to become a teacher over their preferred alternative career and their stated likelihood of becoming a teacher. While most information experiments in higher education have focused on its effect on major choice, we study its potential to influence career choice after graduating (Damgaard & Nielsen, Wiswall & Zafar, 2015).

Three findings stand out. First, we find that the best performing teachers-in-training particularly value career advancement opportunities and curricular autonomy. This implies

that improving these two working conditions would increase the selection of high quality potential teachers into the profession. Investments in curricular autonomy are particularly attractive due to their low direct costs, however they might be difficult to combine with a strong focus on pay-for-performance based on standardized tests which incentivizes maximizing effort into teaching the centralized curriculum (Han, 2018). Second, we find that teachers-in-training have highly heterogeneous perceptions of the working conditions of a teacher. This heterogeneity cannot be explained by objective characteristics such as education level, but has a large influence on the attractiveness of the teaching profession. Finally, we find that teachers-in-training underestimate the public appreciation of teachers. Correcting this bias with an information treatment increased their willingness-to-pay to become a teacher by 3,6% of a teacher's salary.

The rest of this paper is organized as follows. Section 2 present the design of the survey, including the discrete choice experiments and information experiment. Section 3 describes the methodology and sample. Section 4 present the results, which are then summarized and further discussed in Section 5.

2 Survey and experimental design

2.1 Discrete choice experiment

To estimate pre-service teachers' valuation of a range of working conditions, we design a series of discrete choice experiments. Discrete choice experiments can measure preferences for a wide range of attributes with high statistical power. Respondents repeatedly choose between hypothetical alternatives, each described by a list of attributes. Their choices are then estimated as a function of these attributes. Using discrete choice experiments provides more reliable estimates than other stated preference methods (Feld et al., 2020). Discrete choice experiments' validity in predicting real-world choices in labour market settings has been repeatedly established (Johnston, 2020; Maestas et al., 2018; Mas and Pallais, 2017; Wiswall and Zafar, 2018).

In this discrete choice experiment, pre-service teachers repeatedly choose between two hypothetical jobs. The experiment consists of two different choice settings, called 'decks'. A first deck consists of a series of choices between two unlabelled jobs, as for example in Maestas et al. (2018). This deck measures preferences for four job attributes not specific to the teaching profession, but are often stated reasons for (not) becoming a teacher: (i) workload, (ii) opportunities for career advancement, (iii) frequency of working with young people and (iv) salary (Carlo et al., 2013; Fray and Gore, 2018; Hargreaves et al., 2007; Heinz, 2015; Kyriacou et al., 2003; Saks et al., 2016). A high workload is an important reason of excessive stress, emotional exhaustion and burnout among teachers, and negatively affects their ability to teach (Cunningham, 1983; Jerrim and Sims, 2021; Smith and Bourke, 1992; Van Droogenbroeck et al., 2014). Career advancement opportunities are especially important to older teachers, and might in particular help attract male teachers and high ability teachers (Dolton et al., 2018; OECD, 2005). Being able to work with young people is often cited as one of the most important reasons for becoming a teacher (Fray and Gore, 2018; Haubrich, 1960; Heinz, 2015). Including this attribute allows us to assess the relative importance of working conditions to intrinsic and altruistic reasons in pre-service teachers' career choice. If we find that certain working conditions are more important than one of the most important sources of motivation, we can expect that working conditions are also more important than the other sources of altruistic or intrinsic motivation, such as making

Figure 1: Example of a question in the discrete choice experiment from deck 1

Below you can find two hypothetical job offers. They are identical on all dimensions not described. Which job would you prefer?

- Job A
- Job B

Job A	Job B
Average amount of time for things beside work	Little time for things beside work
Little opportunities for career advancement	Many opportunities for career advancement
Almost never working with young people	Frequently working with young people
€2000 per month	€2200 per month

a contribution to society or teaching ability. Including salary as an attribute allows us to express the preferences for other attributes in terms of willingness-to-pay. Table 1 shows an example of a choice-set from deck 1.

The second deck consists of a series of choices between two teaching jobs. This deck measures preferences for three job attributes specific to the teaching profession also stated as reasons for (not) becoming a teacher: support from school team, time spent on maintaining order during class which we use as a numerical approximation of difficult student behavior[1], and autonomy over curriculum (Carlo et al., 2013; Fray and Gore, 2018; Kyriacou et al., 2003). Difficult student behavior, and especially managing a classroom, is an important cause of stress and burnout, and scares off many potential teachers (Cunningham, 1983; Kyriacou et al., 2003; Manthei et al., 1996; Smith and Bourke, 1992; Van Droogenbroeck et al., 2014). Support from the school team on the other hand is considered as an important remedy to excessive stress and burnout, especially among early career teachers (Burke et al., 2015). Curricular autonomy is generally rated as less important than job attributes such as salary and workload (Carlo et al., 2013). However, it is an interesting attribute to study as changing teachers' autonomy costs little relative to increasing salaries or decreasing workload. Additionally, its relevance is high given the increase of accountability policies such as financial incentives on students' performance on standardized testing in the last decades, which has been argued makes the teaching profession less attractive by reducing its autonomy as as a professional (Parcerisa et al., 2022; Strong and Yoshida, 2014). All the attributes of the

[1]The advantage of having numerical variables in the discrete choice experiment is that their effect can be estimated by only one coefficient. Categorical variables on the other hand require different coefficients for each level

first two decks and their values can be found in table A1. Table 2 shows an example of a choice-set from deck 2.

Figure 2: Example of a choice set in the discrete choice experiment from deck 2

Teaching job A	Teaching job B
8 minutes per class spent maintaining order	3 minutes per class spent maintaining order
Almost no support from school team	A lot of support from school team
50% of classes for own learning goals	5% of classes for own learning goals
€2300 per month	€1900 per month

Using these attributes and their possibly values, we construct 15 choice-sets for deck 1 and 18 choice-sets that maximize statistical efficiency using a D-efficient design (Louviere et al., 2000). These choice-sets were divided into three blocks, such that each respondent answered to 5 choice-sets from deck 1 and 6 from deck 2, to prevent answering fatigue (Bech et al., 2011). To limit concerns of omitted variable bias, respondents are instructed that all attributes not listed are identical for all alternatives (Wiswall and Zafar, 2018). In a pilot study, all 96 participants stated having no problems understanding or following the instructions of the discrete choice experiment.

2.2 Concrete policy changes

To answer research question 4, the survey measured pre-service teachers' perception of how concrete policy changes would affect the working conditions of teachers. We then estimate the value placed upon these changes in working conditions in terms of an equivalent salary increase (or 'willingness-to-pay') using the results of the discrete choice experiment. Three of the policy measures aims to reduce teachers' workload, while on policy measure aims to increase their career advancement opportunities.

The first policy change consisted of having 'an assistant for four hours per week that can help with supervision, corrections and administration' aimed at reducing teachers' workload. The rationale for the use of assistants to lower teachers' workload is similar to the rationale for the increasing role of nurses in healthcare provision. Nurses can be drawn from a different pool of candidates, and can take over doctors' work at a lower cost (Daly and Carnwell, 2003). However, for assistants to be a cost-effective investment in teacher welfare, the increased welfare of teachers should be large enough to justify their costs. Otherwise, other policy measures will be able to increase teachers' welfare more at the same cost. The use of assistants in education is not new, but their role in Flemish education remains limited.

The second policy change consisted of providing teachers with a 'computer-based personalized learning trajectory with incorporated incorporated evaluation and differentiation' to

reduce teachers' workload. The choice of this policy change was motivated by the growing literature on computer-based personalized learning, which finds it can generally achieve similar learning gains at a lower cost if sufficient attention is paid to the learners engagement with the course material (Nguyen, 2015; Tsay et al., 2018; Xie et al., 2019). Teachers could use this material to both reduce and shift their workload, or, as the formulation of the policy change emphasized, they could opt not to use it.

