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Abstract

This paper analyzes whether and how attending an internship during tertiary education affects income. We address endogeneity with an IV approach that exploits information regarding whether the internship was a mandatory component of the study. We further address selection into programs with mandatory internship by using the share of mandatory internships at the closest university, exploiting the low mobility of Swiss students. The results suggest that doing an internship increases income. In contrast to the literature on internships we find that the effect mainly works by increasing human capital rather than through signaling, and mainly works through general rather than firm- or field-specific human capital.

JEL: I23, J01, J31

Keywords: Internship, Income, Human capital, Signaling, Soft skills, Experience

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1. Introduction

To succeed on the labor market, tertiary graduates increasingly need soft skills and experience in addition to the hard skills acquired during their education. For example, Swiss job advertisements from 1970 to 2008 show a six fold increase in the demand for experience (Salvisberg, 2010). The value of soft skills has also increased on the American labor market in the past two decades (Deming, 2017). Therefore, tertiary education needs to provide soft skills and experience in order to set graduates up for employment.

In response to criticism that they put too little emphasis on soft skills and experience (e.g., Boyce, Williams, Kelly, & Yee, 2001; Hancock, et al., 2009) tertiary education institutions have addressed the issue by introducing internship requirements (e.g. Silva, et al., 2018). Soft skills seem to require different learning processes than hard skills do (Raelin, 1997), though only limited evidence exists on the optimal learning environment of soft skills (e.g. Shepherd, 1998; Brunello & Schlotter, 2011). However, Bolli and Renold (2017) find that the workplace has a distinct comparative advantage over the classroom for learning soft skills. Students who spend time learning soft skills in the workplace also acquire experience, which increases their employability (Helyer & Lee, 2014).

While a rich literature analyzes the perceived benefits of internships (e.g. Beck & Halim, 2008; Shoenfelt, Stone, & Kottke, 2013) and correlations between internships and labor market outcomes (e.g. Gault, Redington, & Schlager, 2000; Reimer & Schröder, 2006; Shaw, 2012), far fewer papers use identification strategies that can tackle the issue of self-selection. Klein and Weiss (2011) and Weiss, Klein and Grauenhorst (2014) find no wage effects using a propensity score matching approach based on mandatory internships, while Siedler, Saniter and Schumann (2016) find positive wage effects based on changes in mandatory internships. McKenzie, Assaf and Cusolito (2016) evaluate a randomized experiment and find a 73% income increase from an internship program in Yemen. Nunley et al. (2016) exploit data from a résumé audit, suggesting that internship experience increases interview requests, as do Baert et al. (2019). The authors of the former study try to identify the channel through which internships create effects and attribute them to signaling (Spence, 1973). Thus far, there is conflicting evidence on the effect of internships on income and employment, and scant information on the channel through which effects might flow.

This paper analyzes the impact of internships during tertiary education on incomes one and five years after graduation, then explores both signaling and human capital explanations for internships' effects. We use data from the Swiss Graduate Survey in 2007, 2009, and 2011, which contains information on graduates' personal characteristics, education, transition to work, and current employment. To identify the effect of internship we first follow Siedler, Saniter and Schumann (2016) in exploiting variation in internships being mandatory for graduation. Since the presence of mandatory internships might affect the student's choice of university department, we further take the average of mandatory internships at the closest university that offers a particular program as an instrument, exploiting the low mobility of Swiss students.

Our results show that completing an internship increases graduates' income. We find evidence that the main mechanism is human capital, not signaling, and further that it is general human capital rather than the field- or firm-specific types. This contradicts the literature on internships, which often attribute benefits to more specific types of human capital. Overall, we find internships to have a positive impact on incomes because they foster general human capital accumulation. Since general human capital is related to soft skills and experience overall—not in one particular field or company, internships appear to be achieving their purpose.

2. Theoretical Background and Hypotheses

Education systems build human capital in societies by preparing participants for employment (Klieme, et al., 2007). Therefore—in addition to many other purposes—the programs in an education system must impart knowledge and skills (human capital) that can help individuals be employable and productive in a firm. Tertiary education programs do not always meet that goal. Employers complain that graduates from tertiary education do not bring the right skills with them, especially when it comes to soft skills (Matsouka, 2016). Universities' attempts to provide those skills have had limited results (Cranmer, 2006). Although soft skills are important for success in life (Heckman & Kautz, 2012), they are not transmitted by tertiary education.

Employers can also invest in human capital, not just educators (Becker, 1964). Bolli and Renold (2017) show that soft skills are better learned in workplaces, not schools. Experience—practical knowledge and skills from direct observation and participation (Merriam-Webster Dictionary)—is only gained at work. This is the insight behind

Wilson's (2012) recommendation of facilitating tertiary education graduates' labor-market entry by equipping them with experience during their studies. His suggestions for providing experience are sandwich degree programs, internships, and work-based degree programs in tertiary education.

Various studies suggest that doing an internship during tertiary education has a positive impact on both soft skills and experience (e.g. Brooks, Cornelius, Greenfield, & Joseph, 1995; Sarcletti, 2009; Helyer & Lee, 2014; Silva, et al., 2018). According to Brooks, Cornelius, Greenfield and Joseph (1995), senior students with internship experience have more work-relevant skills, specific knowledge of their occupation, and clearer career goals. In this line, Sarcletti (2009) argues that internships provide occupation-specific skills, and Helyer and Lee (2014) state that students with internships are more employable because of their experience. Weible (2009) summarizes the benefits of internships for students, employers, and universities. For students, the benefits include higher salaries, shorter job searching, more job offers, and improved skills. To sum up the anecdotal evidence, an internship combines the acquisition of soft skills and experience, thereby enhancing employability and facilitating the transition from tertiary education into the labor market.

Theoretically, an internship is an investment—paid for by accepting low or no wages—in skills that increases an individual's productivity (human capital theory; Becker, 1964). Higher productivity in turn entails higher income on the labor market. Experience also directly increases income (Mincer, 1974). Internships should increase income through greater human capital and acquired experience. Therefore, we specify our first hypothesis that:

H1: Internships increase income among university graduates

Existing studies examining the effect of internships on labor market outcomes causally have found mixed evidence for their effect on income. Klein and Weiss (2011) and Weiss, Klein, and Grauenhorst (2014) analyze mandatory internships in tertiary education with a propensity-score-matching approach and find no effect on wages five years after graduation. McKenzie, Assaf and Cusolito (2016) also find no significant effect of internships on average monthly income in a randomized experimental setting. In contrast, Siedler, Saniter, and Schumann (2016) find substantial effects of internships during studies on graduates' wage returns (about six percent) using the

variation in mandatory internships as an instrument. This last study is in line with our expectation.

There are various ways channels through which an internship might influence income. Identifying the channel through which internships affect income—if they do so—is our second research question. One possible channel through which internships might work is signaling (Spence, 1973). Employers on the labor market suffer from information asymmetry as they are not able to observe the productivity of graduates before they hire them. Thus, employers look for signals indicating the graduate's productivity. Completing an internship might serve as such a signal because more able graduates should more easily find an internship position. Furthermore, having had a position at a more prestigious firm also indicates graduate's motivation and productivity (Sarcletti, 2009).

The second channel of internship effects on income is screening (Stiglitz, 1975). In this case, employers use the internship as an opportunity to evaluate potential future employees and to glean information about their actual productivity. This reduces the information asymmetry associated with hiring a worker of unknown productivity. According to Autor (2001) firms provide training to screen future employees and select higher-ability candidates. This could also apply to internships.

