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Conference Paper

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Beiträge zur Jahrestagung des Vereins für Socialpolitik 2014: Evidenzbasierte Wirtschaftspolitik
- Session: Education III, No. C18-V3

Provided in Cooperation with:

Verein für Socialpolitik / German Economic Association

Suggested Citation: Schweri, Juerg; Hartog, Joop (2014) : Do wage expectations influence the decision to enroll in nursing college?, Beiträge zur Jahrestagung des Vereins für Socialpolitik 2014: Evidenzbasierte Wirtschaftspolitik - Session: Education III, No. C18-V3, ZBW - Deutsche Zentralbibliothek für Wirtschaftswissenschaften, Leibniz-Informationszentrum Wirtschaft, Kiel und Hamburg

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Do wage expectations influence the decision to enroll in nursing college?

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PRELIMINARY DRAFT (v5feb2014), DO NOT CITE.

A B S T R A C T

Given a severe nurse shortage in Switzerland, this paper investigates Swiss students' choice for nursing college education and the impact of their ex ante wage expectations on college enrolment. The analysis contributes to a small developing literature that uses subjective wage expectation data to predict education choice. We surveyed a full cohort of healthcare trainees on upper-secondary level in their third year of training. The main result is that trainees who expected a lower starting wage when working as healthcare employee were more likely to enroll in a nursing college later on. This result suggests a role for policies that increase returns from studying nursing to attract students to nursing. In addition, the result confirms that subjective wage expectation data is useful in modeling individual choice.

JEL classification: I11, I21, J24, J31, D84

Keywords: college choice, human capital, healthcare, subjective expectations, wage

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This paper has benefited greatly from work and discussions with Ines Trede. We thank participants at the QURE workshop in Reus (Spain) for helpful comments. Part of the work on this paper was done while Schweri was a visiting scholar at the University of Amsterdam.

1. Introduction

Individuals' decision to enroll in nursing college is highly relevant for educational and labor market policies in healthcare. This is particularly true because most industrialized countries are affected by nurse shortages (Simoens et al., 2005). While there is a sizeable and growing literature on nurses' labor supply and its wage elasticity, the influence of wages on the education and training of nurses has hardly been analyzed in the economic literature. For example, Shields (2004) mentions training new nurses as one of four major instruments to counter nurse shortage, but the literature he reviews barely touches this specific issue.

The present paper studies whether individuals' wage expectations affect their subsequent enrolment in nursing college. Our use of subjective expectation data warrants some remarks on the relevant economic approaches. According to the neoclassical standard model for educational choices, individuals base their decisions on a comparison of lifetime benefits to cost: the rate of return on an investment versus the cost of capital; i.e., the market rate of interest, or the household discount rate, depending on whether the capital market is perfect or not. In its application, this model has to acknowledge two complications: heterogeneity and uncertainty.

Gary Becker has acknowledged individual heterogeneity in his Woytinsky lecture (Becker, 1967) right after the introduction of human capital theory. Each individual has his own equilibrium rate of return, at the intersection of individual marginal benefit and marginal cost curves. But with schooling an investment decision, cost and certainly benefits lie in the future. There are no ready observations on these variables and a theory of expectations is indispensable. Can we trace the individual decision process and ask for the relevant variables in a survey? For a long time, such data were rejected by mainstream economists. The approved approach was to impose an econometric model of interpretation on observable market data and deduce, *ex hypothesi*, individuals' information sets.¹

As Manski (1993, 2004, 2007) points out, this approach relies on strong assumptions that are not testable with choice (i.e., revealed preference) data alone. He advocates analyses that include subjective beliefs by eliciting individuals' expectations and preferences. Several studies have since investigated the quality, accuracy, and distribution of subjective wage expectation data (see the literature cited in section 2). Only a handful of recent studies use *ex ante* wage expectations to explain observed educational choices. These studies focus on the particular questions of college major choice (Arcidiacono et al., 2012; Zafar, 2011a, 2011b) or physician's specialty choice (Nicholson and Souleles, 2001) of students that have already enrolled in post-secondary studies.

Our results are a contribution to this literature. Wage policies to attract young people to nursing would have to act via the expectations of these young people. It is therefore important to know whether they are aware of actual market wages and whether they act upon their wage expectations.

¹ Examples for this approach include Willis and Rosen (1979), Keane and Wolpin (1997), Belzil and Hansen (2002), Cunha et al. (2005), Chen (2008), and Beffy et al. (2012).

We will analyze college enrollment (i.e., additional schooling) of healthcare employees that hold an upper-secondary degree. In Switzerland, healthcare employees are the main target group for the recruitment of nursing students. Health care employees earn their upper-secondary degree through three years of standardized training and provide care services in hospitals, nursing homes etc. We surveyed a full cohort of prospective healthcare employees in their third and final year of training, asking them about their training experiences and their further career plans. After successfully completing healthcare training, healthcare employees have to decide whether they (i) want to work in healthcare as skilled workers after completing their upper-secondary degree, (ii) want to go on to post-secondary education at a nursing college or (iii) do something else. We traced their actual choices in a follow-up survey.

The two consecutive surveys allow us to analyze the effect of individuals' ex ante wage expectations on their subsequent decision to enroll in college. The well-defined choice situation and the homogeneity of the sample under consideration increase the internal validity of the study. While its external validity may be limited for the same reasons, our study extends the scope of the empirical literature: The papers of Arcidiacono et al. (2012) and Zafar (2011a, 2011b) use relatively small convenience samples of college students. College students are a selected group and likely to be better informed than other individuals. For the study of educational decisions (in nursing and more generally), the accuracy of young individuals' expectations at earlier stages of schooling seems at least as relevant. Our analysis covers a major sample of upper-secondary students who have not yet proceeded to post-secondary education.

We find that healthcare trainees wage expectations are close to actual market wages for healthcare employees as well as for nurses at different ages. Wage expectations are thus realistic, but the variance of expectations increases with age and education, indicating trainees' increasing uncertainty about future wages that are further away from their current situation. Controlling for a variety of personal characteristics, we find that ex ante wage expectations have a significant effect on subsequent career paths. Trainees that expected to earn a higher wage as healthcare employee at age 25 are more likely to work as healthcare employee one year after completing training, and less likely to study nursing. We show that trainees with lower time preference, higher risk aversion and higher extrinsic motivation are also more likely to enroll in nursing college. Finally, we show that wage expectations have a significant effect on the future career paths that individuals expected in the follow-up survey.

The paper is organized as follows: Section 2 discusses literature on nurses' labor supply and the analysis of wage expectation data. Section 3 provides information on the institutional setup in Swiss healthcare education and especially on the healthcare employee profession. Section 4 presents the data collected from healthcare employees in two consecutive surveys. Section 5 shows the results on how wage expectations influence the decision to enroll in nursing college, and tests whether the results are sensitive to the sample attrition in the follow-up survey and other data issues. Section 6 concludes and discusses policy implications of our findings.

2. Related literature

In order to attract more students to nursing colleges, a seemingly obvious policy measure is to increase nurses' wages. This policy is, however, costly, and the evidence on its effectiveness is limited. Spetz and Given (2003) develop a forecasting model and advocate higher wages for registered nurses to counter nurse shortage. Askildsen et al. (2003) find varying effects of wages on nurses' labor supply in different models and specification. Their preferred model estimates a relatively low elasticity of .21. A review of international studies that investigate the labor supply decision of Registered Nurses concludes that "even large wage increases are unlikely to be successful in tackling current and predicted nurse shortages" (p. F464) and points to the importance of non-pecuniary job aspects in influencing labor supply (Shields, 2004).

The literature on nurses' labor supply exhibits two gaps: First, many studies focus on qualified nurses' participation in the labor market, their decision to quit nursing, and the influence of job characteristics such as shift work or geographically differentiated pay and monopsony.² While these aspects are of obvious importance, the training of new nurses has hardly been investigated. An exception is Spetz (2002) who finds that there are no financial gains associated with the choice of a baccalaureate degree in nursing versus other tracks to become a RN.³ A change in relative wages for a baccalaureate degree versus an associate degree does, however, have a significant effect on the choice of the degree of nursing education, as does the previous educational and work history of the students. Second, Shields (2004) points to the "the lack of control for individual unobservable heterogeneity (e.g. motivation, ability and other personality traits)" (p. F491) in most studies. This omission also makes it difficult to assess the relative importance of pecuniary and non-pecuniary factors (Antonazzo et al., 2003). Our study contributes to filling these gaps as it analyzes nursing college enrollment with data containing wage expectations as well as measures on various personality traits.