The third policy change to reduce teachers' workload consisted of providing teachers with opportunities to cooperate with teachers from different schools on lesson preparation and tests. Teacher collaboration is seen as an important component of educational quality, but opportunities for cooperating within a school can be limited in the context of secondary education where teaching is course-specific (Goddard et al., 2007; Vangrieken et al., 2015). Cooperation between schools, also referred to as professional learning communities, is seen as an important component of an education systems that fosters teachers collaboration in order to improve educational quality (Lomos et al., 2011). One important advantage of teacher collaboration aside from decreased isolation is to increase their knowledge and facilitate cooperation on shared tasks, which can reduce teachers' workload (Vangrieken et al., 2015).

The final policy change aims to improve teachers' career advancement opportunities by providing teachers with 'the option to promote to head teacher with coordinating and supervision tasks, compensated by a lower teaching workload'. This type of multi-level teaching career might seem obvious, but many education systems, including Flanders, still have no career advancement opportunities within teaching (Eurydice, 2018). No previous research has quantified the extent to which this would improve the attractiveness of the teaching profession.

To prevent answering fatigue, each respondent was randomly assigned to rate the effect of one out of four policies.

2.3 Questions on perceived working conditions and background characteristics

Aside from the discrete choice experiment and policy changes, the survey contained two other groups of question.

To answer research question 2, the survey asks to students to rate how they perceive the general job attributes, for example workload, to be both in a career as a teacher and in their preferred alternative career. The perception of teacher-specific job attributes was only asked for a career as a teacher, as they by definition do not exist in the respondents' preferred alternative career. In the discrete choice experiment, the categorical job attributes contained only two or three possible values to allow for sufficient precision in the estimation. To capture a more nuanced perspective, these perception questions allow respondents to rate a job attribute in between two attribute values.[2][3]

To measure heterogeneity in pre-service teachers' preferences, the survey contained questions on three important background characteristics: students' gender, the domain in which

[2]Rather than ascribing labels to these additional values, we instruct respondents that these additional values can be interpreted as somewhere in the middle between the two other values. This allows us to confidently assume that the valuation of these 'in between' values is the average of the surrounding two values. This assumption is more difficult to justify when ascribing new labels. For example, one could argue that 'a little' does not signify the midpoint between 'almost none' and 'some', but it closer to 'almost none'.

[3]The perceived frequency of working with young people as a teacher was not included to prevent the survey from being too long which decreases response quality (Galesic and Bosnjak, 2009), as this is naturally 'frequently'.

they would teach, and their average grades on internship courses. Rather than directly asking students for their grades, we ask their informed consent, which a large majority provided, to retrieve this information from the universities' administrative data in order to improve its accuracy. This variable is, however, only observed for students studying to teach in upper secondary education, where teaching internships represent about a quarter of the program's credits. To take into account different scoring practises in different courses, we use students' relative GPA compared to the course-specific mean in terms of standard deviations using administrative data on the grade distribution on that internship course in the past three years. We believe that performance on course internship, which is evaluated both by higher education teaching personnel and teachers in secondary education, is a reasonable approximation of teacher quality. It is more holistic than the commonly used teacher quality measure of learning gains on their students' standardized test scores, though both measures are correlated (Hanushek, 1997).

2.4 Willingness-to-pay to be a teacher

A third and final deck of the discrete choice experiment consists of a series of choices between a job as a teacher and students' individual-specific preferred alternative career.[4] The only other attribute that varies is the jobs' salaries. This allows us to estimate an willingness-to-pay for becoming a teacher over the individual's preferred alternative career, which can be interpreted as students' preference overall career preference in terms of the maximum salary difference they would be willing to tolerate before opting for the other career.[5] To maximize the information gathered, we adopt a tailored approach in presenting salary differences to the respondents based on their previous choices. For instance, if students indicate a preference for working as a teacher when the salary is equal to their preferred alternative career, the subsequent choice-set would feature a preferred alternative career with a salary €500 higher than before. This methodology ensures that respondents are provided with relevant and context-specific scenarios, enhancing the accuracy and depth of their responses. Moreover, this method allowed us to identify individual-specific upper and lower bounds for students' WTP to become a teacher. Only in the case where students' WTP for one of the jobs exceeded €1000 in net monthly salary can we not construct an upper bound.

2.5 Information experiment

When making career choices, individuals consider the impact on their image and identity. This information experiment focuses on assessing how providing information about the image of the teaching profession affects the career preferences of pre-service teachers. Specifically, the treatment group receives information regarding the ranking of teachers in the general population in terms of (i) trustworthiness and (ii) the perceived value of their contribution to society. By examining the influence of this information on pre-service teachers, we gain insights into the role of societal perception in shaping career preferences. Teachers are consistently ranked as one of the most trustworthy professions, together with nurses, doctors (see for example Gallup (2022)). Additionally, more people rate teachers' contribution to

[4]About 3% of students failed to follow instructions concerning their preferred alternative career (which they explicitly reported). They were either unrealistic (i.e. CEO as a starting job) or did not report anything. These respondents were dropped from the analysis.

[5]It is possible that students only consider 'home production' as an alternative to working as a teacher, which doesn't come with a salary. However, only one student stated home production as their preferred alternative to working as a teacher. This student was subsequently dropped from the analysis.

society as large (72%) as they do for doctors (66%), scientist(65%), engineers (64%) and journalists (28%) (Pew Research Center, 2013).

The information was presented to the students in the form of a quiz. Initially, they were asked to indicate where they believed the general population ranked teachers in terms of trustworthiness and their contribution to society compared to other professions. Subsequently, the correct information was provided. This quiz format offers two key advantages. First, by prompting students to actively reflect on their own perception of teachers' public image, they may become more receptive to changing their beliefs upon receiving accurate information. Second, the quiz format enables us to ascertain whether students in the treatment group were initially misinformed or not, as we have a baseline of where they ranked teachers on these dimensions. This facilitates the interpretation of any null effects of the treatment, allowing us to determine whether the information was inconsequential or if students were already correctly informed.

3 Methodology and sample

3.1 Estimating preferences for job attributes

To estimate students' preferences based on their responses to the choice experiments, we employ a mixed logit model with correlated coefficients. This highly flexible model can approximate any random utility model (Train, 2009).[6] Consider a standard random utility model of choice, where the utility of an alternative i from a choicest t to an individual n, U_{nit}, consist an observable utility component V_{nit} and an unobservable component ϵ_{nit}:

$$U_{nit} = V_{nit} + \epsilon_{nit} \tag{1}$$

Assuming that the unobservable utility components are independently and identically type I extreme value distributed gives the closed form expression for the choice probabilities known from McFadden (1974)'s conditional logit model, with P_{nij} the probability that individual n chooses alternative i over J other alternative and observable utility V_{ni} a linear function of the observed variables x_{ni} and its coefficient matrix β:

$$P_{nij} = \frac{e^{\beta' x_{ni}}}{\sum_{j=1}^{J} e^{\beta' x_{nj}}} \tag{2}$$

The mixed logit model generalizes the conditional logit model by assuming that preference coefficients differ between individuals, but are drawn from a common distribution $f(\beta|\theta)$. Rather than estimating the coefficients directly, the model estimates the parameters that define their distribution θ. The choice probabilities are now the traditional logit probabilities integrated over the possible values of β weighted by its density function $f(\beta)$ (Train, 2009):

$$P_{nij} = \int \left(\frac{e^{\beta' x_{ni}}}{\sum_{j=1}^{J} e^{\beta' x_{nj}}} \right) f(\beta) d\beta \tag{3}$$

The three main advantages of mixed logit over the conditional logit model are that it (i) estimates heterogeneity in preferences, (ii) relaxes the independence of irrelevant alternatives

[6] It is in fact more general than the 'generalized multinomial logit model', despite what its name would suggest (**?**).

assumption, and (iii) accounts for the panel structure of discrete choice experiment data (Lancsar et al., 2017; Train, 2009). It can approximate any random utility model (Train, 2009).