The third major channel through which internships might increase income is by improving human capital and thereby the productivity of graduates through the acquisition of skills (Becker, 1964). Becker (1964) differentiates between general human capital and specific human capital. General human capital would be the case where internship graduates learn transferable workplace skills that apply in any field or workplace. Specific human capital is acquired when the internship teaches occupation- or firm-specific skills.

There is one remaining way internships might affect graduates' income. This possibility is based on social network theory (Granovetter, 1973). Here, the idea is that graduates find employment through connections they make during their internships. However, our data does not allow us to test this possibility. We focus on signaling, screening, and human capital and leave the networking case to further research.

According to Spence (1973) it is also possible that both the human capital and signaling channels operate simultaneously. Therefore, we formulate hypotheses that specifically identify the expected impact of internships on income in the case of each channel of

influence. We further differentiate between specific skills and general skills in the human capital channel.

We begin with the signaling channel. We expect a signaling effect if the internship has an effect on income in the short run, caused by a hiring bump from the signal. We do not expect any effect in the long run because the internship is affecting the graduates' signaling power but not skills. If graduates' and companies' quality varies, we might expect an effect only for firm switchers (Hopkins, 2012). However, we cannot observe quality, so we do not hypothesize that signaling will systematically increase wages for firm switchers over stayers. Signaling should increase wages in the short term—but not long term—for all graduates who complete an internship.

For screening, we also expect a short-term but not long-term effect on graduates' wages. Like signaling, there is a hiring bump from the signal but no change in productivity, so the effect should not persevere into the long term. In the screening case, however, we expect the effect to apply to firm stayers, not firm switchers. The information asymmetry is resolved for the internship firm, but not for a switch firm. Therefore, we formulate the following hypothesis for both signaling and switching:

H2: Internship increases income in the short-run but not in the long run.

If H2 is true, we need to differentiate between signaling and screening. Therefore, we test the following hypotheses when H2 is true, for signaling and screening respectively:

H2a: Internship increases short-run income for both firm stayers and firm switchers,

H2b: Internship increases short-run income for firm stayers, not firm switchers.

There is evidence in the literature for the signaling channel. Weiss, Klein and Grauenhorst (2014) find significant effects of internship on labor market outcomes right after graduation but not in the long run. Therefore, they come to the conclusion that the channel is signaling. Nunley, Pugh, Romero and Seals (2016) cite four pieces of evidence from their résumé audit study that support the internship-as-signal concept: no positive interaction of internship with post-graduation work experience, an internship effect size almost as large as that of post-graduate work experience, four-year-past internships still having an effect, and effects concentrated in the initial stage of the hiring process.

Our third hypothesis concerns the human capital channel generally. If internships increase graduates' skills and therefore productivity, they should increase their earnings both in the short- and long runs. Therefore, the channel of impact is human capital if:

H3: Internships increase income in the short run and in the long run.

The final set of hypotheses differentiate between general and specific human capital. We test these when H2 is not true and H3 is true. An internship would work through general human capital if the graduate acquires soft skills and experience that are transferable to other firms and other occupations. Calling soft skills general human capital is plausible, as those skills can be transferred to other occupations and firms. For example working in a team or being able to communicate can be used anywhere. Therefore, general skills should be applicable in any firm or field, regardless of firm switching or horizontal mismatch.

H3a: Internships increase income for firm stayers and firm switchers,

H3b: Internships increase income for field stayers and field switchers.

Thus far, there is no causal evidence identifying general human capital as the channel through which internships affect income. Skills gained in an internship may be a mix between general and specific human capital (Stevens, 1994), making them partially transferable to other occupations or firms.

If internships provide specific human capital, the skills a graduate gains during their internship are only useful when working in the same field as the one studied, or in the same firm where the internship took place (e.g. Neal, 1999; Sullivan, 2010).

For example, if skills are firm-specific human capital (Derek, 1995), then the skills acquired during an internship are useful in a specific firm, as in the case of proprietary machinery or practices. Accordingly, our hypothesis testing for firm-specific skills looks for income improvement only when graduates remain in the firm where they did their internship, stating:

H3c: Internships increases income for firm stayers, not firm switchers.

The empirical evidence on the effect of experience through firm-specific human capital finds no effect on labor market outcomes (Dustmann & Meghir, 2005; Weber & Falter, 2011).

For field-specific human capital, the graduate would do an internship in an occupation that matches their field of study, then go on to work in that field (horizontal match). This is also in line with the skills-beget-skills approach of Cunha and Heckman (2007), which states that there is a multiplier effect when earlier investments in skills are followed by later investments. In that case, the field of work needs to match the field of study for internships to have positive effects. Our hypothesis to test for occupation-specific human capital is:

H3d: Internships increase income for field stayers, not field switchers.

Evidence on the effect of occupation-specific (also called field-related) human capital on labor market outcomes is plentiful (e.g. Brennan, Blasko, Little, & Woodley, 2002; Sarcletti, 2009; Weber & Falter, 2011; Geel & Backes-Gellner, 2012; Weiss, Klein, & Grauenhorst, 2014). The only study finding causal evidence for occupation-specific human capital from internships is Weiss, Klein, and Grauenhorst (2014). Table 1 summarizes our hypotheses by channel.

Table 1: Summary of hypotheses by channel and criteria

Channel	Hypothesis	
Any	H1	Internships increase income
Signaling or Screening	H2	Internships increase short-run income, no effect on long-run income
Signaling	H2a	Internships increase short-run wages for both firm stayers and firm switchers
Screening	H2b	Internships increase short-run wages for firm stayers, not firm switchers
Human Capital	H3	Internships increase income in both the short- and long run
General Skills	H3a	Internships increase income for firm stayers and firm switchers
	H3b	Internships increase income for field stayers and field switchers
Specific Skills	H3c	Internships increase income for firm stayers, not firm switchers
	H3d	Internships increase income for field stayers, not field switchers

3. Data and Econometric Framework

To test our hypotheses, we analyze data from three waves of the Swiss Graduate Survey[5]. Our sample includes all Swiss university graduates in 2006, 2008 and 2010. Each wave of students is surveyed twice, one and five years after graduation. Table A1 describes all of the variables we use in our estimations and Table 2 provides the corresponding summary statistics.

In order to ensure sample homogeneity, we drop PhD students and teaching students. Furthermore, we balance the sample by dropping students who are not employed either one or five years after graduation. Switzerland has two university types: universities of applied sciences and conventional universities. We focus on only the graduates of conventional universities to maintain generalizability. Dropping observations with missing values yields a sample of 8,821 total graduates.

As shown in Table 2, the dataset is a balanced panel with observations at two points in time, one and five years after graduation. The table shows the short-run, long-run, and time-invariant summary statistics for the sample.