A necessary condition for wage policies to work is that individuals are aware of the wages paid in different occupations and that they base their educational decisions (at least partly) on expected returns. Many papers show that eliciting wage expectations in surveys is feasible, and that the resulting data is of good quality and meaningful (Dominitz and Manski, 1996; Brunello et al., 2004; Webbink and Hartog, 2004; Botelho and Costa Pinto, 2004). Some papers find that students tend to overestimate their income prospects with respect to the mean of actual market wages (Betts, 2006; Jerrim, 2011), or that they underestimate their prospects (Nicholson, 2005; Jensen, 2010). Most studies find that wage expectations are remarkably close to actual market wages (Dominitz and Manski, 1996; Filippin and Ichino, 2005; Webbink and Hartog, 2004). Wolter (2000) and Wolter and Zbinden (2001) come to similar conclusions for Switzerland. Overall, individuals are well informed about their future earnings

² See Shields and Ward (2001), Elliott et al. (2007), Di Tommaso et al. (2009), and Staiger et al. (2010) for recent contributions to this literature.

³ Walton et al. (2005) compare the development of returns to nursing education and new entries into nursing in a descriptive analysis.

prospects, but they also state a high degree of uncertainty about their future wages (Dominitz and Manski, 1996; Schweri et al., 2011).

These findings suggest that individuals have enough information to base their educational decision on their expectations about future, uncertain incomes. An early contribution to the analysis of expectations and choice is Kodde (1986) who found that contemporaneous wage expectations are significantly correlated with additional schooling in a cross-sectional setting. Nicholson and Souleles (2001) elicit wage expectations of medical students and demonstrate that ex ante wage expectations help to predict specialty choices. Arcidiacono et al. (2012) and Zafar (2011a, 2011b) recently showed that college students' wage expectations influence their college major choice. Menon (2008) finds that the expected rate of return to higher education is correlated with the intention to enroll in higher education. In a similar vein, Hartog et al. (2013) show that wage expectations of Chinese Bachelor students matter for their intention to continue to a Master degree. To the best of our knowledge, no study has to date analyzed the influence of ex ante wage expectations on actual college enrolment.

3. Institutional framework of Swiss healthcare education

Recent projections of the available national data predict that until 2020, the need for professionals in health care will increase by 13 to 25% (FSO, 2010). The substantial immigration of nurses from other countries further suggests that the number of nurses trained in Switzerland is insufficient today already (Jaccard Ruedin and Widmer, 2010).

Educational tracks for healthcare professionals have been completely revised since 2004 in Switzerland (Spitzer and Perrenoud, 2007). All health educational programs were integrated into the “regular” educational system, transferring the authority for regulation from the health ministry to the education ministry (Spitzer and Perrenoud, 2007).

Switzerland's educational system is composed of three tiers: compulsory schooling, upper-secondary education and tertiary education. After the end of compulsory schooling in ninth grade, more than 90 percent of young people go on to an upper-secondary education. The most important upper-secondary tracks are college-bound Gymnasium (chosen by roughly 20 percent of a cohort) and apprenticeship training (chosen by almost 70 percent) in one of approximately 260 professions, leading to a federally recognized diploma as skilled worker or employee (OPET, 2012). Both tracks at the upper-secondary level provide entrance to higher education, i.e., “tertiary level” studies.

In 2005, a new healthcare profession at the upper-secondary level was created: healthcare employees, called “FaGe” (*Fachmann/Fachfrau Gesundheit*), are educated for three years. They attend vocational school on 1.5 days per week and acquire professional knowledge and skills while working 3.5 days per week in a hospital, nursing home or homecare institution. This educational track is very popular among young women and ranks in the top three of their most chosen professions in the apprenticeship system (OPET, 2012). As a part of their job, healthcare employees take

on nursing care responsibilities under the direction of registered nurses. Furthermore, they perform tasks in their own responsibility, such as administrative or domestic work (DEA, 2010).

FaGe trainees sign a combined education and work contract. The educational goals they have to achieve during their education are provided by a national law, the “national education and training order” for this profession. After three years of education, trainees must pass a final exam comprising written, oral and practical parts, which test general, as well as professional, knowledge and skills (Berufsbildungsgesetz BBG, 2002). The educational program for healthcare employees is thus highly structured and standardized, as compared to other healthcare assistant educational tracks in Europe (Lizarondo et al., 2010).

After successfully completing education, the training-work contract ends, and healthcare trainees⁴ must make career choices. The available options include (i) working in the just learned profession as a healthcare employee, (ii) entering higher nursing education at a professional college or university of applied sciences, or (iii) heading into another profession (i.e., beginning a different educational track) or engaging in non-working activities, such as language studies abroad. Higher education as a registered nurse (option ii) can last for up to three years⁵ of full-time school, with integrated clinical education and a relatively low wage during this period.

Although the main features of health care educations are defined at the federal level, differences between cantons are substantial. As for cantonal education systems, some cantons offer professional colleges for nursing, others offer nursing degrees at the university of applied sciences.⁶ Few large cantons offer both options, small cantons none. The cost of nursing studies also differs between cantons due to different tuition and grant policies. Tuition fees are, however, only a small fraction of the full cost in all cantons, and grant policies are designed to cover opportunity cost, not the low direct costs. As for cantonal health care systems, cantons have their own cantonal laws on state personnel, including nurses, and on health care provision. These different laws lead to different wage policies and also to slightly different structures in health care (e.g. on the level of concentration between central and regional hospitals).

⁴ We will use “trainee” to denote a person that is in training to become a healthcare employee, or was in training when participating in the first survey; we will use “student” to denote a person that is studying nursing, despite the fact that nursing students receive a considerable amount of training in clinical practice and are de facto trainees (again).

⁵ Nursing college lasts three years according to the national framework curriculum (*Rahmenlehrplan*). For successful graduates of healthcare training (i.e., owners of the national VET diploma as healthcare employee), some cantons reduce study time by a half or one year.

⁶ We will use nursing “college” for both types of tertiary studies, professional colleges and universities of applied sciences because both lead to a degree as registered nurse and almost 90 percent of nursing students in our sample attend a professional college.

4. Data and descriptive statistics

4.1 Survey design

We administered a survey of healthcare employee students in their last year of apprenticeship in all parts of Switzerland.⁷ 21 out of 23 Swiss cantons (i.e., states) participated in the survey; the two missing cantons are small cantons that together account for 3% of the Swiss population⁸.

The paper-and-pencil questionnaire relied on field-tested items from the literature, supplemented with our own items developed for specific issues. We used an adapted version used earlier in a similar survey developed for the canton of Berne (Trede and Schweri, 2014). The development of the questionnaire was supported by field experts and the national professional association in healthcare (OdASanté). We performed a pre-tests of the adapted questionnaire with classes of FaGe trainees from five different cantons (n=70).

The survey took place in the period between September 2010 and January 2011.⁹ At this time, 2209 trainees were trained in their third year as healthcare employee in Switzerland, of whom 2089 were surveyed during class (95%). The missing 120 trainees either work in one of the two missing small cantons or were absent from class at the survey day (illness etc.). The trainees had two lessons (90 minutes) in class to fill in the questionnaire. Teachers were instructed before the survey took place and were present in class, offering assistance in cases of uncertainty.

The sample at hand thus offers two advantages for the analysis: first, because we cover almost the entire cohort, the first survey does not suffer from selectivity due to non-randomly missing cases. Second, the sampling was restricted to a well-defined and homogenous group: all trainees were learning the healthcare employee profession in their third year of training. This regularity eliminates all differences associated with differences among different educations and professions and thus increases the internal validity of the study.

The follow-up survey was administered one year after trainees' graduation, i.e. in the summer of 2012. We had collected postal addresses, telephone numbers as well as email addresses of the trainees in the first survey and contacted them again with a letter containing login information for the online follow-up survey. Individuals that did not fill in the online survey were contacted again several times, first using letters, then by email and by telephone. They were also offered a short version (online or paper-and-pencil) of the follow-up survey, which included a question on their current status (working as FaGe, studying nursing etc.). From the 2089 trainees who participated in the first survey, 73 addresses turned out as invalid. Of the 2016 individuals contacted,

⁷ The authors gratefully acknowledge funding for the survey by the Swiss State Secretariat for Education, Research and Innovation.

⁸ Source: Census of the Federal Statistical Office (Strukturerhebung 2011). Missing cantons: Jura and Neuchâtel.

⁹ We gratefully acknowledge support in organizing and administering the survey by the cantonal professional associations in healthcare. Trede and Schweri (2013) and the reports cited there describe the survey process in detail.

1068 (or 53%) filled in the follow-up survey. We dropped three cases that had not yet finished their FaGe training. As attrition may bias our results, we will come back to this question when assessing the robustness of our results in section 4.3.

4.2 Dependent variable: career decisions

The second column in table 1 shows what healthcare employees are doing one year after graduation from training. Roughly four of ten are working as healthcare employees, a third is studying nursing, and the rest is engaging in various other activities from other post-secondary educations to taking a year off, for example for language studies abroad. Note that we rely on the follow-up survey for information on realized career paths and thus on a reduced sample.