When specifying the distribution of preference coefficients, we adopt a log-normal distribution for variables where we anticipate a non-negative effect and when it improves the overall model fit, which consistently occurred. For all other coefficients, we specify a normal distribution, except for the coefficients related to salary preferences and interaction effects. These coefficients are assumed to be nonrandom, following a common practice in the literature (Lancsar et al., 2017). Specifying preferences for salary as random complicates the distribution of willingness-to-pay estimates and led only to a marginal improvement in model fit. Specifying interaction effects to be random greatly increases the amount of parameters to estimate leading to cases of non-convergence in the heterogeneity analysis. Parameters are estimated by simulated maximum likelihood using 500 Halton draws as recommended by Hole (2008). Finally, we estimate individual-level coefficients using the mean of the coefficients' distributions conditional on the individual's choice pattern (Hole, 2007; Train, 2009) to estimate the distribution of the role of different job attributes rather than only mean effects. Because mixed logit models can produce unreliable tail estimates for log-normally specified coefficients (Revelt and Train, 1998), we report both median and mean estimates.

In addition to preference coefficients, we report students' willingness-to-pay for attributes. This willingness-to-pay can be interpreted as the salary difference at which the student would be indifferent between having the attribute and not having the attribute but having a higher salary. Willingness-to-pay is estimated by dividing the preference coefficient for the attribute by the preference coefficient for salary. Standard errors are computed using the Delta method.

3.2 Estimating the role of job attributes in the choice of career

The discrete choice experiment allows us to estimate how pre-service teachers' value different job attributes. However, this does not yet provide us a full picture on the role of these job attributes in their career choice. For example, pre-service teachers might only place a modest value on career advancement opportunities, but career opportunities might nevertheless be important in their career choice if the other career(s) they consider have significantly more career opportunities than a teaching career.

We use two measures to describe the role of job attributes in the career choice of pre-service teachers: decisiveness and effect. The decisiveness of a job attribute refers to the extent to which it influences pre-service teachers' career choice, irrespective of whether this influence is predominantly negative or positive. The effect of a job attribute refers to the extent to which it on average increases or decreases the attractiveness of the teaching profession relative to the preferred alternative career. Estimating both these measures requires combining results from the discrete choice experiment and the perception of that job attribute both as a teacher and in the preferred alternative career.

We estimate the effect of a general job attribute by the average willingness-to-pay for the difference between how that job attributes is perceived in a teaching career and in the preferred alternative career. In other words, the effect measures the differences in the perceived value of the working conditions, but weights this differences by how much these working conditions are valued. For example, if a person expects to have a lower workload in their preferred alternative career and values this lower workload equivalently to a 5% higher salary, then workload would for that person have a negative effect equivalent to a 5% lower salary. We thus use willingness-to-pay as a common numeric scale in which to express the effect of

different job attributes.

The decisiveness of a general job attribute is the average of the absolute value of the effect of that job attribute. By taking the absolute value, the decisiveness measures whether the job attribute was important in a person's career choice, regardless of in which career the job attribute is perceived to be more favorable. The decisiveness of a general job attribute is thus always positive. [7]

Equation (1) and (2) formally represent how these two measures describing the role of the general job attributes are estimated. $\beta_{i,X}$ is the preference coefficient of individual i for attribute X, while $\beta_{i,salary}$ is the preference coefficient of i for salary. Both can be derived from the mixed logit analysis of the discrete choice experiment. Dividing these two coefficients ensures that results are expressed in terms of willingness-to-pay. $X_{i,teach}$ and $X_{i,PAC}$ refer respectively to the perception of job attribute X in a career as a teacher and the respondents' preferred alternative career (PAC). N is our sample size. Standard errors are obtained using a bootstrap procedure of 500 iterations.

$$Effect_{general} = \frac{1}{N} * \sum_{i=1}^{N} \frac{\beta_{i,X}}{\beta_{i,salary}} * (X_{i,teach} - X_{i,PAC}) \tag{4}$$

$$Decisiveness_{general} = \frac{1}{N} * \sum_{i=1}^{N} \frac{\beta_{i,X}}{\beta_{i,salary}} * |X_{i,teach} - X_{i,PAC}| \tag{5}$$

$$Decisiveness_{teach-spec.} = \frac{1}{N} * \sum_{i=1}^{N} \frac{\beta_{i,X}}{\beta_{i,salary}} * \sigma_X \tag{6}$$

The role of teacher-specific job attributes is different. As they by definition do not exist in respondents' preferred alternative career, we cannot use the same measures as for the general job attributes. One can however conceive an alternative formulation of their decisiveness by looking at how the heterogeneity in the perception of these job attributes influences the choice of careers. For example, different pre-service teachers might have different perceptions of how much support they will receive from an average school team. The decisiveness of this attribute then describes to what extent the differences in these perceptions influence the choice of career. Using the standard deviation of the perception of this attribute as measure of heterogeneity, σ_X, leads to the following formulation of the decisiveness of a teacher-specific job attribute in the choice of careers:

3.3 The sample

The survey, comprising the discrete choice experiment and additional questions, was administered to pre-service teachers through a collaboration with three Flemish higher education institutions. Among these institutions, two are universities of applied sciences offering three-year bachelor programs to become teachers in kindergarten, primary education, or lower secondary education. The third institution is a research university providing a one-year master's program for individuals who have already completed at least a bachelor's degree in a specific subject, preparing them to become teachers in upper secondary education. To-

[7] The decisiveness could in principle be zero as well, if the job attribute is always perceived to be exactly the same in both careers.

gether, these institution enrol about a quarter of Flemish higher education students. Using data from three different institutions increases the external validity of our results.[8]

To encourage participation, the research university and one of the universities of applied sciences utilized lottery-based incentives and verbal encouragement during class hours. Consequently, the response rate reached 28% and 15% of the population respectively. The other university of applied sciences took the approach of allocating in-class time to selected groups of students for survey completion, mitigating potential self-selection biases.Differences in results between different institutions were small, suggesting that self-selection did not play an important role in the other two institutions. As a result, a total sample size of 620 pre-service teachers was obtained.

Table A2 describes some of the background variables of our sample. With respect to gender and scholarship, our sample closely matches the sampling population. 77.2% of our sample consists of students studying to become a teacher in secondary education rather than primary education or kindergarten. The underrepresentation of primary education and kindergarten pre-service teachers was too large to reweigh the sample as to be representative for the teacher population. We therefore limit the analysis of the choice experiments to pre-service teachers for secondary education. Additionally, not all teaching domains are equally represented. To ensure a balanced and representative sample of pre-service teachers for secondary education, we employ Hainmueller (2012)'s entropy reweighing procedure. This procedure allows us to reweigh the sample, addressing the issue of over- or underrepresentation among the teaching domains. Finally, to improve the validity of our results, we limit our analysis to the subset of 218 students who have expressed their intention to work next year. Their career preferences are most relevant to understanding why many pre-service teachers do not opt for the teaching profession. The career preferences of pre-service teachers earlier in their education might still change up until the point where they graduate and choose a first career.

4 Results

4.1 Pre-service teachers' preferences for job attributes

To understand how pre-service teachers decide on whether or not to pursue a teaching career and how to influence that choice, we need to understand how they value certain job attributes. This section estimates pre-service teachers' willingness-to-pay (WTP) for a range of general and teacher-specific job attributes using the results of the discrete choice experiment. Additionally, we consider how this willingness-to-pay differs among those populations policymakers might particularly want to reach: STEM teachers, male teachers and the best-performing pre-service teachers.

Main estimates

Figure 3 describes the median WTP estimates for these job attributes based on these coefficients from the mixed logit analyses. The WTP estimates are expressed in terms of % of teachers' net starting salary. Tables A3 and A4 show the full results of the mixed logit analyses with mean coefficients and standard deviations.

[8] In Flanders, enrolment into higher education is not selective, so differences in students between higher education institutions are generally limited.

The WTP estimates for the general job attributes of deck 1 are large, showing that these are important determinants of pre-service teachers' career choice. The median WTP estimate is highest for the workload attribute. To the median pre-service teacher, having an 'average amount of time' for things beside work rather than 'little time' is equivalent to 18% of a teachers' monthly net salary. Having 'a lot of time' rather than an little time' is valued equivalently to 30% more salary. The other two general attributes, working with young people and having a lot of opportunities for career advancement, were valued similarly. The median WTP for these attributes is about 10% of teachers' net starting salary. However the mean WTP for career advancement opportunities is larger than the mean WTP for working with adolescents, at 17% vs. 10% respectively.[9] The standard deviations for all effects are statistically significant and relatively large. This highlights how these median and mean preferences hide substantial heterogeneity.

