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ABSTRACT

Generation Internship: The Impact of Internships on Early Labour Market Performance*

Many university graduates conduct internships before starting to work in a direct-hire job. I analyse the effects of internships on early labour market performance to evaluate whether they enhance or hinder the university-to-work transition. I use propensity score matching to identify graduates that resemble each other in important characteristics such as cognitive ability, and only differ with respect to the internship experience. This allows comparison between interns and non-interns in key dimensions of job market performance: monthly earnings, employment status, and job satisfaction. The results suggest that internships have detrimental effects across dimensions. Graduates with an internship experience are significantly less likely to be employed one year after graduation, and, if employed, earn significantly less than their non-intern peers. However, the negative effects are short-lived and vanish within five years. Due to this catching up, I can rule out that interns are a negative selection of all graduates. Instead it seems that the internship sends a negative signal to prospective employers and is thus causing the underperformance at job entry. The measured effects are less pronounced for female interns.

JEL Classification: J31, J24, J28

Keywords: internships, temporary work, propensity score matching, youth employment, job-shopping

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1 Introduction

In recent years, a university degree alone does no longer seem to be sufficient for finding a permanent job. Ever more often, university graduates go through short-term practical work experiences, e.g. internships, before finding regular employment. The public press likes referring to this phenomenon as the emergence of the *Generation Internship*. Indeed, in Germany, the internship take up rate among university graduates was as high as 11% in 2005. Interns can be found among graduates from most fields of study - from the arts to the hard sciences alike. Although they are promoted by universities, and have received a lot of attention in the press, their effects for subsequent job market success have never been thoroughly analyzed. Therefore, the goal of this study is to understand the effects of internships on labour market dynamics. Understanding this phenomenon is particularly important to potentially target policies towards their promotion or discouragement.

My main research question is whether internships are effective stepping-stones into regular work. More specifically, I analyse whether university graduates with an internship experience are more likely to be employed within one year after graduation, and how their employment status evolves up to five years thereafter. Moreover, I evaluate whether interns find better jobs in terms of monthly earnings, and work satisfaction, or whether internships trigger negative effects.

Throughout this study, internships are characterized as short-term professional work experiences. They typically last only a few months, and should serve an educational scope. Internships are poorly remunerated, if not completely unpaid. From a conceptual point of view, an internship may increase the chances of finding regular work due to several factors. They may be seen as work experience and enhance human capital accumulation (Mincer, 1962). They could provide a screening device for employers to test a new worker (Stigler, 1962). Also, employers could save on social benefits before hiring the intern on a regular contract. Graduates may also benefit

from internships if they help signalling motivation, as well as effort to potential employers. Furthermore, interns may wish to gain on-the-job experience to increase their employability through specialization and networking.

Nevertheless, internships might also trigger adverse effects. Potential employers could perceive the internship as a negative signal because no direct-hire job was found straight away. Such signals would lead employers to believe that interns are a negative selection among all graduates (Akerlof, 1970; Greenwald, 1986). There may also be locking-in effects (Van Ours, 2004) due to reduced job-search intensity during the internship, which decreases the probability of finding a direct-hire job (García-Pérez and Muñoz-Bullón, 2011; Gagliarducci, 2005). Finally, there may be scarring effects (Cockx and Picchio, 2013) and the risk of being labelled as an 'eternal intern' after floundering in a number of internships.

To my best knowledge no other research has yet looked at how post-graduation internships may impact the transition into regular employment. Existing studies on the school-to-work transition concentrate on duration until graduates find work, on job satisfaction, as well as on over-education, and job-mismatch (Biggeri et al., 2001; Salas-Velasco, 2007; OECD, 2011; Espa et al., 2007; Marzano and Palidda, 2011). Oreopoulos et al. (2012) elucidate the effects of transitioning during an economic downturn. Van der Klaauw and Van Vuuren (2010) analyze the tradeoff between the benefits of intensified job search close to graduation versus increased study efforts for higher academic attainment, and conclude that the two strategies are close substitutes. Weiss et al. (2014) show that voluntary intership or work experience undertaken during university studies can have positive effects on later labour market outcomes.