Table 1

Healthcare employees' status one year after graduation and expected status in 2014 (percentages)

	Actual status in 2012	Expected probability of state in 2014 (mean)
Working as healthcare employee	.418	.169
Studying nursing in college	.349	.475
Other education	.160	.194
Other activity	.073	.161
Observations	1065	976

Short-term career paths in the follow-up survey one year after graduation provide a snapshot only because career paths might look different in a few years' time. We thus asked respondents in the follow-up survey in 2012 to indicate the probability they attach to each of the different options looking ahead to the year 2014. Manski (2004) recommends this type of subjective probability questions because they enable respondents to express their uncertainty about the future, as opposed to questions that ask for the most likely outcome only. We asked respondents to state these probabilities with the help of sliders in the online survey. The text instructed them to give values for the different options that sum up to 100 percent, and the survey software showed respondents the sum of the stated probabilities in real-time. A moderate 89 out of 1068 persons did not answer these probability questions, or did not provide a valid answer.

The last column in table 1 shows the means of the probabilities for the different options. Even though the expected probabilities for 2014 depend on the career paths realized in 2012, the proportions in table 1 differ considerably: the respondents anticipate a shift away from working as healthcare employee to studying nursing and to engaging in other activities within two years after the follow-up survey. Though these ex ante predictions will likely not coincide (fully) with actual realizations in 2014, they point to high occupational mobility in the years after graduation from

healthcare training. We will therefore also analyze the influence of wage expectations on these predictions, next to wage expectations' influence on actual status in 2012.

4.3 Main independent variable: wage expectations

Wage expectations have been elicited for two career options (working as a healthcare employee and working as a nurse) for different ages. We have put a special emphasis on the career option “nursing” since healthcare employees are the main target group for higher nursing education, according to the planning of educational and health authorities (DEA, 2010). The questionnaire asked the trainees for their expected wage if they were to work as (fully trained) healthcare employee (i) directly after training, (ii) at age 25 and (iii) at age 35. Furthermore, trainees stated their expected mean wage if they had successfully achieved a nursing degree and worked as a registered nurse, (iv) at age 25 and (v) at age 35; hence, students stated wage expectations for a total of five scenarios. The reason we asked for starting wages for healthcare employees but not for nurses is that age 25 is very close to the typical age of beginning nurses, while the majority of healthcare employee trainees finishes training between age 20 and age 22.

The questions on wage expectations asked for gross wages per month in a full-time position, excluding allowances. Hospitals and nursing homes typically have clear rules about allowances for shifts and for changes in cost-of-living (inflation). Pretests confirmed that trainees had no problem to understand and answer the questions. The exact phrasing of the questions can be found in the appendix.

We start assessing the quality of the responses by looking at item non-response and implausible answers. Out of 2089 respondents, only 25 did not feel able to state an expectation for the starting wage when working as a healthcare employee. Additionally, there were few implausible values. We have not applied usual methods for survey wage data such as trimming because we are interested in the quality of the wage expectation data and do not want to make answers look more accurate than they were. Therefore, we discarded only cases with obviously wrong answers. For example, a respondent gave very low wages for age 35 and wrote that he or she intended to have a family by then. This person had not followed our instruction to state a full-time wage; his or her answer was thus deleted. In few cases, we corrected entries where the original intention was obvious. For example, one respondent gave the following answers for the five scenarios (in ascending order from healthcare employee starting wage, wage at age 25 etc. to nursing wage at age 35): {4400, 4600, 5000, 5400, 600}. In all likelihood, he or she meant the last figure to be 6000. We also found several cases where wage expectations for healthcare employee scenarios looked plausible, but for nurse scenarios they were implausibly low. The likely reason is that respondents have not indicated the wage after obtaining a nursing degree, but rather an internship wage of about 1000 CHF that nursing students receive during clinical education (as defined in the curricula). Taken together, we corrected 21 cases by discarding or editing as described above. Finally, we deleted few answers from persons that were already older than specified in the scenario. That is, respondents

with age 25 or older at the time of the survey are by definition not able to state an “expectation” for themselves about a future wage at age 25.

Column 2 in table 2 shows the number of valid observations for all elicited wage expectation variables. The number of missing cases is somewhat higher for the scenarios with a specified age, for two reasons. First, we dropped answers from respondents that were older than asked in the scenario (see previous paragraph). Second, we suspect that the starting wage scenario is closest to respondents’ situation and therefore easiest to answer. Few respondents answered the first question and wrote “no clue” for the other questions.

The number of missing cases ranges between 1.5% and 7.4%, which shows that the vast majority of respondents felt able to answer questions on their expectations and provided answers that are not wildly implausible.

Table 2

Wage expectations of healthcare trainees for different scenarios (in CHF)

Wage expectations	Observations	Mean	Std. dev.	10 th perc.	25 th perc.	Median	75 th perc.	90 th perc.
as healthcare empl.: starting wage	2055	4123	453	3500	3900	4200	4500	4500
as healthcare empl.: age 25	1934	4562	578	4000	4200	4500	4800	5000
as healthcare empl.: age 35	1987	5019	887	4200	4500	5000	5200	6000
as nurse: age 25	1940	5395	830	4600	5000	5300	5800	6200
as nurse: age 35	1986	6047	1063	5000	5500	6000	6500	7100
Life-time “return” on nursing	1908	0.207	0.164	0.073	0.120	0.189	0.271	0.385

Std.dev.: standard deviation; perc.: percentile

Table 2 presents descriptive information on the distribution of wage expectations for the five scenarios elicited. The percentiles are round values because respondents typically stated their expectations in steps of hundred Swiss Francs (sometimes even 50 Francs). While responses rounded to a full thousand or to five hundred are more frequent, we also observe many values in between. The distributions are almost symmetric with a slightly longer upper tail. Means and percentiles increase with age and with educational degree, a finding that mirrors stylized facts on the labor market.

Overall, the dispersion of the wage expectations appears limited, seeing that the 10th and 90th percentiles are in a range of plus or minus 20 percent of the median. Variance and interquartile range increase with age and educational degree. Note especially that the standard deviations for expected nursing wages are clearly higher than for expected healthcare employee wages. There are two likely reasons for this. First, there is more heterogeneity in nurses’ careers because they can develop in

different directions (e.g., nursing manager, quality manager, trainer). This heterogeneity is associated with higher wage dispersion (especially after several years of experience) and thus higher ex ante wage uncertainty for potential future nurses. Second, healthcare employees are likely to be more uncertain about actual wages in a profession they are not yet working in, than in the profession they have been trained in (healthcare employee) for more than two years already.

Trainees' wage expectations contain their expectation for the rate of return of a nursing degree. As we observe only two points of the expected lifetime earnings for healthcare employees and nurses each, we approximate the life-time rate of return as follows:

$$R = \frac{w_{25}^n + 3 * w_{35}^n}{w_{25}^{he} + 3 * w_{35}^{he}} - 1$$

The return of graduating from nursing college is the expected life time income as nurse (w^n at age 25 and age 35) over the expected life-time income as healthcare employee (w^{he} at age 25 and age 35). This calculation assumes that wage profiles are flat between age 20 and 30 (w_{25}) and again after age 30 (w_{35}); it does not include opportunity cost or discounting. It provides a simple approximation of the income difference between nurses and healthcare employees (for a similar approach, see e.g. Menon, 2008). All refinements are arbitrary as we have to rely on the four points of information available.

The last row in table 2 shows the distribution of this approximated return (in quotes) to studying. If we want to know the annual wage advantage, we need to divide by the duration of the studies. The duration again depends on the cantons: At the time of the survey, nursing studies of three years were reduced in some cantons by either a half or a full year for graduated healthcare employees. 20.7 percent total wage advantage thus mean an expected, undiscounted wage advantage between 8.3 and 10.4 percent per year. As an actual rate of return would include discounting and opportunity cost, we should keep in mind that our raw estimate is bound to be higher than the actual rate of return.

4.4 Further variables

The decision to enroll in college depends on many factors. We designed the survey in a way to capture the main influences. The appendix contains more information on the following variables including descriptive statistics. We measured all of these variables in the third year of training and include them in the multivariate models of section 4.

- a) Personal characteristics and background: age, sex, siblings, living situation, parents' education, parents' occupational status, no. of books at home, parents in healthcare, level of school track attended on lower-secondary level

- b) Preferences: time preference, risk aversion, intrinsic and extrinsic motivation, preference for patient contact, preference for work-life balance, intention to work part-time in future¹⁰
- c) Information on the training as healthcare employee: including courses to obtain vocational baccalaureate, including pre-courses for vocational baccalaureate, grade point average in vocational school, type of training firm (hospital, nursing home, home care etc.)
- d) Subjective assessment of the training as healthcare employee and of own performance: self-efficacy (in general education and in work tasks), commitment to healthcare employee profession, satisfaction with training, stress during training
- e) Canton dummies

Since schooling decisions are influenced by time preference according to economic theory, the measurement of time preference is of high importance. Based on Frederick et al. (2002), we decided against a question of the type “do you prefer 1000 CHF today or 1100 CHF in one year?”. This kind of question seems to be too far from the choice situation that students are confronted with. The negative reactions of healthcare students in an early pretest of the questionnaire confirmed this assessment. Therefore, we asked respondents to choose their preferred option between two lifecycle wage paths that are typical for lower and higher educated nursing professions. We derived these wage paths from cantonal wage tables and from wage information in the Swiss Labor Force Survey for working nurses. One wage path (akin to a true wage path for healthcare employees) promises a higher wage during the next three years, but less later on, compared to the other wage path. The two paths imply a discount rate of 5.3 percent as it equalizes the present value of the two stylized, but realistic lifetime income streams for healthcare employees and nurses. This figure represents the rate of return offered by a nursing education. The questionnaire item thus implicitly measures whether an individual’s discount factor is higher or lower than the rate of return of 5.3 percent.