Teacher-specific job attributes are highly valued as well. The median pre-service teacher places considerable importance on receiving "some" or "a lot" of support from the school team, valuing these attributes at approximately 9% and 12% of a teacher's net salary, respectively. Having some support thus is crucial, but its added value diminishes with the amount of support. Disruptive behavior seems less important. Having to spend 3 or 6 minutes less per class on keeping order is valued at 3% and 5%. This might be explained by the fact that previous research that emphasized the importance of this job attribute often came from those who did not opt for the teaching profession nor undertook any teacher education (Hargreaves et al., 2007; Saks et al., 2016). Those who do undertake a teacher education thus seem less averse to more difficult student behavior. Finally, having more autonomy over the curriculum is valued highly. Being able to decide over 15 or 30 percentage points of class time more on the learning goals yourself is valued to 5 or 10% of teachers' starting salary. For all coefficients except those describing support from the school team, the standard deviations as estimated by the mixed logit model are significant, again implying substantial preference heterogeneity among pre-service teachers.

Heterogeneity analysis

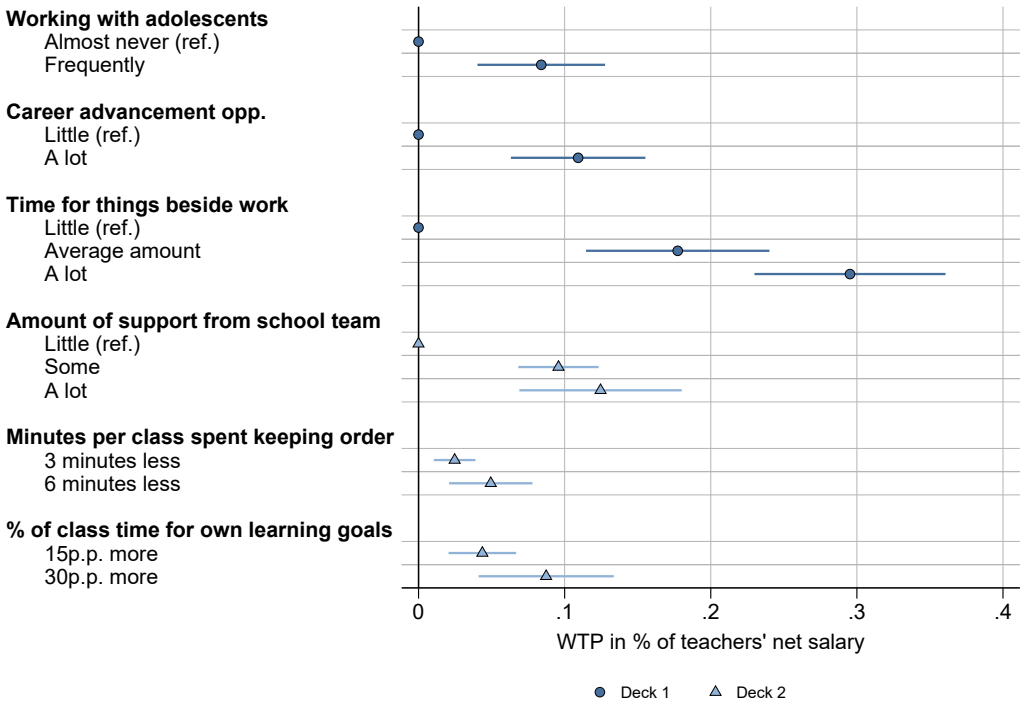
Understanding how career preferences differ between different pre-service teachers can help us understand why some groups are less likely to opt for the teaching profession, and how policymakers can help make the teaching profession more attractive to specific groups.

Tables A5 and A6 describe for deck 1 and deck 2 respectively the heterogeneity in job preferences. Each specification considers the interaction of each attribute value from the main specification with respect one of three background characteristics: gender, whether the student is studying to teach STEM courses and their relative GPA on teaching internships.

We find that students who perform above average in their teaching internship have substantially different preferences. First, students who performed better in their teaching internships value career advancement opportunities notably more. Specifically, students with a GPA on teaching internships that is standard deviation (SD) higher than the course-specific mean value having a lot of career advancement opportunities at 25% of teachers' net starting salary, compared to the valuation of an average student of 14%. Second, students who performed better in their teaching internships also value curricular autonomy more. While the average student values being able to spend 20% of their class time on their own learning goals at 8% of a teachers' net salary, a student who performed one SD higher on their teaching

[9]This difference remains significant when we specify the coefficient of working with adolescents to also be log-normal.

Figure 3: Median willingness-to-pay (WTP) estimates for job attributes from deck 1 & 2



Notes: WTP can be interpreted as the extra salary at which the individual is indifferent between having the job attribute and not having the job attribute having the extra salary. WTP expressed in % of teachers' net starting salary. 95% confidence intervals are estimated using the Delta method. The zero estimates without a confidence interval represent the reference value of the attributes.

internships values this at 17%, a difference of a factor of two. These are important results, given the size of the effects and the crucial role of teacher quality in education.

With respect to other attributes and background characteristics, we find that STEM teachers value having some support from the school team more and that men value having a lot of support from the school team less than their respective counterparts. Both male and STEM teachers are also more averse to having to spend a lot of class time on maintaining order. The size of these differences however is smaller than those previously discussed.

Male teachers also value curricular autonomy about 25% more than female teachers. Enhancing curricular autonomy could thus both increase the inflow of best potential teachers and male teachers, improving both the representativeness and quality of the teaching profession. Note that male pre-service teachers do not significantly score better on teaching internships than their female counterparts. The fact that both men and those who score better on teaching internships value curricular autonomy more thus does not reflect any gendered bias by the evaluators of the teaching internships.

4.2 Perception of the job attributes as a teacher and in the preferred alternative career

The previous section demonstrated pre-service teachers' valuation of different job attributes. To understand the role of these job attributes in their career choice, we also need to know how they perceive these job attributes in a career as a teacher and in their preferred alternative career. For example, we now know that pre-service teachers highly value workload, but the role of workload in their career choice will be determined by the size and direction of the difference in workload between a career as a teacher and their preferred alternative career. Additionally, we explore to what extent differences in the perception of these job attributes can be explained by a range of background characteristics.