To answer my research questions, I analyse survey data from the DZHW 2005/2010 graduate panel in Germany. The panel surveys university graduates after approximately one, and five years of graduation. The survey includes extensive questions on the university-to-work transition, including, information on employment, earnings,

work and life satisfaction, and also on internships.

I use post-graduation internship experience as a treatment, and look at graduates with and without such an experience to compare their post-internship employment status, earnings, earnings trajectories, and job satisfaction. The main challenge of the analysis is self-selection into the treatment group. I perform a propensity score matching based on (Rosenbaum and Rubin, 1983) using the comprehensive data on observable graduate characteristics available in the panel. I match individuals with equivalent university degrees, and similar cognitive, as well as non-cognitive capacities. These factors are believed to be important determinants of both academic and labour market success (Heckman and Rubinstein, 2001; Heckman et al., 2006). I show that interns and non-interns do not differ in observable characteristics, especially not in cognitive ability. Despite the observable similarities of interns and non-interns, their early labour market performances differ importantly.

My results point towards detrimental effects of internships on the probability of finding employment, as well as on post-internship earnings, and work satisfaction. I find that interns under-perform their non-intern peers in all dimensions. Interns are less likely to be employed within one year of graduation and even if they find paid work, they receive significantly lower monthly earnings. In Germany the gap in monthly starting earnings is as large as 21%. The employment and earnings gaps decrease over time, and I observe a full catch up within five years of graduation. In addition, the adverse effects on employment and earnings are also reflected in lower work and life satisfaction.

The paper proceeds as follows. Section 2 discusses the conceptual background, and theories that might predict the effects of internships. Section 3 describes the data. Section 4 defines internships and presents descriptive statistics. The estimation strategy and results are found in Section 5, followed by a discussion in Section 6. Section 7 concludes.

2 Conceptual Background and Literature Review

No research has yet analysed the labour market effects of post-graduation internships neither theoretically nor empirically. Nevertheless, one may draw parallels to other strands of literature to anticipate their potential effects.

Several theories would predict positive effects of internships on subsequent employment and earnings. Firstly, internships may be seen as work experience and on-the-job training (see for example Mincer (1962); Barron et al. (1989); Keane and Wolpin (1997)), which could positively affect wage trajectories through human capital accumulation. According to job mobility models (Burdett, 1978; Jovanovic, 1979) workers switch between jobs to move to employers who are better matches for their skills, and thus pay higher wages. The empirical evidence for this job-shopping hypothesis goes back to Topel and Ward (1992). They show for the case of young American men that between-job wage growth is responsible for one-third of total wage growth of the first ten years in the labour market.

In parallel to my analyses, numerous studies have investigated the role of temporary jobs and fixed-term contracts for the transition from unemployment into regular employment. Much evidence is in favor of the stepping-stone hypothesis (Jovanovic and Nyarko, 1997; Autor and Houseman, 2010; Booth et al., 2002; de Graaf-Zijl et al., 2011; Van den Berg et al., 2002; Ichino et al., 2008). Although long-term effects on employment stability and wage trajectories remain ambiguous (Autor and Houseman, 2005), the literature widely agrees that temporary jobs may accelerate transitions into employment, and substitute unemployment spells. Internships could trigger similar effects. Previous studies mostly looked at the performance of low-skilled workers and those belonging to minorities because of their particular risk of long-term unemployment. However, the same risk concerns young workers (Cockx and Picchio, 2012, 2013; Ryan, 2001). Higher education generally increases employment possibilities and decreases the risk of unemployment. Nevertheless, in most European countries, youth

unemployment still exceeds average unemployment among the general adult population (OECD, 1998, 2012).