Risk aversion is measured by a 10 point scale where individuals grade themselves on their willingness to take risk in business; see Ding, Hartog and Sun (2010) for a discussion of alternatives and references to the literature.

We imputed means for the missing values in the control variables (but not in wage expectations). In the estimations, we included dummy variables indicating imputed values for every control variable. As there are only very few missing variables in most controls, the dummy variables were widely insignificant. In section 4, we thus include only dummies for missing values if we have imputed more than 50 cases for a certain variable. This was the case for the variables self-efficacy in general education, mother’s education and father’s education.

¹⁰ We also asked for the intention to temporarily stop working (e.g. to found a family); including this dummy variable in the models in section 4 does not affect the results.

5. Findings

5.1. Are healthcare trainees' wage expectations reasonable?

Manski (2004) distinguishes between three ways to assess the accuracy of earnings expectations: (i) comparing expectations and realizations for the same individuals, (ii) comparing mean expectations and realizations for the same populations, or (iii) comparing mean expectations with historical realizations.

Our approach falls into the third category: we compare mean expectations with current wages (that will be historical when students will actually have graduated). This is warranted only if the cohort under scrutiny will have the same distribution of realizations as shown by the actual wage data used for the comparison. We will use two data sources for comparison: first, wage information from the Swiss Labor Force Survey; second, cantonal wage recommendations issued by cantonal authorities themselves or by the cantonal healthcare employer's association. The advantage of the SLF survey data is that it provides information on the distribution of the wages. The disadvantage is that the number of observations is low for nurses and insufficient for healthcare employees because this profession was introduced only some years ago.

There are several reasons why the wage expectations in our survey should be close to official wage recommendations. First, healthcare institutions (hospitals, nursing homes) are mostly run by cantons (or municipalities) or at least financed by them to a large extent. Wage structures in healthcare are thus strongly influenced by the state (starting wages as well as wage growth), which leads to a reduced wage variance. This publicly available information reduces uncertainty for individuals and should help them to predict their later wage. Second, students in our sample will graduate within a few months. Cantonal wage schemes are unlikely to change quickly and without prior public debate, which again reduces uncertainty.

Nevertheless, we cannot perfectly validate the accuracy of wage expectations by comparing them with historical data, because this data might deviate from the actual realizations for the surveyed individuals later on. The reason is that there remains considerable variance in actual wages, which creates uncertainty for individuals about their own future wage, in addition to the uncertainty about future developments in wages.

Cantonal pay schemes do not lead to degenerate wage distributions within cantons, for several reasons. First, there exist private hospitals and nursing homes that are not bound by pay schemes. Second, hospitals and nursing homes have some degree of autonomy and are not strictly obliged to adhere to wage recommendations. For example, salary schemes often set salary bands instead of fixing exact salaries. Third, there are different roles and positions within hospitals and nursing homes that lead to wage differences within the same institution. The heterogeneity in roles increases with age and is supposedly more pronounced for nurses than for healthcare employees.

These reasons create variance in actual wages of healthcare employees and nurses. For trainees who build expectations about their future wage, this wage variance can be predictable heterogeneity (as far as trainees know their own ability, preferences etc. and use this information to predict their wage), or unpredictable risk. Both

heterogeneity and risk cause wage expectations to vary even if trainees are perfectly informed about actual wages and official pay schemes. But trainees' information about current wages may not be perfect, which would add errors to their prediction of own future wages. Moreover, the future developments in healthcare are uncertain, in particular because the healthcare training curricula as well as the nurse education curricula have been revised some years ago¹¹; accordingly, the "skill and grade mix" in healthcare institutions is diverse and still developing and adds a risk component to any prediction about wages.

Table 3

Median and interquartile range for nurses' wages based on labor force survey (in CHF)

Monthly gross wage	25 th percentile	Median	75 th percentile	Interquartile range
nurse: age 25	4808	5361	5709	901
nurse: age 35	5731	6349	6977	1246

Estimated wages from quantile regressions with 605 observations, source: SLFS 2009-2011¹²

Comparing median nursing wages in tables 2 and 3, we find that expectations and actual data are almost the same for age 25, whereas actual values are slightly higher than expectations for age 35. Trainees are well informed, on average, about wages early in a nurse's career, but seem to underestimate wage growth to some extent. The 25th and 75th percentiles of actual and expected wages are remarkably close. The interquartile range (last column) shows that there is substantial dispersion in actual wages, despite the existence of pay schemes. Dispersion increases with age.

¹¹ The financing of healthcare has also changed completely, from input-based financing to financing based on diagnosis-related groups.

¹² We estimated pooled quantile regressions for the quantiles .25, .5 and .75 controlling for age, age squared, and indicators for shift and family allowance. Predictions are for age 25 and age 35 without allowances (because expectations were asked this way, see section 4.3). The sample consists of all persons whose current occupation is nursing and who were trained as nurses on tertiary level. Gross monthly wages were standardized to represent full-time wages.

Table 4

Wage expectations compared to official wage recommendations for different regions (in CHF)

	Healthcare employee: starting wage		Nurse: wage at age 25	
	Expectation (mean)	Recommendation	Expectation (mean)	Recommendation
	(1)	(2)	(3)	(4)
Argovia	4112	3900 - 4300	5345	4900 - 5100
Basle	4279	3950 - 4325	5374	5000 - 5300
Bern	4075	4400	5273	5440
Central Switzerland*	3863	3950 - 4250	5215	4900 - 5250
Saint Gall	4088	4255	5396	5250
Zurich	4346	4480	5839	5580

* Central Switzerland is a region covering the cantons of Lucerne, Nidwalden, Obwalden, Schwyz, Uri and Zug. Employers of healthcare personnel in these cantons cooperate such that they can be considered as one region.

We further asked the professional healthcare organizations in all cantons (regions) to provide us with the official wage recommendations (issued by the canton or the healthcare organizations themselves). Table 4 shows recommendations of six cantons (or regions)¹³ and the wage expectations of the healthcare employees in these cantons. The subsamples for these respondents and variables are between 120 and 360 cases. The recommendations refer to starting wages without reference to a certain age. The typical starting age for healthcare employees is in the early twenties, the typical starting age for nurses is around 25.

We may note that the means of the wage expectations in all scenarios are close to the recommendations, or even included in the respective range of wage recommendations. The national means for variables (see table 2) are also included in the overall range of the recommendations shown in table 4.

At closer inspection, expectations seem to be slightly lower than recommendations for healthcare employees, whereas expectations seem to be slightly higher than recommendations for nurses. A partial explanation might be that most trainees assume that they will or would have required some years of work experiences as nurses already at age 25. This is possible as most trainees are 20 or younger at the first survey and nursing college lasts a maximum of three years. Also, some cantons (e.g., Zurich) allow for slightly higher wages if the nursing degree has been earned at a university of applied sciences, which is not reflected in the wage recommendations in table 4.

Overall, healthcare trainees' expectations are close to the wages actually paid in healthcare at the time of the survey. What is more, the ordering of the cantons for wage expectations and recommendations are partly the same: for both professions, wage recommendations as well as recommendations are highest in Zurich.

¹³ We only show cantons or regions with more than 100 respondents. Only one canton with more than 100 respondents is excluded: canton Vaud because the recommendations are too heterogeneous for different employer types. Counting the cantons of the region Central Switzerland separately, table 4 includes 11 cantons. These account for 70% of the respondents in our sample.

We conclude that the wage expectations of healthcare trainees in their final year of training are reasonable and close to observed as well as officially recommended wages. This finding is remarkable as these trainees attend an upper-secondary education program, whereas most of the literature refers to the accuracy of income expectations of college students, a positively selected group of individuals. The finding is not entirely surprising, however, because healthcare trainees work on-the-job and have a lot of contact with senior team mates in hospitals and nursing homes. It is likely that they learn about salaries from their peers, senior colleagues and superiors. Our findings are in line with the hypothesis that trainees rely mainly on actual current wages to form wage expectations for themselves.