[5] https://www.bfs.admin.ch/bfs/en/home/statistics/education-science/surveys/ashs.html

Table 2: Summary Statistics

	Obs	Mean	Std. Dev.	Min	Max
Short-run					
Full-time equivalent income (1'000)	8,821	103	253.00	0.15	21700
Sameemp	8,821	0.06	0.24	0	1
Mismatch	8,821	0.62	0.49	0	1
Age	8,821	28.01	3.96	22	60
Long-run					
Full-time equivalent income (1'000)	8,821	129	113.00	2	2520
Sameemp	8,821	0.03	0.17	0	1
Mismatch	8,821	0.59	0.49	0	1
Age	8,821	32.01	3.96	26	64
Time-invariant					
Intern	8,821	0.57	0.50	0	1
Share of mandatory internship	8,821	0.17	0.18	0	0.76
Working field-related	8,821	0.78	0.41	0	1
Working non-field-related	8,821	0.66	0.47	0	1
Male	8,821	0.47	0.50	0	1
Swiss	8,821	0.96	0.20	0	1

We use a generalized Mincerian specification that includes work experience (Ashworth, Hotz, Maurel, & Ransom, 2017), estimating the following OLS estimations with the wage of student *i* at time *t* (=*t1, t2*) as the dependent variable:

$$lnwage_{it} = \alpha_t + \beta_1 t1 * Intern_{it} + \beta_1 t2 * Intern_{it} + \beta_3 x_{it} + \alpha_y + \alpha_{tu} + \alpha_{tf} + \alpha_{tl} + \varepsilon_{it} \quad (1)$$

α_t represents a fixed effect for the surveys five years after graduation. The main coefficients of interest are β_1 and β_2, which capture the effect of doing an internship one year and five years after graduation, respectively. Since we are interested in whether the two coefficients differ to test H2a and H3, we also estimate a version of (1) that reveals the difference of the two coefficients:

$$lnwage_{it} = \alpha_t + \beta_1 Intern_{it} + \beta_2 t2 * Intern_{it} + \beta_3 x_{it} + \alpha_y + \alpha_{tu} + \alpha_{tf} + \alpha_{tl} + \varepsilon_{it} \quad (2)$$

The vector of observable characteristics, x_{it}, includes age, dummy variables for gender, having Swiss nationality, education of the mother, education of the father and pre-university canton of residence. Most importantly, we include two dummy variables indicating whether the student worked while studying and whether or not that job was related to their field of study. These dummies capture unobserved heterogeneity regarding the choice to work while studying.

We include fixed effects for the year (α_y), plus time-specific fixed effects for university (α_{tu}, 13 universities), scientific field (α_{tf}, 19 fields) and education level (α_{tl}, *Lizenziat* [pre-Bologna Reform university degree], Bachelor, Master). ε denotes the robust error term clustered at the university-field level.

Equation 1 tests H1. Comparing the effects in *t=1* and *t=2* also tests H2a and H3, which rely on whether internships increase wages in the short and long runs. For H2a, internships should increase short-run income because they operate through the signaling channel. For H3, internships should increase wages in both the short- and long runs because they work by increasing human capital.

H2b and H3d look at the difference in internships' impact on wages for firm switchers and stayers, while H3b expects no difference between the two groups. In H2b, firm switchers should have greater wage effects from internships because the internship is a signal for potential outside employers. In H3d, firm stayers should have greater wage effects because they use firm-specific human capital. H3b holds that internships effect wages though general human capital, so there should be no difference between firm stayers and switchers. In order to test these hypotheses, we estimate

$$lnwage_{it} = \alpha_t + \alpha_{Stay} + \beta_1 SameEmp * Intern_{it} + \beta_2 OtherEmp * Intern_{it} + \beta_3 x_{it} + \alpha_y + \alpha_{tu} + \alpha_{tf} + \alpha_{tl} + \varepsilon_{it} \quad (3).$$

H3a and H3c deal with the difference between working in one's field of study or in a different field. H3c suggests that internships increase wages more for students who work in a job related to their field of study because the human capital is field-specific. H3b, in contrast, holds that internships generate general human capital and therefore should improve wages regardless of occupational field. We test these hypotheses by estimating

$$lnwage_{it} = \alpha_t + \alpha_{Mismatch} + \beta_1 Match * Intern_{it} + \beta_1 Mismatch * Intern_{it} + \beta_3 x_{it} + \alpha_y + \alpha_{tu} + \alpha_{tf} + \alpha_{tl} + \varepsilon_{it} \quad (4).$$

In order to address the potential endogeneity of doing an internship, we use an instrumental variable with two types of instruments. The first exploits information on how frequent mandatory internships are in each university-field, as suggested by Siedler, Saniter and Schumann (2016). However, this instrument might be biased because the presence of mandatory internships might affect the choice of university departments. Therefore, the second instrument type uses the average of mandatory internships at the closest university offering a particular field as an instrument. Hence, this approach exploits the fact that Swiss students tend to go to the university closest to where they lived before studying (Denzler & Wolter, 2011).

Formally, we estimate 2SLS[6] estimations that combine equation (1) with

$$t * Intern_{it} = \alpha_t + \gamma_1 t1 * MandShare_{it} + \gamma_2 t2 * MandShare_{it} + \gamma_3 x_{it} + \alpha_y + \alpha_{tu} + \alpha_{tf} + \alpha_{tl} + \varepsilon_{it} \quad (5).$$

The 2SLS equations for equations 2, 3 and 4 are similar to 5.

Table A3A in the appendix shows the full estimates of short-run and long-run effects Table A3B shows the first-stage estimates of short-run and long-run effects. Table A4A shows the full estimates of effect heterogeneity for firm switchers and firm stayers. Finally Table A5B shows the first-stage results for field stayers and field switchers.

4. Results

We start by testing whether internships have an effect on graduates' wages (H1). We find that, with controls (Table A1) and accounting for endogeneity with an instrumental variable approach, internships have a 16.2% short-term and 14.8% long-term positive impact on wages. Table 3 shows all estimations. Therefore, we conclude that internships do increase income, accepting H1.

[6] Accounting for the non-continuous character of dependent variables yields qualitatively the same results.

Table 3: Short-run and long-run effects of internships on wage

	M1	M2	M3	M4
Full Sample				
Short-Run	-0.036**	0.232**	0.189	0.162*
	(0.015)	(0.091)	(0.201)	(0.085)
Long-Run	0.021	0.218***	0.402*	0.148**
	(0.013)	(0.069)	(0.234)	(0.070)
Difference	0.057***	-0.014	0.213	-0.014
	(0.016)	(0.098)	(0.198)	(0.098)
N	17642	17642	17642	17642
F-Test		51.549	14.837	103.924
Model	OLS	2SLS	2SLS	2SLS
Instrument	None	Mand Share Program	Mand Share Closest University	Mand Share Program
Controls	Yes	No	No	Yes

Notes: The table displays OLS and 2SLS coefficients and robust standard errors clustered on department level. Short- and long-run refer to one and five years after studying, respectively. Difference refers to the difference between the short-run and long-run coefficients. F-Test shows the instrument strength in the first stage. All estimates include dummies for wave, the year, as well as wave-specific dummies for the university, study field and education level. Estimates with controls further include gender, age, being Swiss, education of mother and father, the living canton before studying, whether students had study-related work and whether students had study-unrelated work.

Next, we test whether the effect comes through a signaling/screening or human capital channel by examining whether it affects short-term wages only (H2) or both short- and long-term wages (H3). From the same results in Table 3, we reject H2 and accept H3, indicating that the wage impact operates through a human capital channel. Therefore, H2a and H2b are automatically rejected.

To test whether the human capital effect is due to general skills or specific skills, we test the wage effects of internships on firm and field stayers and switchers (H3a, H3b, H3c, and H3d). We begin with firm switchers and firm stayers. If both firm stayers and switchers have wage improvements, it is general human capital (H3a). If firm stayers have positive wage impacts but firm switchers do not, it is evidence for firm-specific human capital (H3c).

Table 4 compares firm switchers and firm stayers. With controls and the instrumental variable approach, firm switchers do better than stayers in the short run (16.4% wage improvement compared to no effect), and the same in the long run (16.8% improvement and no effect for switchers and stayers, respectively). This supports the general human capital approach, but because there is no effect for firm stayers—rather than the predicted similar positive effect—it does not match the hypothesis perfectly.