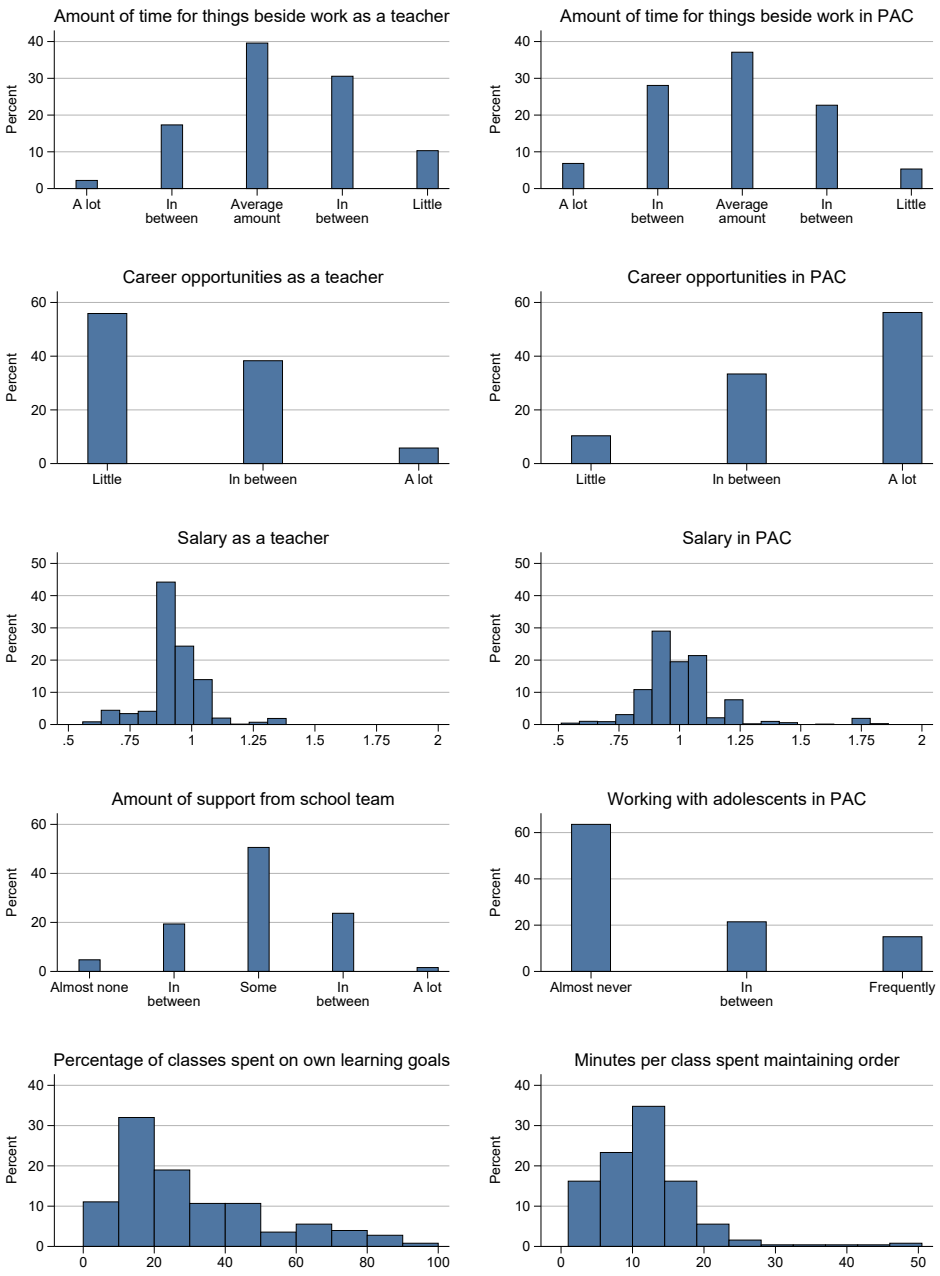
Overall results

Figures 4 plots the perceived general job attributes both as a teacher and in the pre-service teacher's preferred alternative career. Additionally it plots the perception of the teacher-specific job attributes.

The average pre-service teacher perceives two of the general attributes under consideration to be substantially more favorable in their preferred alternative career compared to a teaching career: career advancement opportunities and salary. The majority of respondents expect little career advancement opportunities as a teacher, but a lot of career advancement opportunities in their preferred alternative career. Overall, 69% of the respondents believe that they would have more career advancement opportunities in their preferred alternative career than as a teacher. Only 7% holds the opposing view. Additionally, the average pre-service teacher believes they would earn about 11% less per month starting as a teacher than they would do in their preferred alternative career. Only 23% believes they would earn more as a teacher. This heterogeneity is not only a consequence of different expected salaries in respondents' preferred alternative career, but also because many respondents have a different perception of what a teacher earns.

The perceptions of teachers' (relative) workload is more nuanced. The figure indicates how the distribution of the perceived workload as a teacher is very similar though a bit higher than the workload in the PAC. While 43% of respondents expect to work more as a teacher, 34% expects to work the same amount and 24% expects to work less. The differences are

Figure 4: Perception of general job attributes, both as a teacher and in the preferred alternative career (PAC), and of teacher-specific job attributes



Notes: PAC refers to the pre-service teacher's preferred alternative career. Salary expressed in terms of a teacher's true starting salary. For example, if salary in the PAC is 0.75, the respondent estimates that their salary in their PAC is 25% smaller than the actual salary of a teacher.

also relatively small, with the mostly zero or one level differences on a scale of five. The average pre-service teachers thus expects to work more, but this difference is small and hides substantial heterogeneity. The perceived workload of a teacher is also quite heterogeneous. 37% of respondent believe teaching has an above average workload, while 18% believe it to have a below average workload.

The only job attribute considered in which the teaching profession is clearly preferable is the amount of time spent working with young people. The majority of pre-service teachers (63%) would almost never work with young people in their preferred alternative career. Only 16% believe they would do so frequently.

Regarding teacher-specific attributes, there exists substantial variability among pre-service teachers. In terms of curricular autonomy, the respondent at the 75th percentile anticipates dedicating approximately 40% of class time to their own learning goals, whereas the 25th percentile expects to be able to do so for only 15% of class time. Similarly, concerning classroom management, the 75th percentile foresees spending twice as much time on maintaining order compared to the 25th percentile, with estimates of 14 minutes versus 7 minutes respectively. The median perception of time spent on maintaining order is close to but slightly more pessimistic than actual teachers' time spent on maintaining order, at 10 rather than 8 minutes per class (Van Droogenbroeck et al., 2018). A lack of experience might explain (part of) this modest pessimism. With respect to the amount of support received from the school team, expectations are modest. 50% expects to receive 'some' support. Only 2% expects to receive 'a lot' of support, while 7% expects almost no support. This substantial heterogeneity in the perception of what it means to be a teacher might be an important reason why pre-service teachers (do not) opt for the teaching profession.

Heterogeneity

The results above show how the perceptions of the heterogeneity in the perceived job attributes of a teacher is sizeable. This raises the question to what extent these difference in perception are justified. For example, the national curriculum for some subjects might leave more room for teachers' own learning goals, and TALIS results find that teachers in lower education levels spend more class time on maintaining order (OECD, 2019).

Table A7 shows a series of regressions of all perceived attributes as a teacher as a function of the teaching domain and education level that pre-service teachers are studying for. We find that these variables explain relatively little of the heterogeneity in the perceived attributes as a teacher, with the R-squared of the regressions ranging from 0.15 to 0.02. Only the the education level has some explanatory power, with those in upper secondary rightfully expecting a higher salary and better student behavior, but also less career opportunities and curricular autonomy. Overall, these findings highlight how pre-service teachers studying for the same teaching position have substantially different expectations of what a teaching career entails.

4.3 The role of job attributes in the choice of career

Combining our estimates of pre-service teachers' valuation of job attributes with their perception of these job attributes allows us to assess the role of these job in their career choice. We consider both their decisiveness in this choice and their effect on the relative attractiveness of the teaching profession.

Table 1 presents the average effect and average decisiveness of general job attributes in the career choices of pre-service teachers. Figure 5 shows the distribution of the effect

Table 1: The role of general attributes in pre-service teachers' career choice

	Average effect	Average decisiveness
Workload	-0.033***	0.105***
	(0.006)	(0.022)
Career opportunities	-0.084***	0.098***
	(0.018)	(0.021)
Working with young people	0.081***	0.081***
	(0.015)	(0.015)
Salary	-0.108***	0.152***
	(0.000)	(0.000)
Observations	253	253

Notes: The average effect represent whether the attribute on average increases or decreases the preference to become a teacher over the individual's preferred alternative career. The average decisiveness represent whether the attribute plays a large role in this career choice, regardless of whether its effect is positive. It is estimated by the average absolute value of the effect. Both are expressed in terms of % of a teachers' starting salary.

of general job attributes on pre-service teachers' career choice. It plots at the individual level the perceived differences in the job attributes, weighted by the valuation of these job attributes as estimated using the discrete choice experiment. They are thus all expressed on the same scale, which allows for a comparison of their relative importance.