5.2. Wage expectations and college enrolment

In the previous section, we showed that healthcare trainees have a good level of information about their future wage prospects as healthcare employees or as nurses. This finding adds plausibility to the hypothesis that trainees base their actual career choices after graduation on their expectations about future wages in different settings.

Table 5 presents multinomial logit models of the career paths chosen by the respondents after completing healthcare training. Model 1 in table 5 includes the wage expectations at age 25 for both, working as a healthcare employee and working as a nurse. The signs of the effects are as expected: a higher expected wage as healthcare employee raises the probability to work as healthcare employee and lowers the probability to study nursing; the reverse pattern is true for the wage expected as nurse. The effect of the healthcare employee wage is significant and sizeable: a 10 percent increase in expected wage increases the probability to work as healthcare employee by 5.1 percentage points, and decreases the probability to study nursing by 3.7 percentage points. By contrast, the effect of the expected nursing wage is weak and insignificant. Wage expectations at age 35 are insignificant and omitted from the models to prevent multicollinearity problems.¹⁴

In Model 2 in table 5, we included a list of covariates (described in section 3.4 and in the appendix). These covariates increase the pseudo-R-square considerably, but the effects of the wage expectation variables decrease only slightly. This means that the covariates and wage expectations are only loosely correlated, as is confirmed when we regress wage expectations on covariates (not shown).¹⁵

The two wage expectations variables are jointly significant at a significance level of $p < .01$ in the nursing equation.¹⁶ We can also compare the percentage correctly predicted by model 2 with and without including wage expectations (not shown in the table). The respective percentages correctly predicted are 68.8% for healthcare employees including wage expectations and 67.6% excluding wage expectations;

¹⁴ Table A2 in the appendix shows the correlations between the different wage expectation variables.

¹⁵ A regression of log expected wage as a healthcare employee at age 25 on the covariates (from model 2, table 4, excluding canton dummies) results in a R-squared below .05 and an adjusted R-squared below .025. Results available from the authors.

¹⁶ Marginal effects and significances from a multinomial probit instead of a multinomial logit model are almost identical.

63.9% versus 62.5% for nurses; and 41.0% versus 39.3% for the residual category. Finally, we can calculate the elasticity of nursing college enrolment with respect to expected wages: a 10 percent decrease in expected wage as healthcare employee increases the probability to study by 3.5 percentage points. This is a large effect in comparison to the estimates found in the literature (see Section 2).

Many covariates have significant effects. Males are more likely to go to other options (e.g., to the military, or to other educations such as physiotherapist or paramedic) than to nursing college. Younger trainees enroll in college more often; older trainees are more likely to work as healthcare employees after graduation. Trainees with lower time preference are more likely to enroll in nursing college, as predicted by economic theory. Trainees that are more risk-averse are more likely to go to college. An explanation could be that nursing is a highly respected profession with a long-standing tradition in Swiss healthcare, whereas the occupation of healthcare employee is relatively new. Because the role of healthcare employees in care teams is often not yet clearly defined and changing, the uncertainty about future tasks, roles and perspectives is higher than for nursing.¹⁷

Good grades in vocational school as well as a higher self-efficacy with respect to general education both decrease the likelihood to continue working as healthcare employee. The healthcare employees working in their learned profession are thus a negative selection of healthcare trainees with respect to their academic skills. Yet, trainees with higher satisfaction with training and those with higher intrinsic motivation are also more likely to stay healthcare employees, *ceteris paribus*.

A high extrinsic motivation increases the probability to go to nursing college. This is an interesting finding: On average, trainees have higher intrinsic motivations than extrinsic motivations, also in the group of nursing students. But the selection into nursing is influenced more by extrinsic motivation than by intrinsic motivation. A likely reason is that healthcare trainees are already working in a nursing profession and both, healthcare employee positions as well as registered nursing jobs, are satisfying in realizing intrinsic motives, but differ in terms of satisfying external motivations.

The importance attached to patient contact also increases the likelihood to go to nursing. As healthcare employees spend as much time with patients as do nurses, the reason must be the quality of the contact: a nurse can provide more sophisticated services to patients and can react more autonomously to patient needs than healthcare employees. Balancing private life and work is more difficult for nurses, such that trainees who attach a high importance to work-life balance rather work as healthcare employees.

¹⁷ It is unlikely that the result on risk aversion is driven by unemployment risk, as unemployment is low in Switzerland for people with upper-secondary (4.1%) or tertiary degree (3.7%). Source: Swiss Labour Force Survey, data file je-d-03.03.02.14. Employment prospects in healthcare are better than average due to skills shortages in the healthcare sector.

Table 5

Average marginal effects: mlogit of career path on wage expectations (two models)

	Model 1 (without covariates)			Model 2 (with covariates)		
	(1)	(2)	(3)	(4)	(5)	(6)
	Working as healthcare employee	Studying nursing	Other option	Working as healthcare employee	Studying nursing	Other option
Proportions in sample	0.409	0.355	0.236	0.409	0.355	0.236
In wage expect. healthc. empl.: age 25	0.508*** (0.140)	-0.373*** (0.133)	-0.136 (0.119)	0.454*** (0.136)	-0.350*** (0.129)	-0.103 (0.117)
In wage expect. nurse: age 25	-0.111 (0.094)	0.057 (0.097)	0.054 (0.089)	-0.119 (0.081)	0.088 (0.082)	0.031 (0.081)
Male				0.053 (0.070)	-0.248*** (0.082)	0.195*** (0.049)
Age: 18 or younger				-0.119*** (0.030)	0.088*** (0.029)	0.030 (0.027)
Age: 24 or older				0.322* (0.169)	-0.193 (0.210)	-0.128 (0.169)
Time preference: low				-0.047 (0.030)	0.067** (0.030)	-0.020 (0.027)
Risk averse in business				-0.013** (0.006)	0.015*** (0.006)	-0.002 (0.005)
GPA in vocat. school				-0.183*** (0.039)	0.139*** (0.040)	0.044 (0.035)
Self-efficacy in general educ.				-0.035* (0.019)	0.010 (0.018)	0.025 (0.016)
Self-efficacy in work tasks				0.020 (0.030)	-0.000 (0.029)	-0.020 (0.025)
Satisfaction with training				0.041** (0.018)	-0.016 (0.017)	-0.026* (0.014)
Intrinsic motiv.: high				0.054* (0.031)	-0.032 (0.031)	-0.022 (0.027)
Extrinsic motiv.: high				-0.106*** (0.030)	0.115*** (0.029)	-0.010 (0.026)
Importance pa- tient contact: high				-0.053* (0.031)	0.099*** (0.030)	-0.047* (0.027)
Importance work- life balance: high				0.059* (0.032)	-0.065** (0.031)	0.006 (0.028)
Pseudo-R2		0.007			0.211	
N		1013			1013	

Standard errors in parentheses; * p<0.10, ** p<0.05, *** p<0.01; further covariates included in model 2: see list in section 3.4

Instead of looking at the different wage expectations separately, we can also look at the effect of the expected life-time return of nursing (introduced in table 2 in section 3.3). We replicated model 2 in table 5 with approximated expected life-time return and found that it has a significant and positive influence on the probability to study nursing one year after graduating from healthcare training: an increase of 10 percentage points

in expected total return (or about 4 to 5 percentage points in annual return) leads to an increase in the probability of studying nursing of 2 percentage points (not shown). This significant effect does, however, contribute less to predicting choices¹⁸ and hinges on the respondents with very low expected return. If we exclude outliers, the effect is not significant anymore, contrary to the results for expected wage as healthcare employee at age 25 shown in table 5. We conclude that using the unaltered wage expectations as regressors leads to a better specification than imposing a certain structure for expectations. These results suggest that in our data, the standard human capital model of rates of return is too strict.

We hypothesized that the effect of wage expectations is different for different subgroups, hence we looked at several interactions, notably of wage expectations with time preference, risk aversion, extrinsic and intrinsic motivation and others (e.g., intention to work part-time). We did, however, not find compelling evidence for the existence of interaction effects. Note that this implies that a wage increase has no significant effect on the composition of additional supply (i.e. the wage raise does not predominantly attract extrinsically motivated supply).

5.3. Sensitivity analysis

A concern with the results in the previous section is sample attrition: for 47 percent of the trainee cohort, we have information on wage expectations and the covariates from the first survey, but not on their career path at the time of the follow-up survey. Comparing the means of variables from the first survey between the two groups, we find some significant differences, which means that attrition is not random.

Wooldridge (2002) recommends inverse probability weighting to account for sample attrition. We thus replicate the multinomial logit from table 5, model 2, applying weights from a probit that uses attrition (yes/no) as dependent variable. In this probit, we use all the variables from model 2 as explanatory variables.