This may be because of the very low number of individuals who are still with their internship firm five years after graduation. Therefore, we reject H3c and accept H3a that the channel is general human capital with regard to firm-related skills. However, we need to reinforce this finding with field-related skills to complete the analysis and because the results did not match H3a perfectly.

Table 4: Effect heterogeneity for firm switchers and firm stayers

	M1	M2	M3	M4
Short-Run				
OtherEmp	-0.035**	0.251***	0.236	0.164*
	(0.015)	(0.090)	(0.199)	(0.085)
SameEmp	-0.030	0.041	-0.146	0.052
	(0.041)	(0.158)	(0.339)	(0.133)
Difference	0.005	-0.210	-0.382	-0.112
	(0.041)	(0.143)	(0.258)	(0.119)
N	8821	8821	8821	8821
F-Test		54.034	8.352	53.597
Long-Run				
OtherEmp	0.021	0.229***	0.421*	0.168**
	(0.013)	(0.072)	(0.240)	(0.072)
SameEmp	0.057	0.002	0.053	0.076
	(0.055)	(0.146)	(0.266)	(0.137)
Difference	0.035	-0.228	-0.368	-0.092
	(0.054)	(0.160)	(0.247)	(0.153)
N	8821	8821	8821	8821
Partial R2		56.939	7.630	55.656
Model	OLS	2SLS	2SLS	2SLS
Instrument	None	Mand Share Program	Mand Share Closest University	Mand Share Program
Controls	Yes	No	No	Yes

Notes: The table displays OLS and 2SLS coefficients and robust standard errors clustered on department level. Short- and long-run refer to one and five years after studying, respectively. Difference refers to the difference between OtherEmp and SameEmp coefficients. F-Test shows the instrument strength in the first stage. All estimates include dummies for wave, the year, as well as wave-specific dummies for the university, study field and education level. Estimates with controls further include gender, age, being Swiss, education of mother and father, the living canton before studying, whether students had study-related work and whether students had study-unrelated work.

Finally, we examine the difference between field stayers and field switchers to determine whether the human capital effect has to do with occupation- or field-specific skills (H3d) or general skills (H3b). We expect that internships increase income for field stayers, not field switchers if the skills are field-specific (H3d), and that the effect is for both field stayers and switchers if the skills are general. Table 5 shows the difference in effects depending on field match or mismatch. With controls and the instrumental

variable approach, there is no short-term effect for stayers but some advantage for switchers who do an internship. In the long run, both field stayers and switchers are better off for having done an internship (15.8% and 16.7% better, respectively). Therefore, we reject H3c and accept H3a that the main channel is general human capital.

Table 5: Effect heterogeneity for field stayers and field switchers

	M1	M2	M3	M4
Short-Run				
Match	-0.061**	0.176**	0.110	0.102
	(0.024)	(0.084)	(0.187)	(0.077)
Mismatch	-0.020	0.274***	0.265	0.180*
	(0.019)	(0.104)	(0.215)	(0.096)
Difference	0.041	0.099	0.155*	0.078
	(0.030)	(0.070)	(0.081)	(0.068)
N	8821	8821	8821	8821
F-Test		54.495	7.819	54.148
Long-Run				
Match	0.019	0.204***	0.392*	0.158**
	(0.020)	(0.067)	(0.225)	(0.069)
Mismatch	0.024	0.232***	0.417*	0.167**
	(0.015)	(0.078)	(0.251)	(0.076)
Difference	0.006	0.027	0.025	0.009
	(0.023)	(0.041)	(0.058)	(0.039)
N	8821	8821	8821	8821
F-Test		54.453	10.919	53.945
Model	OLS	2SLS	2SLS	2SLS
Instrument	None	Mand Share Program	Mand Share Closest University	Mand Share Program
Controls	Yes	No	No	Yes

Notes: The table displays OLS and 2SLS coefficients and robust standard errors clustered on department level. Short- and long-run refer to one and five years after studying, respectively. Match and Mismatch refer to the interactions of internship with field match/mismatch. Difference refers to the difference between Match and Mismatch coefficients. F-Test shows the instrument strength in the first stage. All estimates include dummies for wave, the year, as well as wave-specific dummies for the university, study field and education level. Estimates with controls further include gender, age, being Swiss, education of mother and father, the living canton before studying, whether students had study-related work and whether students had study-unrelated work.

Table 6 provides an overview of how the empirical tests allow inference about the channel through which internships affect wages. To summarize, we find that internships do increase income for university graduates. They do so through the human capital channel, by imparting general skills. We do not find evidence for signaling, screening, or specific human capital.

Table 6: Summary of empirical results by hypothesis

Channel	Hypothesis		Accepted
Any	H1	Internships increase income	Yes
Signaling or Screening	H2	Internships increase short-run income, no effect on long-run income	No
Signaling	H2a	Internships increase short-run wages for both firm stayers and firm switchers	-
Screening	H2b	Internships increase short-run wages for firm stayers, not firm switchers	-
Human Capital	H3	Internships increase income in both the short- and long run	Yes
General Skills	H3a	Internships increase income for firm stayers and firm switchers	Yes
	H3b	Internships increase income for field stayers and field switchers	Yes
Specific Skills	H3c	Internships increase income for firm stayers, not firm switchers	No
	H3d	Internships increase income for field stayers, not field switchers	No

Comparing the results of our main model 2 to model 3 tests whether students select universities according to how many mandatory internships are in their program, since model 3 only uses variation in the closest university. The results suggest that this type of selection is only minor issue. Furthermore, including observable control variables in model 4 has little effect on the estimates. This suggests that the variation we exploit is orthogonal to these observable characteristics, thereby supporting the validity of the IV estimates.

5. Conclusions

Internships are increasingly common as universities attempt to ensure that graduates successfully enter the labor market and earn good wages. The justifications for internships range from general real-life experience to gaining specific job-specific, company-specific, or field-specific skills. Students compete to earn internships in prestigious companies to show potential employers that they are desirable. Other

benefits of internships are creating a professional network and, for employers, screening potential workers before committing to hiring them.

This paper analyzes the impact of university internships on income, and whether it comes through experience and skills or signaling. We find that internships do increase income, and that they do so not through any specific skills or signaling but through general human capital. It appears that the skills learned during an internship matter, but more because internships teach young people to function in a workplace than because they teach any detailed process.

This may indicate that internships are less valuable for students with any work experience, as it appears that any experience will do. Universities may consider broadening the scope of the internships students can complete to count for mandatory internship requirements, and may consider waiving those requirements for students who have already worked. In countries with vocational education and training programs that include apprenticeship-style workplace learning, any students who have come from that to university may not need internships as much as their pure-academic peers.

We do not rule out the networking channel, and look forward to future research where the data enables testing that possibility. We use an instrumental variable approach to account for endogeneity, but no instrument is perfect. Instrumental variable approaches generally yield high coefficients, so we prefer to focus on the interpretation of results rather than effects sizes. In addition, these approaches capture local average treatment effects, yielding no information on untreated groups or those far from the margin in the treatment group. We control for the key observable factors but cannot completely account for all variation. Our analysis does not measure skills directly, instead developing and testing hypotheses for indications of skills. Finally, our results show that general human capital is the main channel but do not eliminate other channels. These findings should be validated in other contexts.