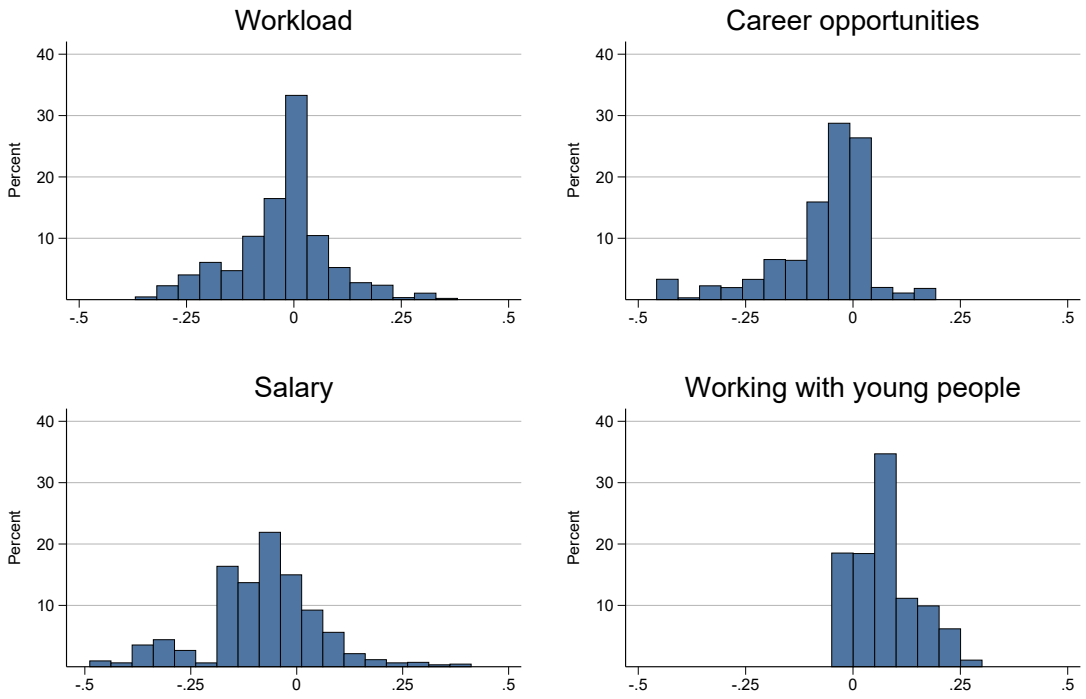
First, we find that workload is a decisive attribute in the choice pre-service teachers between a teaching career and their preferred alternative career. The difference in workload between the two careers under consideration is on average valued equivalently to a salary difference of 10.5% of a teacher's net starting salary. However, workload only has a relatively small negative effect on the preference to become a teacher over the preferred alternative career. Differences in workload were small and heterogeneous, with some also expecting a higher workload in their preferred alternative career.

Second, career advancement opportunities and being to work with young people are of similar decisiveness in pre-service teachers' career choice, but have the opposite effect. The lower career advancement opportunities in the teaching profession on average decrease the attractiveness of the teaching profession by an equivalent of an 8,4% lower salary. The higher opportunities to work with young people in the teaching profession on average increase its attractiveness by an equivalent of a 8.1% higher salary. Finally, perceived salary differences are the most decisive attribute, and generally to the disadvantage of the teaching profession.

Perceived teacher-specific job attributes such as student behavior cannot increase or decrease the attractiveness of the teaching profession, as they by definition are not present in respondents' preferred alternative careers. However, we can consider how heterogeneity in the perception of teaching-specific job attributes is decisive in pre-service teachers' career choice. Table 2 shows how a change of one standard deviation in the perceived value of teacher-specific job attributes influences the WTP to be a teacher.

Overall, these results show how heterogeneity in the perception of these teacher-specific job attributes plays a large role in the attractiveness of the teaching profession. One lower standard deviation in perceived curricular autonomy and one standard deviation higher in

Figure 5: Distribution of the effect of general job attributes on the relative preference for the teaching profession



Notes: Effect expressed in willingness-to-pay as a % of teachers' net starting salary.

Table 2: The importance of teaching-specific job attributes on preference for teaching profession

	WTP for one SD in perceived value
Support from school team	0.07***
	(0.02)
Time spent on maintaining order	0.10***
	(0.02)
Curricular autonomy	0.11***
	(0.02)
Observations	253

Notes: WTP expressed in terms of % of a teachers' starting salary. Standard deviation weighted by WTP as estimated using mixed logit analysis of discrete choice experiment

perceived time spent maintaining order are equivalent to 11 and 10% lower salary respectively. Having a 1,5 standard deviations lower perception of the amount of time spent maintaining order thus increases the attractiveness of the teaching profession by the equivalent of about 15% of a teacher's salary. This more optimistic perception of student behavior would thus fully compensate the average perception of the lower salary as a teacher. Heterogeneity in perceived support from school team is found to be the least important of the three teacher-specific job attributes. This follows from the fact that perceived support from school team is relatively homogeneous as highlighted in subsection 4.2. These results demonstrate the importance of individual-specific perceptions of the working conditions of teaching profession.

4.4 The effect of concrete policy changes

Previous results provided novel insights into how pre-service teachers decide on whether or not to become a teacher. This final results section considers how different policy measures could influence this decision, by assessing the effect of four concrete policy changes on their preference to become a teacher.

Figure A1 illustrates how each policy measure influences pre-service teachers' perception of the targeted attribute in a career as a teacher. Each policy measure results in a significant improvement in the specific attribute being targeted, though a sizeable minority also expects no noticeable effect. Table 3 provides a detailed description of the valuation of these improvements in the targeted job attributes, by combining the changes in job attributes with the valuation of these job attributes as measured by the discrete choice experiment

The provision of a computer-based personalized learning trajectory is regarded as the most valuable policy measure, with the reduced workload valued equivalently to 9.3% of a teacher's starting net salary. Pre-service teachers who express a desire to utilize this personalized learning trajectory for their students thus anticipate a significant decrease in their workload. This measure could be a highly cost-effective policy to increase teacher welfare, considering the limited costs involved after development due to their scalability. However, the ultimate desirability of this policy measure hinges on its impact on educational quality. In fact, the high anticipated decrease in workload can also be considered as a worrying sign that teachers will use these personalized learning trajectories more to reduce their workload than to shift their workload towards more personalized instruction.

The remaining three policy changes, being having an assistant, being able to promote to senior teacher and being able to cooperate with teachers from different schools, are valued similarly at approximately 4% to 5% of a teacher's salary. However, the valuation of the assistant policy falls below the threshold required to justify its cost. The estimated WTP for the assistant implies an hourly wage that is significantly below the minimum level (€5.2) necessary for it to be as cost-effective as a straightforward salary increase. Pre-service teachers would thus prefer a higher salary over additional support to carry out tasks such as supervision, administration and correction of tests and tasks. It is more difficult to estimate whether the other two policy changes would be cost-effective, though one would expect that facilitating cooperation between teachers of different schools could be done at relatively low costs and to have positive effects on students' learning as well.

5 Discussion & Conclusion

Understanding how pre-service teachers decide whether or not to become a teacher is needed to address the pressing issues of teacher shortages and the challenges in attracting male

Table 3: Effect of policy changes on WTP to become a teacher

Reducing workload	
Assistant for 4 hours per week that can help with supervision, corrections and administration.	0.05*** (0.01)
Computer-based adaptive learning trajectory available with incorporated evaluation and differentiation	0.09*** (0.02)
Opportunities of cooperating with teachers from different schools on lesson preparation and tests.	0.05*** (0.01)
Increasing career opportunities	
Option to promote to head teacher with coordinating and supervision tasks, compensated by a lower teaching workload	0.04*** (0.01)

Notes: Effect expressed in % of a teacher's starting salary.

teachers, STEM teachers and the best-performing pre-service teachers. A growing amount of economic studies stress the role of working conditions and the attractiveness of other careers in determining the supply of teachers. Previous literature using discrete choice experiments has provided precise valuations of a wide range of working conditions by in-service teachers, but has not considered how these valuation influences the decision of potential teachers on whether or not to become a teacher.

This study uses a novel combination of methodologies to address the limitations of these earlier strands of literature. We combine discrete choice experiments, which estimate the valuation of working conditions, with pre-service teachers' perception of these working conditions both in a teaching career and in their preferred alternative career. Together, these results provide novel insights into the role of working conditions in pre-service teachers' career choice. Five insights stand out, each with important policy implications.

First, the best performing pre-service teachers value having a lot of career advancement opportunities and a high degree of curricular autonomy significantly more. Having a lot of career advancement opportunities increases the attractiveness of the teaching profession on average equivalently to a 14% higher salary. On the other hand, a student with a GPA on their teaching internships that is one standard deviation higher than the mean values these same career opportunities equivalently to a 25% higher salary. The limited career advancement opportunities of teachers are thus pushing away those who could be particularly excellent teachers. Additionally, the increasing use of accountability policies that decrease teachers' autonomy over the curriculum for the sake of educational quality might be harming the most important input to educational quality: having good teachers. More encouragingly, these findings highlights how improving the career advancement opportunities and increasing curricular autonomy of teachers would increase both the quantity and the quality of teacher supply. Improving career advancement opportunities would also help improve the representativeness the teaching profession by attracting more male teachers.