From an employer's perspective, internships are an inexpensive way to reduce information asymmetries by learning the worker's type (Stigler, 1962). Because internships are not severely regulated through employment protection laws, employers may test-hire graduates to learn about their true ability, and devise job offers accordingly. In addition, employers may save on social benefits for the duration of the internship until a proper work contract is signed. Internships could thus increase employment, especially in markets where employment protection laws are responsible for frictions in the hiring process (Acemoglu and Angrist, 2001; Dolado et al., 2002). All of the above mechanisms could cause internships to have beneficial effects on workers' careers.

On the other hand, internships could have negative effects on graduates' careers, for example, if they send negative signals to employers, and inhibit hiring of interns due to adverse selection (Akerlof, 1970; Greenwald, 1986). Negative signals of interns being the low-quality selection of all graduates could originate for example if employers perceive that interns were unable to find direct-hire jobs right after graduation. Negative signals to employers could also lead to low wage offers which interns might readily accept if they are not aware of their true value for the employer (Gibbons et al., 2005). Similarly, interns' reservation wages may be lower compared to non-interns'. This could originate in differences in opportunity costs between interns and non-interns as well as in locking-in effects (Van Ours, 2004), meaning that interns decrease their search efforts during the internship. Low wage offers may also be accepted if individuals are liquidity constraint, and thus obliged to quickly start working (Chetty, 2008). Cockx and Picchio (2013) find that such initial employer-employee mismatch may lead to persistent scarring effects of young workers. This would especially apply if internship experiences lead to difficulties in subsequent job search, causing prolonged spells of early unemployment or depressed wage growth.

Thus, in theory, positive and negative effects of internships could be supported. The following section presents the empirical evidence which I will then discuss in light of the theories presented in this section.

3 Data

I use graduate panels from the DZHW in Germany. The DZHW is a publicly funded non-profit organization with the scope of collecting and providing data on the higher education system. The DZHW starts new panel waves roughly every 4 years. They survey a representative sample of German university graduates 1, 5, and 10 years after their final university examination. Starting with the wave of graduates from the academic year 2004/05 the survey includes details on post-graduation internships. I therefore use the first and second waves from this particular panel for my analysis. The first wave contains 11,783 observations. 5,327 observations are lost due to non-response to the second wave. The final German data set contains 6,456 observations.[1]

4 Descriptive Statistics

Throughout this research, internships are characterised as short-term, ideally supervised, professional work experiences. Internships should have an educational scope, and temporary character. Apart from a few exceptions, interns do not have a work contract, and are thus not protected within a legal frame. Internships are often poorly remunerated, if not completely unpaid.[2] I restrict the analysis to internships which are conducted after graduation, as opposed to internships which are completed during the

[1]Despite the important number of missing observations, there are no evident patterns of attrition bias. It is not the case that specific types of individuals systematically select into or out of the panels. Randomization checks between the full and the selected samples do not show anomalies in important factors such as age, gender, university grades and internship participation. See Table 8 in the Appendix for descriptive statistics between the selected sample and deleted individuals split by panel waves.

[2]There is no information on internship remuneration in the data.

course of studies. This is a deliberate choice to ensure comparability of treatment effects. The reasons for conducting an internship during a study course can differ greatly between individuals and may thus entail different effects on subsequent education and employment outcomes. Internships during studies could be mandatory, or voluntary. Students may seek them out of self interest for orientation or education, or because it was recommended to them by parents or peers. Internship experiences following graduation on the other hand serve as a means of transitioning to the labour market. Graduation can be seen as a natural time zero. Across individuals studying towards different degrees of varying study duration and with diverse job prospects, the moment of graduation represents the starting point of the professional post-graduation career. It is from this point onwards, that individuals are fully qualified to enter the labour market through an accomplished degree, and roughly the moment at which job search commences.

In the DZHW graduate panel data, 1014 individuals report an internship experience. 288 among them did their internship during a second study program, or during a gap year. Just like internships during the course of a study programme, these internships are unlikely to have served the purpose of transitioning from university to a permanent job, and are thus not considered as internships for the further analyses.[3]

Table 1 shows descriptive statistics for interns and non-interns and indicates that the two groups resemble each other in key characteristics. Interns and non-interns are of same age, have similar study durations and most importantly attain the same mean grades at graduation. The only noticeable difference is that women appear to slightly overpopulate the group of interns: 58% of non-interns, but around 68% of the interns are women.[4]

Internships in the transition from university to work are indeed quite common.