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Table A1: Variable Description

Variable Name	Definition
Dependent Variable	
Income*	Full-time equivalent income
Main Explanatory Variable	
Intern	Dummy variable indicating whether the student has done an internship during the study.
Interaction Variables	
Time	Dummies for the survey timing t1 (one year after graduation) and t2 (five years after graduation)
SameEmp/OtherEmp	Dummies indicating whether the student works in the internship firm or not after graduation.
Match/Mismatch	Dummies indicating whether the student works in employment related to the study or not.
Instruments	
Mand Share Program	Cohort-specific share of mandatory internships in the field of the university.
Mand Share Closest University	Cohort-specific share of mandatory internships in the field of the closest university to the living place before studying.
Control Variables	
Work Fit	Dummy indicating whether the student worked beside of the study in employment related to the study.
Work No Fit	Dummy indicating whether the student worked beside of the study in employment unrelated to the study.
Male	Dummy indicating whether the student is male.
Age	Age of the student.
Swiss	Dummy indicating whether the student's nationality is Swiss.
Education Mother	20 dummy variables for the highest education of the mother.
Education Father	20 dummy variables for the highest education of the father.
Living Canton	26 dummy variables for the canton students lived before starting the studies.
University	12 dummy variables for the university
Field	19 dummy variables for the field of study
Education Level	3 dummy variables for Lizenziat, Bachelor, Master
Year	Dummy variables for the survey year 2007, 2009, 2011, 2013, 2015

Notes: * Variable enters in logs

Table A3A: Full estimates of short-run and long-run effects

	M1	M2	M3	M4
Intern short-Run	-0.036**	0.232**	0.189	0.162*
	(0.015)	(0.091)	(0.201)	(0.085)
Intern long-Run	0.057***	-0.014	0.213	-0.014
	(0.016)	(0.098)	(0.198)	(0.098)
Working field-related	0.006			0.007
	(0.013)			(0.013)
Working non-field-related	0.056***			0.037**
	(0.012)			(0.015)
Male	-0.041***			-0.027**
	(0.012)			(0.011)
Age	0.022***			0.024***
	(0.002)			(0.002)
Swiss	0.007			0.010
	(0.024)			(0.024)
Education Mother				
Primary Education	-0.002			-0.009
	(0.047)			(0.049)
2-year VET diploma	-0.026			-0.039
	(0.047)			(0.049)
3-4 year VET diploma	0.010			0.003
	(0.047)			(0.049)
High school	-0.005			-0.015
	(0.051)			(0.052)
Teacher seminar	0.001			-0.010
	(0.047)			(0.048)
PET diploma	-0.026			-0.034
	(0.049)			(0.050)
College of professional education	0.020			0.004
	(0.055)			(0.057)
College of education	-0.000			-0.010
	(0.050)			(0.050)
UAS degree	-0.000			-0.014
	(0.047)			(0.049)
University degree	0.018			0.005
	(0.058)			(0.058)
PhD	0.023			0.013
	(0.064)			(0.067)
Education father				
Primary Education	0.013			0.039
	(0.049)			(0.050)
2-year VET diploma	0.031			0.052
	(0.065)			(0.067)
3-4 year VET diploma	0.014			0.033
	(0.047)			(0.048)
High school	0.006			0.018
	(0.050)			(0.050)
Teacher seminar	0.046			0.068
	(0.056)			(0.058)
PET diploma	0.019			0.034
	(0.048)			(0.050)
College of professional education	0.018			0.039
	(0.049)			(0.051)
College of education	0.040			0.058
	(0.049)			(0.051)
UAS degree	0.004			0.021
	(0.046)			(0.047)
University degree	0.026			0.045
	(0.048)			(0.050)
PhD	0.027			0.045
	(0.062)			(0.062)
Constant	10.469***	11.272***	11.306***	10.520***
	(0.088)	(0.087)	(0.167)	(0.125)
N	17642	17642	17642	17642
F-Test		51.549	14.837	103.924
Model	OLS	2SLS	2SLS	2SLS
Instrument	None	Mand Share Program	Mand Share Closest	Mand Share
Controls	Yes	No	No	Yes

Notes: The table displays OLS and 2SLS coefficients and robust standard errors clustered on department level. Short- and long-run refer to one and five years after studying, respectively. Difference refers to the difference between the short-run and long-run coefficients. F-Test shows the instrument strength in the first stage. All estimates include dummies for wave, the year, as well as wave-specific dummies for the university, study field and education level.

Table A3B: First stage of short-run and long-run effects

	Intern*Short-run			Intern*Long-run		
	M2	M3	M4	M2	M3	M4
Share *Short-run	0.742***		0.734***	-0.000		-0.009
	(0.073)		(0.072)	(0.000)		(0.006)
Share *Long-run	-0.000		-0.009	0.742***		0.734***
	(0.000)		(0.006)	(0.073)		(0.072)
ShareClosest*Short-run		0.230***			-0.000	
		(0.060)			(0.000)	
ShareClosest *Long-run		-0.000			0.230***	
		(0.000)			(0.060)	
Long-run			-0.646***			0.291***
			(0.095)			(0.040)
Working field-related			-0.003			-0.003
			(0.007)			(0.007)
Working non-field-related			0.054***			0.054***
			(0.006)			(0.006)
Male			-0.040***			-0.040***
			(0.009)			(0.009)
Age			-0.005***			-0.005***
			(0.001)			(0.001)
Swiss			-0.009			-0.009
			(0.011)			(0.011)
Education Mother						
Primary Education			0.015			0.015
			(0.020)			(0.020)
2-year VET diploma			0.031			0.031
			(0.023)			(0.023)
3-4 year VET diploma			0.016			0.016
			(0.020)			(0.020)
High school			0.018			0.018
			(0.020)			(0.020)
Teacher seminar			0.026			0.026
			(0.020)			(0.020)
PET diploma			0.017			0.017
			(0.020)			(0.020)
College of professional			0.039*			0.039*
			(0.021)			(0.021)
College of education			0.022			0.022
			(0.022)			(0.022)
UAS degree			0.032			0.032
			(0.020)			(0.020)
University degree			0.031			0.031
			(0.021)			(0.021)
PhD			0.016			0.016
			(0.036)			(0.036)
Education father						
Primary Education			-0.066***			-0.066***
			(0.025)			(0.025)
2-year VET diploma			-0.050*			-0.050*
			(0.030)			(0.030)
3-4 year VET diploma			-0.041*			-0.041*
			(0.022)			(0.022)
High school			-0.024			-0.024
			(0.027)			(0.027)
Teacher seminar			-0.055**			-0.055**
			(0.025)			(0.025)
PET diploma			-0.030			-0.030
			(0.024)			(0.024)
College of professional			-0.052**			-0.052**
			(0.025)			(0.025)
College of education			-0.039			-0.039
			(0.027)			(0.027)
UAS degree			-0.038*			-0.038*
			(0.022)			(0.022)
University degree			-0.041			-0.041
			(0.025)			(0.025)
PhD			-0.046*			-0.046*
			(0.025)			(0.025)
N	17642	17642	17642	17642	17642	17642
Model	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Instrument	Mand Share	Mand Share	Mand Share	Mand Share	Mand Share	Mand Share
Controls	No	No	Yes	No	No	Yes

Notes: The table displays OLS coefficients and robust standard errors clustered on department level. Short- and long-run refer to one and five years after studying, respectively. All estimates include dummies for wave, the year, as well as wave-specific dummies for the university, study field and education level.