Second, we find that the perception of the working conditions of a teacher such as work-

load, student behavior and curricular autonomy are highly heterogeneous. For example on student behavior, the 75th percentile expects to spend 14 minutes per class on maintaining order, while the 25th percentile expects to spend only half that time. This heterogeneity plays a decisive role in the career choice of pre-service teachers. Being one standard deviation more pessimistic about student behavior makes the teaching profession less attractive by the equivalent of a 10% lower salary. Differences in objective characteristics such as teaching domain and education level can explain only little of this heterogeneity. This suggests that some pre-service teachers are misinformed about the working conditions of the teaching profession. Improving the perceptions of those being overly pessimistic might be an effective way for those in teacher education to increase the supply of teachers. However, note that field experiments such as Ajzenman et al. (2021) show that this does not always work as expected. Correcting the perception of those being overly optimistic about working conditions might help soften the reality shock upon becoming a teacher, which can lead to burnout and attrition (Corcoran, 1981; Dicke et al., 2015; Friedman, 2000; Marso and Pigge, 1987; Voss and Kunter, 2020).

Finally, we estimate the effect of an information treatment about the appreciation of teachers by the general public on teachers-in-training' willingness-to-pay to become a teacher. We find that this treatment increases teachers-in-training' willingness to become a teacher over their preferred alternative job by 3.6% of a teacher's salary. Additionally, we estimate that it would lead to an increase in the supply of teachers by about 5 percentage points. A well-designed government campaign with a similar effect would already be sufficient to address the teacher shortage in many countries and could be particularly cost-effective.

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A Appendix

Table A1: Attributes & attribute values in DCE

Deck 1	Possible values
Net monthly salary	€1900-€2400 (in increments of €100) for students for upper secondary education
	€1800-€2300 (in increments of €100) for students for lower secondary & elementary education & kindergarten
Workload	A lot of time for things beside work
	An average amount of time for things beside work
	Little time for things beside work
Career advancement opportunities	Little possibilities to advance your career
	A lot of possibilities to advance your career
Deck 2	
Net monthly salary	€1900-€2400 (in increments of €100) for students for upper secondary education
	€1800-€2300 (in increments of €100) for students for lower secondary & elementary education & kindergarten
Support from school team	A lot of support
	Some support
	Almost no support
Autonomy in curriculum	% of class time free for own learning goals
	Between 5 and 50% in increments of 15
Students behavior	Minutes of class time lost to maintain order
	Between 3 and 18 minutes in increments of 5 (on total of 50)

Table A2: Sample characteristics

	Share (in %)	Observations
Background characteristics		
Male	43.2	398
Migration background	33.7	359
Scholarship	30.1	359
Plan to work next year	43.5	589
Educational level		
Kindergarten	6.9	577
Elementary school	15.9	577
Lower secundary	38.0	577
Upper secondary	39.2	577
Teaching domain in secondary education		
Economics & Business	15.1	251
Languages	22.3	251
STEM	17.1	251
Arts	9.6	251
Society	17.9	251
Sports	43.0	251
Vocational	7.2	251

Table A3: Mixed logit analysis of discrete choice experiment: deck one

	Mean	Standard deviation
Net salary (in % of teachers' starting salary)	14.32***	
	(3.47)	
Working with adolescents		
Almost never	ref.	
Frequently	1.44***	1.37***
	(0.39)	(0.40)
Time for things beside work		
Little	ref.	
Average amount	3.20***	2.50***
	(0.78)	(0.85)
A lot	4.63***	1.92**
	(0.96)	(0.81)
Career advancement opportunities		
Little	ref.	
A lot	2.41***	2.89**
	(0.61)	(1.46)
Number of choices	1115	

Notes: Dependent variable is the respondents' choices in the first deck of the discrete choice experiment. Independent variables are all the attributes describing the alternatives of this deck. The distribution of all effects with a standard deviation was specified to be lognormal except working with adolescents. * $p<0.10$, ** $p<0.05$, *** $p<0.01$

Figure A1: Perceived attribute values with and without four policy measures

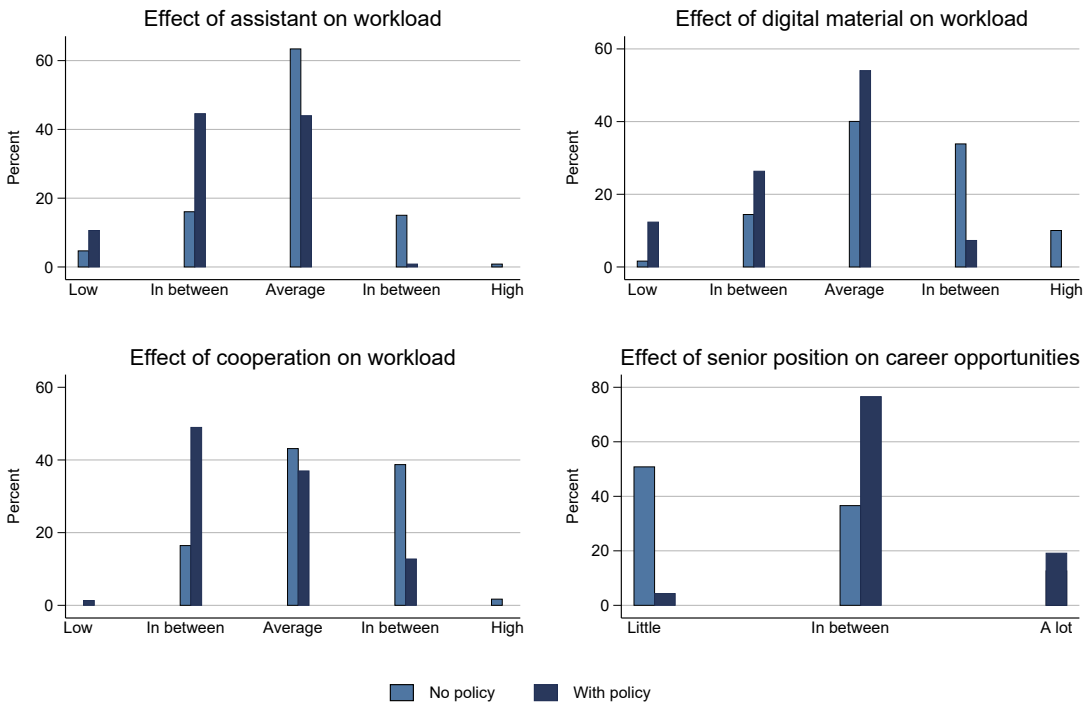

Table A4: Mixed logit analysis of discrete choice experiment: deck two

	Mean	Standard deviation
Net salary (in % of teachers' starting salary)	15.66***	
	(2.190)	
Time spent keeping order (in minutes)	−0.26***	0.40*
	(0.08)	(0.22)
Time free to spent on own learning goals (in %)	0.09***	0.13*
	(0.03)	(0.07)
Support from school team		
Almost none	ref.	
Some	3.10***	8.77
	(1.288)	(7.60)
A lot of	4.16***	7.53
	(1.50)	(5.43)
Number of choices	1314	

Notes: Dependent variable is the respondents' choices in the second deck of the discrete choice experiment. Independent variables are all the attributes describing the alternatives of this deck. The distribution of all effects with a standard deviation was specified to be lognormal. * p<0.10, ** p<0.05, *** p<0.01