Table 6

Mlogit results with inverse probability weighting (with covariates as in table 5, model 2; only avg. marginal effects for wage expectation variables shown)

	Model without weighting			Model with inverse probab. weights		
	(1)	(2)	(3)	(4)	(5)	(6)
	Working as healthcare employee	Studying nursing	Other option	Working as healthcare employee	Studying nursing	Other option
In wage exp. healthc. empl.: age 25	0.454*** (0.136)	-0.350*** (0.129)	-0.103 (0.117)	0.428*** (0.138)	-0.284** (0.125)	-0.144 (0.119)
In wage exp. healthc. empl.: age 25	-0.119 (0.081)	0.088 (0.082)	0.031 (0.081)	-0.124 (0.086)	0.087 (0.081)	0.037 (0.084)
N	1013			1013		

Standard errors in parentheses; * p<0.10, ** p<0.05, *** p<0.01

¹⁸ The same holds for other combinations of wage expectations variables, such as the ratio of nursing wage to healthcare employee wage, or expected wage growth for both groups.

Table 6 compares the results of the multinomial logit models without weights (columns 1 to 3 are identical to the results presented in table 5, columns 4 to 6) and with weights, which are the inverse of the probability to answer in the follow-up survey. Weighting changes the results for the wage expectation variables only slightly. This finding suggests that sample attrition is not biasing our results.

Inverse probability weighting relies on observables to correct the bias due to attrition. If unobserved variables influence the selection into our follow-up sample, we can correct the resulting bias only by using a selection model. We use a Heckman two-step estimation with a binary college enrolment indicator as dependent variable in the second step. As an additional explanatory variable to explain non-participation in the first step, we include a dummy variable that indicates whether respondents had given us their full name in the first survey. Respondents were not obliged to do so. Those who did not give their name were less likely to answer in the follow-up survey. First, they are probably less inclined to answer because we asked their name explicitly for the purpose of re-contacting them. Second, if the name was missing, we were not able to contact these respondents with a letter in addition to e-mail, which reduced the probability to reach them. This variable is highly significant in the first stage and was excluded from the second stage. The two step model shows no evidence for selection bias (the selection term is insignificant), and the coefficients of the wage expectation variables hardly change compared to the model without selectivity correction. While the results of the weighting and the selection model support our earlier results, we cannot fully exclude the possibility that sample attrition affects the results.

A second concern is that our results might be caused by cognitive dissonance. The argument would be that trainees that intended to study nursing inflated their wage expectations for nursing and decreased them for working as a healthcare employee in order to rationalize their choice. This would lead to an inverse causality problem: we want to show that expectations influence choices, but cognitive dissonance suggests that choices might influence expectations. We think that this is a minor concern for the following reasons: First, we collected expectations in the third year of training before the actual career paths were chosen (one year after training). As trainees could not yet be sure about their future career, they could not condition their expectations on a certain career choice. If cognitive dissonance is a problem at all, it is more likely to occur in cross-section settings where individuals can adapt their subjective beliefs to their actual situation. Second, Zafar (2011) studies the occurrence of cognitive dissonance in a setting similar to ours and does not find evidence for it. He collected subjective beliefs about future career outcomes for a sample of students in their first year and one year later on. During this period, students advanced in their choice for a college major. For a variety of career expectations, Zafar (2011) compared expectations for the chosen major and for alternative choices. He does not find that expectations become more favorable for the chosen major and less favorable for the alternatives, even though choices have been made in the meantime. We cannot make a similar test for trainees' wage expectations as they have realized a choice in the

follow-up survey and earn a wage already (if working). Asking for a wage expectation does not make sense anymore, contrary to Zafar's students who are not yet on the labor market. We can, however, test for a pattern consistent with cognitive dissonance using another variable. In both surveys, we asked individuals whether they would opt for their healthcare training again, with hindsight. The question was asked with identical wording. If cognitive dissonance is at play, we might expect that the actual career path in the follow-up survey influences the answers. We would expect that healthcare employees are more inclined to train as healthcare employee again, than those that study nursing and especially those who do something else. We find that in all three groups, the answers (on a 1 to 6 Likert scale) increase from the first to the second survey. While the increase is not statistically different for those working as healthcare employee and those studying nursing, the third group's increase is higher than for the other two groups. This pattern is not consistent with cognitive dissonance.

Finally, one might challenge our results because college enrolment is a process that happens during many years after graduation from healthcare training. The snapshot taken at the follow-up survey in 2012 might therefore hide the substantial number of healthcare training graduates that will enroll in nursing college in the years to come. While only a further follow-up survey is able to settle this issue definitely, we can make use of respondents' own assessment of their career paths in the next two years. As discussed in section 3.2, we asked respondents for the subjective probabilities they attached to the various possible paths. They had to split the total probability of 100 percent among the four paths shown on top of table 7. Using these probabilities as dependent variables leads to a multivariate fractional regression model (Wooldridge and Papke, 2006; Mullahy, 2011) which can handle share data with values between 0 and 1 as well as boundary values that occur with non-trivial probability. We used the Stata command `fmlogit` provided by Buis (2012).

Table 7 replicates model 2 in table 5 with a different dependent variable: probabilities for future paths replace the actual states in 2012. The estimations reproduce the main result that wage expectations have a significant influence on future career paths. A lower expected wage when working as a healthcare employee at age 25 increases the likelihood to study nursing. Contrary to the results in table 5, the expected wage when working as a nurse at age 25 has a significant effect, too: a higher wage expectation as nurse decreases the likelihood to work as a healthcare employee. Overall, wage expectations as healthcare employee and as nurse operate as we would expect from theory.

Table 7

Fractional mlogit: expected probability of the respondents to be in one of three states in 2014 (stated in the follow-up survey in 2012), average marginal effects

	(1) Working as healthcare employee	(2) Studying nursing	(3) Other option
Mean of dependent variable	0.162	0.479	0.358
ln wage exp. healthcare employee: age 25	0.038 (0.067)	-0.242** (0.112)	0.204** (0.099)
ln wage exp. nurse: age 25	-0.081** (0.035)	0.103 (0.087)	-0.022 (0.078)
N	930		

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; further covariates included in model 2: see list in section 3.4

6. Conclusion

We have investigated the influence of wage expectations on the decision to enroll in nursing college in the context of nurse shortages in Switzerland, as healthcare employees are the main source of nursing students. We find that more than 90 percent of trainees are able and willing to answer questions about their expectations for future wages in different scenarios. The number of implausible values is low; the answers to wage expectations are thus of good quality. We compare the average wage expectations with actual wage data as well as official wage recommendations for healthcare employees and nurses and find that the respective numbers are very close.

These results confirm earlier findings by Dominitz and Manski (1996) and others: survey data on wage expectations yield meaningful and plausible results, with expectations clearly anchored to observable market means. Yet, expected wages exhibit non-negligible dispersion among individuals, even in our case of fairly strictly defined low-dispersion wage scales. A key question is then if dispersion is a reflection of unobserved heterogeneity (with individuals having rather precise information on their own opportunities), of information heterogeneity, or of risk? An interpretation as unobserved heterogeneity loses credibility by the result that personal characteristics usually unobserved, such as abilities and preferences are barely related to wage expectations. Unobserved heterogeneity may stem from a host of factors, but the usual suspects, when observed, have no systematic effect on expected wages. Intuitively plausible is our finding that the dispersion is larger when we ask for more hypothetical situations: wages at higher ages, wages for a possible education in future, rather than the education actually attended. The standard deviations for expected nurses' wages are 44% and 20% higher than those for health care employees at the same age, the interquartile ranges are 33% and 43% higher. This is in line with results reported by Arcidianoco et al. (2012) of improving accuracy of information when students get closer to labor market entrance. So, we tend to attribute the dispersion to differences in information quality and precision.

Our main result is that healthcare trainees' wage expectations partially explain whether they go on to study nursing one year after graduation. If a healthcare trainee expects his or her wage as healthcare employee at age 25 to be lower by 10 percent, his or her probability to study nursing will increase by 3.5 percentage points, on average. Expecting a higher wage as nurse also increases the probability to study nursing, but not significantly so. If we look at respondents' expected career until 2014, however, the expected wage as nurse does have a significant effect, along with the expected healthcare employee wage. Wage expectations help to predict choices: the share of correct predictions increases when we include wage expectations, but modestly so.

Our findings are in line with results of Nicholson and Souleles (2001), Arcidiacono et al. (2012) and Zafar (2011a) about the effect of wage expectations on students' major and specialty choices. We provide evidence, for the first time, that *ex ante* wage expectations have a significant effect on individuals' decision for further, post-secondary schooling.

Only the wage of the presently attended education has a significant effect, which we explain with less uncertainty, or better information, on this wage. If we compress the wage information to a crude measure of the rate of return of continued education, we find no significant effect on actual choice. This suggests that in our data set, the human capital model is too strict, possibly a consequence of increasing information noise in data on more hypothetical situations. We can also interpret our results as indicating myopic decision making, with emphasis on easily observable opportunity cost in favor of more remote perceived future benefits. The observations we have on private preferences, such as discount rates, risk aversion, extrinsic motivation, have effects in the anticipated direction.