Table A4A: Full estimates of effect heterogeneity for firm switchers and firm stayers

	Short-run				Long-run			
	M1	M2	M3	M4	M1	M2	M3	M4
Intern	-0.035**	0.251***	0.236	0.164*	0.021	0.229***	0.421*	0.168**
	(0.015)	(0.090)	(0.199)	(0.085)	(0.013)	(0.072)	(0.240)	(0.072)
SameEmp	0.180***	0.377***	0.456***	0.246***	0.025	0.225**	0.303**	0.092
	(0.038)	(0.096)	(0.138)	(0.079)	(0.047)	(0.094)	(0.133)	(0.088)
Intern*SameEmp	0.005	-0.210	-0.382	-0.112	0.035	-0.228	-0.368	-0.092
	(0.041)	(0.143)	(0.258)	(0.119)	(0.054)	(0.160)	(0.247)	(0.153)
Working field-related	0.000			0.002	0.017			0.018
	(0.016)			(0.016)	(0.013)			(0.013)
Working non-field-related	0.080***			0.057***	0.024**			0.008
	(0.017)			(0.020)	(0.011)			(0.013)
Male	-0.027*			-0.011	-0.057***			-0.045***
	(0.015)			(0.016)	(0.012)			(0.011)
Age	0.023***			0.025***	0.019***			0.020***
	(0.003)			(0.003)	(0.002)			(0.002)
Swiss	0.020			0.023	-0.008			-0.005
	(0.034)			(0.033)	(0.024)			(0.024)
Education Mother								
Primary Education	-0.049			-0.060	0.039			0.031
	(0.057)			(0.058)	(0.051)			(0.054)
2-year VET diploma	-0.082			-0.101*	0.030			0.015
	(0.058)			(0.058)	(0.050)			(0.054)
3-4 year VET diploma	-0.029			-0.041	0.045			0.035
	(0.055)			(0.055)	(0.052)			(0.056)
High school	-0.042			-0.054	0.025			0.015
	(0.061)			(0.060)	(0.056)			(0.058)
Teacher seminar	-0.031			-0.047	0.032			0.020
	(0.054)			(0.054)	(0.055)			(0.058)
PET diploma	-0.074			-0.083	0.014			0.006
	(0.056)			(0.056)	(0.056)			(0.058)
College of prof. edu.	0.002			-0.019	0.031			0.015
	(0.064)			(0.065)	(0.060)			(0.064)
College of education	-0.047			-0.061	0.044			0.033
	(0.062)			(0.061)	(0.058)			(0.061)
UAS degree	-0.030			-0.048	0.023			0.009
	(0.056)			(0.056)	(0.052)			(0.056)
University degree	0.018			0.001	0.011			-0.003
	(0.069)			(0.067)	(0.060)			(0.062)
PhD	0.008			-0.007	0.034			0.023
	(0.077)			(0.080)	(0.078)			(0.081)
Education father								
Primary Education	0.058			0.090	-0.034			-0.011
	(0.070)			(0.071)	(0.049)			(0.053)
2-year VET diploma	0.120			0.150*	-0.068			-0.047
	(0.088)			(0.090)	(0.061)			(0.064)
3-4 year VET diploma	0.073			0.097	-0.050			-0.033
	(0.070)			(0.071)	(0.046)			(0.050)
High school	0.058			0.074	-0.045			-0.033
	(0.074)			(0.074)	(0.053)			(0.056)
Teacher seminar	0.090			0.119	-0.004			0.015
	(0.082)			(0.083)	(0.046)			(0.049)
PET diploma	0.075			0.095	-0.041			-0.027
	(0.070)			(0.071)	(0.047)			(0.051)
College of prof. edu.	0.083			0.111	-0.050			-0.030
	(0.073)			(0.073)	(0.048)			(0.054)
College of education	0.096			0.119*	-0.022			-0.005
	(0.070)			(0.071)	(0.054)			(0.059)
UAS degree	0.058			0.080	-0.054			-0.038
	(0.069)			(0.070)	(0.046)			(0.050)
University degree	0.071			0.095	-0.021			-0.004
	(0.072)			(0.072)	(0.051)			(0.056)
PhD	0.101			0.125	-0.050			-0.033
	(0.084)			(0.083)	(0.060)			(0.063)
Constant	10.431***	11.218***	11.233***	10.308***	10.634***	11.454***	11.376***	10.936***
	(0.182)	(0.089)	(0.167)	(0.149)	(0.151)	(0.061)	(0.193)	(0.132)
N	8821	8821	8821	8821	8821	8821	8821	8821
F-Test		54.034	8.352	53.597		56.939	7.630	55.656
Model	OLS	2SLS	2SLS	2SLS	Model	OLS	2SLS	2SLS
Instrument	None	Mand	Mand	Mand	Instrument	None	Mand	Mand
Controls	Yes	No	No	Yes	Controls	Yes	No	No

Notes: The table displays OLS and 2SLS coefficients and robust standard errors clustered on department level. Short- and long-run refer to one and five years after studying, respectively. Difference refers to the difference between OtherEmp and SameEmp coefficients. F-Test shows the instrument strength in the first stage. All estimates include dummies for wave, the year, as well as wave-specific dummies for the university, study field and education level.

Table A4B1: First stage of effect heterogeneity for firm switchers

	Short-run			Long-run		
	M2	M3	M4	M2	M3	M4
SameEmp	-0.367***	-0.416***	-0.351***	-0.386***	-0.435***	-0.356***
	(0.031)	(0.036)	(0.029)	(0.034)	(0.037)	(0.031)
Share*OtherEmp	0.743***		0.725***	0.741***		0.726***
	(0.073)		(0.071)	(0.073)		(0.072)
Share*SameEmp	-0.255***		-0.283***	-0.195*		-0.264**
	(0.096)		(0.099)	(0.105)		(0.109)
ShareClosest*OtherEmp		0.270***			0.245***	
		(0.054)			(0.058)	
ShareClosest*SameEmp		-0.465***			-0.396***	
		(0.085)			(0.086)	
Working field-related			-0.008			-0.009
			(0.013)			(0.013)
Working non-field-related			0.103***			0.104***
			(0.012)			(0.013)
Male			-0.077***			-0.077***
			(0.017)			(0.018)
Age			-0.008***			-0.009***
			(0.001)			(0.002)
Swiss			-0.010			-0.020
			(0.022)			(0.022)
Education Mother						
Primary Education			0.048			0.047
			(0.037)			(0.039)
2-year VET diploma			0.085**			0.085**
			(0.039)			(0.042)
3-4 year VET diploma			0.048			0.049
			(0.036)			(0.038)
High school			0.043			0.046
			(0.039)			(0.040)
Teacher seminar			0.067*			0.067*
			(0.036)			(0.039)
PET diploma			0.033			0.040
			(0.037)			(0.038)
College of prof. edu.			0.084*			0.090**
			(0.043)			(0.043)
College of education			0.055			0.059
			(0.039)			(0.042)
UAS degree			0.079**			0.081**
			(0.037)			(0.040)
University degree			0.066			0.073*
			(0.040)			(0.042)
PhD			0.048			0.044
			(0.067)			(0.070)
Education father						
Primary Education			-0.139***			-0.136***
			(0.047)			(0.049)
2-year VET diploma			-0.137**			-0.112**
			(0.053)			(0.056)
3-4 year VET diploma			-0.089**			-0.085*
			(0.041)			(0.044)
High school			-0.058			-0.052
			(0.049)			(0.053)
Teacher seminar			-0.112**			-0.104**
			(0.048)			(0.050)
PET diploma			-0.070			-0.063
			(0.044)			(0.048)
College of prof. edu.			-0.114**			-0.109**
			(0.046)			(0.050)
College of education			-0.085*			-0.084
			(0.048)			(0.052)
UAS degree			-0.081*			-0.079*
			(0.043)			(0.045)
University degree			-0.081*			-0.079
			(0.047)			(0.050)
PhD			-0.101**			-0.097*
			(0.050)			(0.050)
N	8821	8821	8821	8821	8821	8821
Model	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Instrument	Mand Share	Mand Share	Mand Share	Mand Share	Mand Share	Mand Share
Controls	No	No	Yes	No	No	Yes

Notes: The table displays OLS coefficients and robust standard errors clustered on department level. Short- and long-run refer to one and five years after studying, respectively. All estimates include dummies for wave, the year, as well as wave-specific dummies for the university, study field and education level.