Table A5: Preference heterogeneity in deck 1 of the discrete choice experiment

Interacting heterogeneity variable:	GPA on internships	STEM	Male
Interaction & Mean effect			
Net salary x ...	0.64	7.18	1.66
	(8.18)	(4.54)	(3.46)
Net salary (in % of teachers' salary)	14.17***	13.66***	15.14***
	(4.79)	(2.33)	(2.68)
Career advancement opportunities			
Little	ref.	ref.	ref.
A lot x ...	1.62*	0.79	−0.03
	(0.85)	(0.49)	(0.38)
A lot	2.04***	2.19***	2.42***
	(0.63)	(0.34)	(0.38)
Working with adolescents			
Almost never	ref.	ref.	ref.
Frequently x ...	0.76	0.12	−0.18
	(1.24)	(0.55)	(0.49)
Frequently	1.98***	1.51***	1.74***
	(0.76)	(0.34)	(0.39)
Amount of time for things beside work			
Little	ref.	ref.	ref.
Average x ...	1.83	1.98**	0.06
	(1.53)	(0.80)	(0.64)
Average	2.70***	1.87**	3.36***
	(0.92)	(0.76)	(0.59)
A lot x ...	1.30	2.44**	0.88
	(2.15)	(1.12)	(0.87)
A lot	4.07***	3.76***	4.10***
	(1.28)	(0.65)	(0.73)
Standard deviation			
Frequently working with adolescents	2.25***	1.83***	1.89***
	(0.56)	(0.31)	(0.32)
SD_low_workload	3.31**	2.13*	2.16***
	(1.68)	(0.94)	(0.76)
Avg. amount of time for things beside work	3.09*	2.69*	2.57***
	(1.65)	(1.18)	(0.80)
A lot of career advancement opportunities	3.52	2.25**	2.40***
	(2.48)	(0.70)	(0.73)
Number of choices	445	825	1000

Notes: Dependent variable is respondents' choices in the first deck of the discrete choice experiment. Variables followed by "x..." specify the interaction effect between that attribute and the background characteristic specified in the first row of that column. The distribution of all attributes with a standard deviation was specified to be lognormal. GPA on internships is standardized and defined relative to the course-specific mean. * p<0.10, ** p<0.05, *** p<0.01

Table A6: Preference heterogeneity in deck 2 of the discrete choice experiment

Interacting heterogeneity variable:	GPA on internships	Male	STEM
Interaction and mean effects			
Net salary x ...	7.02	1.31	−0.28
	(6.75)	(2.95)	(3.47)
Net salary (in % of starting salary)	15.64***	19.03***	20.55***
	(3.90)	(2.49)	(2.60)
Amount of support from school team			
Almost none	ref.	ref.	ref.
Some x ...	0.23	−0.54	0.74*
	(0.72)	(0.39)	(0.44)
Some	3.14*	2.86***	3.34***
	(1.64)	(0.68)	(1.14)
A lot x ...	−0.55	−0.85*	0.09
	(0.93)	(0.47)	(0.46)
A lot	6.45**	4.78***	5.55***
	(2.68)	(0.87)	(1.54)
Time spent keeping order x ...	−0.01	−0.08**	0.08***
	(0.07)	(0.04)	(0.04)
Time spent keeping order (in minutes)	−0.79**	−0.43***	−0.58***
	(0.33)	(0.08)	(0.16)
Time free to spend on own learning goals x ...	0.06**	0.03**	0.01
	(0.03)	(0.01)	(0.01)
Time free to spend on own learning goals (in %)	0.07***	0.12***	0.12***
	(0.02)	(0.03)	(0.03)
Standard deviation			
Some support	9.52	6.65**	9.80*
	(8.51)	(3.05)	(5.60)
A lot of support	11.66	6.67**	12.11*
	(9.29)	(2.65)	(6.28)
Time free to spent on own learning goals (in %)	2.25	0.57***	1.63**
	(1.67)	(0.18)	(0.75)
Time spent keeping order (in minutes)	0.25	0.32*	0.21***
	(0.28)	(0.17)	(0.07)
Number of choices	532	1200	1170

Notes: Dependent variable is respondents' choices in the second deck of the discrete choice experiment. Variables followed by "x..." specify the interaction effect between that attribute and the background characteristic specified in the first row of that column. The distribution of all attributes with a standard deviation was specified to be lognormal. GPA on internships is standardized and defined relative to the course-specific mean. * p<0.10, ** p<0.05, *** p<0.01

Table A7: Heterogeneity in perceived attributes of the teaching profession

	Salary	Workload	Career opportunities	Student behavior	Curricular autonomy	Support school team
Economics	18.23	−0.02	−0.15	−0.06	−1.22	0.02
	(40.20)	(0.18)	(0.12)	(1.06)	(4.03)	(0.16)
Languages	−29.49	−0.08	−0.13	1.18	−1.00	−0.23
	(40.05)	(0.22)	(0.16)	(1.38)	(4.33)	(0.17)
STEM	−0.67	0.02	−0.07	0.32	−6.52*	0.06
	(40.68)	(0.19)	(0.12)	(1.04)	(3.78)	(0.16)
Social sciences	−9.73	0.18	−0.19*	1.03	0.44	0.23
	(35.26)	(0.18)	(0.11)	(1.37)	(3.63)	(0.15)
Arts	2.39	0.18	0.07	−0.65	−4.70	−0.30
	(30.70)	(0.25)	(0.13)	(2.09)	(5.43)	(0.26)
Sports (ref.)						
Upper secondary	197.15***	0.17	−0.38***	−2.38**	−12.33***	−0.00
	(33.40)	(0.15)	(0.10)	(0.95)	(3.35)	(0.13)
Lower secondary (ref.)						
Constant	1792.62***	2.87***	1.89***	11.92***	38.68***	2.99***
	(35.98)	(0.19)	(0.12)	(1.17)	(4.05)	(0.14)
Respondents	222	226	226	226	226	226
R2	0.15	0.02	0.10	0.04	0.08	0.03

Notes: Dependent variables are perceived working conditions as a teacher as described in A1. Salary is net salary per month in €. Workload, support from school team and career opportunities are categorical variables with respectively 5, 5 and 3 levels. Student behavior is in terms of minute per class spent maintaining order. Curricular autonomy is expressed in terms of % of class time free to spend on own learning goals. Standard errors are robust. * p<0.10, ** p<0.05, *** p<0.01

Table A8: Balance of information treatment

	(1) Treatment	(2) Control	(3) Difference	(4) P-value of difference
Male	0.4410	0.4133	-0.0278	0.58
PAC related to education	0.1007	0.0673	-0.0334	0.15
Plan to work next year	0.4766	0.4804	0.0037	0.92
Scholarship	0.3000	0.2994	-0.0006	0.99
First year	0.6118	0.5932	-0.0185	0.73
Higher educ. father	0.3765	0.3842	0.0077	0.88
Higher educ. mother	0.4941	0.5593	0.0652	0.23
Migration background	0.3353	0.3220	-0.0133	0.79
Economics	0.3829	0.3571	-0.0257	0.63
Language	0.1600	0.1688	0.0088	0.83
STEM	0.1314	0.1234	-0.0081	0.83
Art	0.0514	0.0909	0.0395	0.16
Society	0.1429	0.1234	-0.0195	0.61
Sport	0.3086	0.3377	0.0291	0.57
Vocational	0.0457	0.0584	0.0127	0.60
Kindergarten	0.0599	0.0601	0.0002	0.99
Elementary	0.1199	0.1519	0.0320	0.24
Lower secondary	0.3596	0.3165	-0.0432	0.25
Upper secondary	0.4606	0.4715	0.0110	0.78
Observations	330	339	669	669

Table A9: Effect of information treatment on WTP to become a teacher over preferred alternative career (PAC) in terms of net monthly starting wage (in €): subgroup analysis

	Female	Male	Plan to work	Don't plan to work	For primary education	For secondary education
Treatment	0.08*	−0.02	0.06*	0.02	0.01	0.03
	(0.04)	(0.05)	(0.03)	(0.03)	(0.06)	(0.02)
Constant	0.09***	0.03	0.05**	0.08***	0.20***	0.06***
	(0.03)	(0.03)	(0.02)	(0.02)	(0.04)	(0.02)
Number of respondents	224	167	312	340	124	509

* p<0.10, ** p<0.05, *** p<0.01

Table A10: Effect of information treatment on stated probability to become a teacher

	Stated probability to become a teacher
Treatment	4.97*
	(2.69)
Constant	62.16***
	(1.95)
Number of respondents	568

* p<0.10, ** p<0.05, *** p<0.01