Finally, our findings suggest that policies affecting individual costs and benefits of nursing education could play a role in attracting more students to nursing college. In the remainder, we suggest directions for further research on policy measures rather than recommending their immediate implementation, as we have not directly analyzed them.

Reducing healthcare employees' wages seems to be an obvious instrument based on our results if one wants to attract new nurses; but this could in turn reduce the supply of new healthcare employee trainees and thus reduce the pool of potential future nurses. Our finding of more uncertainty attached to expected nursing wages suggests another option: targeted information (e.g. in vocational school and/or in hospitals and nursing homes) about career opportunities for registered nurses, and the benefits associated with these opportunities, might help to reduce uncertainty and thus influence career choice.

Apart from adjusting relative nursing wages, there are other policies that reduce opportunity costs and might increase the demand for nursing college. Nursing colleges could offer part-time studies that allow students to earn a living while studying. The high importance attached to work-life balance by trainees and its negative effect on taking up nursing studies further suggests providing more family-friendly working conditions. This would reduce the cost of studying (e.g., cost for child care) and thus attract additional students to nursing, next to decreasing quit rates of working nurses.

Appendix

Phrasing of questions about wage expectations

The following questions are about your future career. What do you think you will earn per month? Please answer these questions even if you are not entirely sure. Write down the sum that you deem likely (gross without deductions, without allowances).

1. Assume you work as a FaGe after finishing your education. How much do you estimate you would then earn per month in a full-time position?

My (gross) wage per month after training:

My (gross) wage per month at age 25:

My (gross) wage per month at age 35:

2. Assume that you attend and complete an education as nurse after finishing your FaGe education. How much do you estimate you would earn as a registered nurse per month in a full-time position?

My (gross) wage per month at age 25:

My (gross) wage per month at age 35:

Personal characteristics	Explanation on variables included in the multivariate models
Age	Respondents' age at the time of the first survey. Two dummies included in models: "age 18 or younger", "age 24 or older"; reference category: age between 19 and 23
Male	Dummy: female=0, male=1
Number of siblings	3 dummies: "1 sibling", "2 siblings", "3 or more siblings"; ref. cat.: no siblings
Living situation	4 dummies: "lives alone", "lives with partner", "lives with colleagues", "other"; ref.cat.: lives with parent(s)
Parents' education	2x2 dummies: "mother's education: upper-secondary", "mothers' education: tertiary", ref. cat.: mother's education: below upper-secondary; "father's education: upper-secondary", "fathers' education: tertiary", ref. cat.: fathers' education below upper-secondary
Parents' occupational status	2x2 dummies: "mother is supervisor", "mother is self-employed", ref. cat.: mother is neither supervisor nor self-employed; "father is supervisor", "father is self-employed", ref. cat.: father is neither supervisor nor self-employed
Number of books at home	2 dummies: "2 to 4 bookshelves", "5 or more bookshelves"; ref. cat.: 0 or 1 bookshelf
Parents in healthcare	Dummy: Parents do not work in healthcare=0, at least one parent works in healthcare=1
School track attended on lower-secondary level	3 dummies: "medium level", "high level", "other school type"; ref. cat.: low level track
Preferences	
Time preference low	Respondents were asked to choose between two age-earnings profiles (see text in section 3.4). Dummy: "low time preference", i.e., respondent chose profile with less wage in the beginning and more wage later on=1, otherwise=0
Risk averse in business	Item on risk taking with respect to professional career, scale 0 to 10. We reversed the scale to create a risk aversion (instead of risk taking) variable.
Intrinsic motivation	Original scale 1-4, consisting of 4 items on the importance given to 1. autonomy, 2. meaningful tasks, 3. diversified tasks, 4. matching of tasks and one's own skills Dummy =1 if answer is 3.75 or above
Extrinsic motivation	Original scale 1-4, consisting of 3 items on the importance given to 1. wages, 2. career and 3. possibilities for further education Dummy =1 if answer is 3.5 or above
Importance of patient contact	One item on importance given to frequent contact with patients, original scale 1-4 Dummy =1 if answer equals 4
Importance of work-life balance	One item on importance given to reconciling work and family life, original scale: 1-4 Dummy =1 if answer equals 4
Intention to work part-time in the future	2 dummies: "intention to mainly work part-time 50-90%", "intention to mainly work part-time 0-49%" during the next 10 years; ref. cat.: no intention to mainly work part-time
Information on training	
GPA in voc. school	Grade point average in vocational school in the second year of training (i.e. in the year before the first survey took place). Scale: 1 ("very bad") to 6 ("very good")
Includes course to obtain voc. baccalaureate	Dummy: one if trainee follows training track that leads to the vocational baccalaureate degree (in addition to the VET diploma)
Includes prep. course for voc. baccalaureate	Dummy: one if trainee follows additional course in VET school that prepares for the vocational baccalaureate education after completion of training
Type of training firm	Type of the firm where trainee has signed training contract and receives healthcare training. 5 dummies: "long-term care", "psychiatric care", "rehabilitation", "home

	care”, “other”; ref. cat.: acute hospital
Subjective assessment	
Self-efficacy in general education	Scale 1-6; based on 5 items measuring whether respondent believes in his or her ability to succeed in general education lessons in vocational school
Self-efficacy in work tasks	Scale 1-6; based on 4 items measuring whether respondent believes in his or her ability to succeed in a work situation
Satisfaction with training	Scale 1-6; based on 9 items about satisfaction with in-company training and with vocational school
Professional commitment	Scale 1-6; based on 6 items about commitment to the profession “healthcare employee”
Stress during training	Scale: 1-6; self-assessment of psycho-physical stress at work based on 5 items
Cantonal dummies	

Table A1

Descriptive statistics of the variables used in the multivariate models, n=1013 (valid cases in table 2)

	Overall mean	Std. dev.	Group means		
			(1) Working as healthcare employee	(2) Studying nursing	(3) Other
Personal characteristics					
Male	.060		.060	.019	.121
Age < 18y	.429		.314	.539	.464
Age > 23y	.010		.019	.003	.004
1 sibling	.401				
2 siblings	.333				
3 or more siblings	.219				
Lives with partner	.046		.070	.025	.038
Lives with colleague(s)	.028		.046	.014	.017
Other living situation	.012		.014	.006	.017
Mother’s education: upper secondary	.683		.671	.689	.695
Mother’s education: tertiary	.170		.152	.172	.197
Father’s education: upper secondary	.615		.609	.681	.527
Father’s education: tertiary	.280		.268	.242	.360
Father self-employed	.222		.220	.236	.205
Father is supervisor	.458		.420	.494	.469
Mother self-employed	.096		.116	.078	.088
Mother is supervisor	.189		.217	.169	.167
Bookshelves at home: 2 to 4	.442		.440	.453	.431
Bookshelves at home > 4	.289		.251	.292	.351
Parents in healthcare	.384		.379	.417	.343
Lower-secondary school: attended medium track	.623		.568	.686	.623
Lower-secondary school: attended highest track	.063		.046	.061	.096

Preferences					
Time preference low	.690		.640	.739	.703
Risk-taking in career	5.08	2.43	5.32	4.74	5.16
Intrinsic motivation	.589		.587	.611	.561
Extrinsic motivation	.516		.464	.592	.494
Importance of patient contact	.591		.577	.661	.510
Importance of work-life balance	.696		.710	.689	.682
Intention to work part-time in future: 50-90%	.417		.457	.353	.431
Intention to work part-time in future: < 50%	.032		.029	.019	.054
Information on training					
GPA in voc. school	5.16	0.41	5.07	5.25	5.18
Includes course to obtain voc. baccalaureate	.150		.097	.153	.238
Includes prep. course for voc. baccalaureate	.062		.019	.047	.159
Type of training firm: long-term care	.439		.514	.392	.381
Type of training firm: psychiatric care	.059		.070	.047	.059
Type of training firm: rehabilitation	.037		.029	.039	.046
Type of training firm: home care	.054		.046	.064	.054
Type of training firm: other	.026		.031	.017	.029
Subjective assessment					
Self-efficacy in general education	4.60	0.84	4.48	4.66	4.71
Self-efficacy in work tasks	4.82	0.57	4.82	4.87	4.75
Satisfaction with training	4.31	1.17	4.40	4.42	3.99
Professional commitment	4.71	0.95	4.81	4.79	4.44
Stress during training	2.55	0.89	2.62	2.46	2.55
Wage expectation					
as healthcare employee, age 25	4530	571	4600	4469	4501
as nurse, age 25	5389	849	5416	5371	5370
No. of observations		1013	414	360	239

Table A2

Correlations between five elicited wage expectations (in logs)

Log wage expectations	Healthcare employee, starting wage	Healthcare employee, age 25	Healthcare employee, age 35	Nurse, age 25	Nurse, age 35
Healthcare employee, starting wage	1.000	0.637	0.473	0.287	0.241
Healthcare employee, age 25	0.637	1.000	0.775	0.366	0.417
Healthcare employee, age 35	0.473	0.775	1.000	0.370	0.527
Nurse, age 25	0.287	0.366	0.370	1.000	0.876
Nurse, age 35	0.241	0.417	0.527	0.876	1.000