Table A4B2: First stage of effect heterogeneity for firm stayers

	Short-run			Long-run		
	M2	M3	M4	M2	M3	M4
SameEmp	0.292***	0.362***	0.294***	0.301***	0.366***	0.302***
	(0.032)	(0.042)	(0.032)	(0.041)	(0.048)	(0.041)
Share*OtherEmp	-0.004		-0.004	-0.007		-0.008
	(0.009)		(0.009)	(0.006)		(0.006)
Share*SameEmp	1.045***		1.044***	1.169***		1.167***
	(0.126)		(0.124)	(0.158)		(0.157)
ShareClosest*OtherEmp		-0.038***			-0.019***	
		(0.011)			(0.006)	
ShareClosest*SameEmp		0.634***			0.728***	
		(0.147)			(0.179)	
Working field-related			-0.000			0.001
			(0.004)			(0.003)
Working non-field-related			0.007***			0.004**
			(0.002)			(0.002)
Male			-0.001			-0.002
			(0.003)			(0.002)
Age			-0.001***			-0.000
			(0.001)			(0.000)
Swiss			-0.007			0.002
			(0.006)			(0.003)
Education Mother						
Primary Education			-0.017			-0.017**
			(0.014)			(0.007)
2-year VET diploma			-0.023			-0.023**
			(0.015)			(0.010)
3-4 year VET diploma			-0.015			-0.016***
			(0.014)			(0.006)
High school			-0.004			-0.008
			(0.013)			(0.008)
Teacher seminar			-0.013			-0.013**
			(0.013)			(0.006)
PET diploma			0.004			-0.004
			(0.014)			(0.006)
College of prof. edu.			-0.003			-0.010
			(0.017)			(0.008)
College of education			-0.010			-0.014**
			(0.014)			(0.006)
UAS degree			-0.013			-0.016**
			(0.014)			(0.007)
University degree			-0.003			-0.011*
			(0.014)			(0.006)
PhD			-0.014			-0.011
			(0.020)			(0.008)
Education father						
Primary Education			0.007			0.004
			(0.013)			(0.007)
2-year VET diploma			0.039*			0.012
			(0.023)			(0.011)
3-4 year VET diploma			0.008			0.002
			(0.014)			(0.007)
High school			0.009			0.004
			(0.017)			(0.009)
Teacher seminar			0.003			-0.005
			(0.013)			(0.007)
PET diploma			0.011			0.003
			(0.013)			(0.006)
College of prof. edu.			0.010			0.005
			(0.015)			(0.006)
College of education			0.008			0.005
			(0.015)			(0.007)
UAS degree			0.006			0.004
			(0.013)			(0.005)
University degree			0.000			-0.002
			(0.015)			(0.007)
PhD			0.009			0.005
			(0.013)			(0.007)
N	8821	8821	8821	8821	8821	8821
Model	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Instrument	Mand Share	Mand Share	Mand Share	Mand Share	Mand Share	Mand Share
Controls	No	No	Yes	No	No	Yes

Notes: The table displays OLS coefficients and robust standard errors clustered on department level. Short- and long-run refer to one and five years after studying, respectively. All estimates include dummies for wave, the year, as well as wave-specific dummies for the university, study field and education level.

Table A5A: Full estimates of effect heterogeneity for field stayers and field switchers

	Short-run				Long-run			
	M1	M2	M3	M4	M1	M2	M3	M4
Intern	-0.061**	0.176**	0.110	0.102	0.019	0.204***	0.392*	0.158**
	(0.024)	(0.084)	(0.187)	(0.077)	(0.020)	(0.067)	(0.225)	(0.069)
Mismatch	-0.066**	-0.104**	-0.135**	-0.090*	0.010	-0.015	-0.020	0.005
	(0.027)	(0.052)	(0.060)	(0.051)	(0.020)	(0.031)	(0.043)	(0.029)
Intern*Mismatch	0.041	0.099	0.155*	0.078	0.006	0.027	0.025	0.009
	(0.030)	(0.070)	(0.081)	(0.068)	(0.023)	(0.041)	(0.058)	(0.039)
Working field-related	-0.008			-0.007	0.016			0.017
	(0.016)			(0.016)	(0.012)			(0.012)
Working non-field-related	0.090***			0.069***	0.025**			0.009
	(0.017)			(0.020)	(0.011)			(0.013)
Male	-0.024			-0.009	-0.057***			-0.045***
	(0.015)			(0.016)	(0.012)			(0.011)
Age	0.025***			0.027***	0.019***			0.021***
	(0.003)			(0.003)	(0.002)			(0.002)
Swiss	0.022			0.026	-0.008			-0.005
	(0.033)			(0.033)	(0.024)			(0.024)
Education Mother								
Primary Education	-0.046			-0.054	0.041			0.035
	(0.057)			(0.058)	(0.050)			(0.053)
2-year VET diploma	-0.083			-0.099*	0.030			0.019
	(0.058)			(0.059)	(0.049)			(0.053)
3-4 year VET diploma	-0.026			-0.035	0.045			0.039
	(0.055)			(0.056)	(0.052)			(0.054)
High school	-0.039			-0.051	0.026			0.018
	(0.061)			(0.060)	(0.056)			(0.058)
Teacher seminar	-0.031			-0.045	0.033			0.023
	(0.054)			(0.055)	(0.054)			(0.057)
PET diploma	-0.069			-0.079	0.016			0.009
	(0.056)			(0.056)	(0.056)			(0.058)
College of prof. edu.	0.008			-0.012	0.032			0.018
	(0.065)			(0.066)	(0.060)			(0.063)
College of education	-0.046			-0.057	0.045			0.036
	(0.063)			(0.062)	(0.057)			(0.060)
UAS degree	-0.025			-0.042	0.025			0.013
	(0.056)			(0.056)	(0.051)			(0.055)
University degree	0.023			0.006	0.012			0.000
	(0.069)			(0.067)	(0.059)			(0.061)
PhD	0.011			-0.002	0.034			0.024
	(0.077)			(0.080)	(0.078)			(0.080)
Education father								
Primary Education	0.062			0.092	-0.034			-0.011
	(0.070)			(0.071)	(0.049)			(0.052)
2-year VET diploma	0.128			0.151*	-0.067			-0.048
	(0.088)			(0.090)	(0.061)			(0.064)
3-4 year VET diploma	0.079			0.101	-0.049			-0.033
	(0.070)			(0.071)	(0.046)			(0.050)
High school	0.055			0.068	-0.045			-0.034
	(0.074)			(0.073)	(0.053)			(0.056)
Teacher seminar	0.096			0.122	-0.003			0.016
	(0.082)			(0.084)	(0.045)			(0.049)
PET diploma	0.080			0.097	-0.040			-0.027
	(0.070)			(0.071)	(0.047)			(0.051)
College of prof.edu.	0.087			0.112	-0.049			-0.031
	(0.073)			(0.073)	(0.048)			(0.053)
College of education	0.104			0.125*	-0.021			-0.006
	(0.070)			(0.071)	(0.054)			(0.058)
UAS degree	0.062			0.082	-0.053			-0.038
	(0.069)			(0.070)	(0.045)			(0.049)
University degree	0.075			0.097	-0.021			-0.004
	(0.072)			(0.072)	(0.050)			(0.055)
PhD	0.105			0.127	-0.050			-0.033
	(0.084)			(0.083)	(0.059)			(0.062)
Constant	10.412***	11.187***	11.234***	10.356***	10.617***	11.552***	11.404***	10.926***
	(0.191)	(0.080)	(0.149)	(0.143)	(0.152)	(0.057)	(0.180)	(0.131)
N	8821	8821	8821	8821	8821	8821	8821	8821
F-Test		54.495	7.819	54.148		54.453	10.919	53.945
Model	OLS	2SLS	2SLS	2SLS	Model	OLS	2SLS	2SLS
Instrument	None	Mand	Mand	Mand	Instrument	None	Mand	Mand
Controls	Yes	No	No	Yes	Controls	Yes	No	No

Notes: The table displays OLS and 2SLS coefficients and robust standard errors clustered on department level. Short- and long-run refer to one and five years after studying, respectively. Match and Mismatch refer to the interactions of internship with field match/mismatch. Difference refers to the difference between Match and Mismatch coefficients. F-Test shows the instrument strength in the first stage. All estimates include dummies for wave, the year, as well as wave-specific dummies for the university, study field and education level.

Table A5B1: First stage for field stayers

	Short-run			Long-run		
	M2	M3	M4	M2	M3	M4
Mismatch	-0.366***	-0.405***	-0.370***	-0.355***	-0.396***	-0.361***
	(0.024)	(0.029)	(0.024)	(0.023)	(0.028)	(0.023)
Share*Match	0.977***		0.964***	1.041***		1.031***
	(0.067)		(0.067)	(0.068)		(0.068)
Share*Mismatch	-0.127***		-0.136***	-0.092**		-0.096**
	(0.044)		(0.044)	(0.041)		(0.041)
ShareClosest*Match		0.650***			0.680***	
		(0.080)			(0.074)	
ShareClosest*Mismatch		-0.240***			-0.232***	
		(0.041)			(0.036)	
Working field-related			-0.010			-0.018**
			(0.007)			(0.009)
Working non-field-related			0.056***			0.046***
			(0.009)			(0.008)
Male			-0.039***			-0.030***
			(0.010)			(0.010)
Age			-0.004***			-0.004***
			(0.001)			(0.001)
Swiss			-0.014			-0.015
			(0.017)			(0.016)
Education Mother						
Primary Education			-0.018			-0.027
			(0.031)			(0.026)
2-year VET diploma			-0.003			-0.005
			(0.031)			(0.022)
3-4 year VET diploma			-0.020			-0.016
			(0.029)			(0.022)
High school			-0.032			-0.025
			(0.029)			(0.023)
Teacher seminar			-0.013			0.002
			(0.027)			(0.022)
PET diploma			-0.009			-0.028
			(0.029)			(0.024)
College of prof. edu.			-0.022			-0.013
			(0.032)			(0.026)
College of education			-0.004			0.016
			(0.028)			(0.023)
UAS degree			-0.010			-0.009
			(0.028)			(0.023)
University degree			-0.014			0.000
			(0.027)			(0.023)
PhD			-0.014			-0.018
			(0.042)			(0.033)
Education father						
Primary Education			-0.035			-0.052
			(0.030)			(0.034)
2-year VET diploma			-0.055			-0.033
			(0.038)			(0.036)
3-4 year VET diploma			-0.023			-0.032
			(0.028)			(0.030)
High school			-0.032			-0.013
			(0.034)			(0.038)
Teacher seminar			-0.043			-0.073**
			(0.031)			(0.036)
PET diploma			-0.018			-0.018
			(0.030)			(0.032)
College of prof. edu.			-0.026			-0.049
			(0.032)			(0.033)
College of education			-0.027			-0.039
			(0.034)			(0.036)
UAS degree			-0.016			-0.028
			(0.030)			(0.031)
University degree			-0.024			-0.037
			(0.029)			(0.031)
PhD			-0.026			-0.040
			(0.030)			(0.031)
N	8821	8821	8821	8821	8821	8821
Model	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Instrument	Mand Share	Mand Share	Mand Share	Mand Share	Mand Share	Mand Share
Controls	No	No	Yes	No	No	Yes

Notes: The table displays OLS coefficients and robust standard errors clustered on department level. Short- and long-run refer to one and five years after studying, respectively. All estimates include dummies for wave, the year, as well as wave-specific dummies for the university, study field and education level.

Table A5B2: First stage for field switchers

	Short-run			Long-run		
	M2	M3	M4	M2	M3	M4
Mismatch	0.406***	0.445***	0.402***	0.406***	0.444***	0.399***
	(0.026)	(0.031)	(0.026)	(0.026)	(0.031)	(0.026)
Share*Match	-0.197***		-0.204***	-0.239***		-0.256***
	(0.058)		(0.058)	(0.062)		(0.062)
Share*Mismatch	0.844***		0.838***	0.791***		0.786***
	(0.062)		(0.061)	(0.065)		(0.064)
ShareClosest*Match		-0.382***			-0.397***	
		(0.054)			(0.061)	
ShareClosest*Mismatch		0.444***			0.426***	
		(0.058)			(0.061)	
Working field-related			0.004			0.013
			(0.009)			(0.009)
Working non-field-related			0.051***			0.060***
			(0.010)			(0.009)
Male			-0.041***			-0.050***
			(0.010)			(0.010)
Age			-0.006***			-0.006***
			(0.001)			(0.001)
Swiss			-0.005			-0.003
			(0.019)			(0.020)
Education Mother						
Primary Education			0.047			0.059*
			(0.030)			(0.033)
2-year VET diploma			0.066			0.068*
			(0.040)			(0.039)
3-4 year VET diploma			0.052*			0.049
			(0.031)			(0.033)
High school			0.069*			0.064*
			(0.036)			(0.038)
Teacher seminar			0.067*			0.052
			(0.035)			(0.034)
PET diploma			0.045			0.064*
			(0.036)			(0.034)
College of prof. edu.			0.100**			0.093**
			(0.041)			(0.037)
College of education			0.048			0.031
			(0.035)			(0.036)
UAS degree			0.074**			0.075**
			(0.033)			(0.034)
University degree			0.076**			0.063*
			(0.035)			(0.034)
PhD			0.047			0.053
			(0.054)			(0.068)
Education father						
Primary Education			-0.098**			-0.082**
			(0.041)			(0.037)
2-year VET diploma			-0.045			-0.068
			(0.044)			(0.045)
3-4 year VET diploma			-0.060*			-0.052
			(0.035)			(0.035)
High school			-0.016			-0.037
			(0.044)			(0.037)
Teacher seminar			-0.067			-0.039
			(0.042)			(0.041)
PET diploma			-0.043			-0.045
			(0.038)			(0.037)
College of prof. edu.			-0.078**			-0.056
			(0.039)			(0.041)
College of education			-0.052			-0.041
			(0.040)			(0.039)
UAS degree			-0.061*			-0.050
			(0.035)			(0.037)
University degree			-0.059			-0.047
			(0.042)			(0.041)
PhD			-0.066			-0.054
			(0.043)			(0.039)
N	8821	8821	8821	8821	8821	8821
Model	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Instrument	Mand Share	Mand Share	Mand Share	Mand Share	Mand Share	Mand Share
Controls	No	No	Yes	No	No	Yes

Notes: The table displays OLS coefficients and robust standard errors clustered on department level. Short- and long-run refer to one and five years after studying, respectively. All estimates include dummies for wave, the year, as well as wave-specific dummies for the university, study field and education level.

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