References

- Arcidiacono, P., Hotz, J., Kang, S., 2012. Modeling College Major Choices using Elicited Measures of Expectations and Counterfactuals. *Journal of Econometrics* 166(1), 3-16.
- Askildsen, J., Baltagi, B., Holmas, T., 2003. Wage Policy in the Health Care Sector: A Panel Data Analysis of Nurses' Labour Supply. *Health Economics* 12(9), 705-719.
- Becker, G. S., 1967. Human Capital and the Personal Distribution of Income. W. S. Woytinsky Lecture No. 1. Ann Arbor: University of Michigan.
- Belzil, C., Hansen, J. 2002. Unobserved Ability and the Return to Schooling. *Econometrica* 70(5), 2075-2091.
- Beffy, M., Fougère, D., Maurel, A., 2012. Choosing the field of study in postsecondary education. Do expected earnings matter? *Review of Economics and Statistics* 94(1), 334-347.
- Betts, J., 1996. What Do Students Know About Wages? Evidence from a Survey of Undergraduates. *Journal of Human Resources* 31(1), 27-56.
- Botelho, A., Pinto, L., 2004. Students' expectations of the economic returns to college education: results of a controlled experiment. *Economics of Education Review* 23(6), 645-653.
- Brunello, G., Lucifora, C., Winter-Ebmer, R., 2004. The wage expectations of European college students. *Journal of Human Resources* 39(4), 1116-1142.
- Buis, M., 2012. FMLOGIT: Stata module fitting a fractional multinomial logit model by quasi maximum likelihood. RePEc:boc:bocode:s456976
- Chen, S., 2008. Estimating the variance of wages in the presence of selection and unobserved heterogeneity. *Review of Economics and Statistics* 90(2), 275-289.
- Cunha, F., Heckman, J., Navarro, S., 2005. Separating uncertainty from heterogeneity in life cycle earnings. *Oxford Economic Papers* 57(2), 191-261.
- DEA Federal Department of Economic Affairs, 2010. Education in the nursing professions. Report. Bern: Federal Department of Economic Affairs.
- Di Tommaso, M.L., Strøm, S., Sæther, E.M., 2009. Nurses wanted: Is the job too harsh or is the wage too low? *Journal of Health Economics* 28(3), 748-757.
- Ding, X., Hartog, J., Sun, Y., 2010. Can We Measure Individual Risk Attitudes in a Survey?, Tinbergen Institute Discussion Papers 4807.
- Dominitz, J., Manski, C., 1996. Eliciting Student Expectations of the Return to Schooling. *Journal of Human Resources* 31(1), 1-26.
- Elliott, R.F., Ma, A.H.Y., Scott, A., Bell, D., Roberts, E., 2007. Geographically differentiated pay in the labour market for nurses. *Journal of Health Economics* 26(1), 190-212.
- Filippin, A., Ichino, A., 2005. Gender wage gap in expectations and realizations. *Labour Economics* 12(1), 125-145.
- Frederick, S., Loewenstein, G., O'Donoghue, T., 2002. Time discounting and time preference: A critical review. *Journal of Economic Literature* 40(2), 351-401.

- FSO Federal Statistical Office, 2010. Gesundheitspersonal in der Schweiz – Bestandesaufnahme und Perspektiven bis 2020. Neuchâtel: Bundesamt für Statistik.
- Hartog, J., Ding, X., Liao, J., 2013 (forthcoming). Is Earnings Uncertainty Relevant for Educational Choice? An Empirical Analysis for China.
- Jaccard Ruedin, H., Widmer, M., 2010. Ausländisches Gesundheitspersonal in der Schweiz (Obsan Bericht 39). Neuchâtel: Schweizerisches Gesundheitsobservatorium, Bundesamt für Statistik.
- Jensen, R., 2010. The (Perceived) Returns to Education and the Demand for Schooling. *Quarterly Journal of Economics* 125(2), 515-548.
- Jerrim, J., 2011. Do UK higher education students overestimate their starting salary? *Fiscal Studies* 32(4), 483-509.
- Keane, M., Wolpin, K., 1997. The Career Decisions of Young Men. *Journal of Political Economy* 105(3), 473-522.
- Kodde, D., 1986. Uncertainty and the demand for education. *Review of Economics and Statistics* 68(3), 460-467.
- Lizarondo, L., Kumar, S., Hyde, L., Skidmore, D., 2010. Allied health assistants and what they do: A systematic review of the literature. *Journal of Multidisciplinary Healthcare* 39(3), 143-153.
- Manski, C., 1993. Adolescent Econometricians: How Do Youth Infer the Returns to Schooling? In: Clotfelter, C., Rothschild, M. (Eds.), *Studies of Supply and Demand in Higher Education*. University of Chicago Press, p. 43-60.
- Manski, C., 2004. Measuring Expectations. *Econometrica* 72(5), 1329-1376.
- Manski, C., 2007. *Identification for Prediction and Decision*. Cambridge (MA) and London: Harvard University Press.
- Menon, M., 2008. Perceived rates of return to higher education: Further evidence from Cyprus. *Economics of Education Review* 27(1), 39-47.
- Mullahy, J., 2011. Multivariate Fractional Regression Estimation Of Econometric Share Models. UCD Geary Institute Discussion Paper 2011/33.
- Nicholson, S., 2005. How Much Do Medical Students Know About Physician Income? *Journal of Human Resources* 40(1), 100-114.
- Nicholson, S., Souleles, N., 2001. Physician Income Expectations and Specialty Choice. NBER working paper 8536.
- OPET Federal Office for Professional Education and Technology, 2012. *Facts and figures*. Bern: Federal Office for Professional Education and Technology.
- Papke, L., Wooldridge, J., 1996. Econometric Methods for Fractional Response Variables with an Application to 401(k) Plan Participation Rates. *Journal of Applied Econometrics* 11(6), 619-632.
- Schweri, J., Hartog, J., Wolter, S., 2011. Do students expect compensation for wage risk? *Economics of Education Review* 30(2), 215-227.
- Shields, M.A., 2004. Addressing nurse shortages: What can policy makers learn from the econometric evidence on nurse labour supply? *The Economic Journal*, 114(499), F464-F498.

- Shields, M.A., Ward, M., 2001. Improving nurse retention in the National Health Service in England: the impact of job satisfaction on intentions to quit. *Journal of Health Economics* 20(5), 677-701.
- Simoens, S., Villeneuve, M., Hurst, J., 2005. Tackling Nurse Shortages in OECD Countries. OECD Health Working Papers No. 19.
- Spetz, J., 2002. The value of education in a licensed profession: the choice of associate or baccalaureate degrees in nursing. *Economics of Education Review* 21(1), 73-85.
- Spetz, J., Given, R., 2003. The Future of the Nurse Shortage: will Wage Increases Close the Gap? *Health Affairs* 22(6), 199-206.
- Spitzer, A., Perrenoud, B., 2007. Reforming the Swiss nurse education system: a policy review. *International Journal of Nursing Studies* 44, 624-634.
- Staiger, D., Spetz, J., Phibbs, C., 2010. Is There Monopsony in the Labor Market? Evidence from a Natural Experiment. *Journal of Labor Economics* 28(2), 211-236.
- Trede, I., Schweri, J., 2013. Laufbahnentscheidungen von Fachfrauen und Fachmännern Gesundheit. Zusammenfassende Erkenntnisse und Bewertung. Zollikofen and Bern: Swiss Federal Institute for Vocational Education and Training and OdaSanté.
- Trede, I., Schweri, J., 2014 (forthcoming). Work values and intention to become a registered nurse among Swiss healthcare assistants: a cross-sectional analysis. *Nurse Education Today*.
- Walton, S.M., Graves, P.E., Sexton, R.L., 2005. New Entry and the Rate of Return to Education: The Case of Registered Nurses. *Atlantic Economic Journal* 33, 325-336.
- Webbink, D., Hartog, J., 2004. Can students predict their starting salaries? Yes! *Economics of Education Review* 23(2), 103-113.
- Willis, R., Rosen, S., 1979. Education and self-selection. *Journal of Political Economy* 87(5), S7-S36.
- Wolter, S., 2000. Wage expectations: A comparison of Swiss and US Students. *Kyklos* 53, 51-69.
- Wolter, S., Zbinden, A., 2001. Labour Market Expectations of Swiss University Students. *International Journal of Manpower* 23, 458-470.
- Zafar, B., 2011a. How do College Students Form Expectations? *Journal of Labor Economics* 29(2), 301-348.
- Zafar, B., 2011b. Can subjective expectations data be used in choice models? Evidence on cognitive biases. *Journal of Applied Econometrics* 26(3), 520-544.