[3]See Saniter and Siedler (2014) for a recent discussion paper on the effects of summer and gap year internships on labour market outcomes.

[4]See Table 8 in the Appendix for an augmented version of Table 1 and a discussion of attrition bias in the analysis.

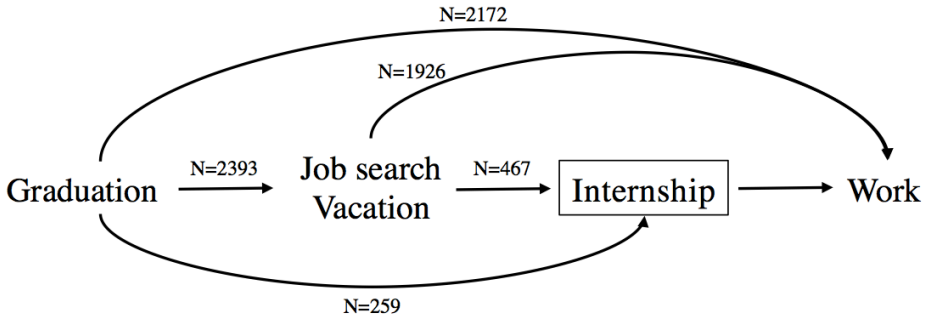
Table 1: Descriptive Statistics for Non-Interns and Interns

	Non-Interns		Interns	
Variable	Mean	std. dev	Mean	std.dev
Age	27.96	(3.55)	28.02	(3.13)
Female	0.58	(0.49)	0.68	(0.47)
Grades	1.64	(0.88)	1.67	(0.80)
Study Duration	5.166	(1.51)	5.512	(1.45)
		Study Fields		
Psychology	0.019	(0.14)	0.054	(0.23)
Culture	0.057	(0.23)	0.11	(0.31)
Art	0.030	(0.17)	0.044	(0.20)
Social Sciences	0.087	(0.28)	0.105	(0.31)
Linguistics, Literature	0.074	(0.26)	0.088	(0.28)
Agriculture, Land Studies	0.057	(0.23)	0.050	(0.22)
Business, Economics	0.150	(0.36)	0.165	(0.37)
Law	0.028	(0.17)	0.022	(0.15)
Hard Sciences	0.034	(0.18)	0.021	(0.14)
Pedagogics	0.047	(0.21)	0.039	(0.19)
Engineering	0.22	(0.41)	0.123	(0.33)
Sport	0.006	(0.08)	0.001	(0.04)
Human Medicine	0.073	(0.26)	0.059	(0.24)
Geo- and Biology	0.050	(0.22)	0.066	(0.25)
Chemistry and Pharmacy	0.037	(0.19)	0.008	(0.09)
Architecture	0.032	(0.18)	0.052	(0.22)
Job search (in months)	4.67	(3.07)	6.30	(3.44)
Internship search (in months)			3.68	(3.09)
Employment 1 year after grad.	0.869	(0.338)	0.836	(0.370)
Employment 5 years after grad.	0.861	(0.346)	0.851	(0.356)
Log-Earnings 1 year after grad.	7.417	(0.712)	7.239	(0.777)
Log-Earnings 5 years after grad.	8.032	(0.509)	7.960	(0.466)

Note: Job search is mean time until first job was found, potentially including months of search inactivity and internship. Mean job search includes 53% of non-intern graduates who start their job straight after graduation and never search. Similarly, 36% of interns start the internship without previous search.

Roughly 11% of all graduates do an internship in Germany. Table 1 also shows enrolment in particular study fields by intern status. One notices that internships are common across all fields. Enrolment in a certain field of studies is largely independent of the later choice to do an internship. Internships are marginally more frequent in fields where the labour market opportunities are less clear cut such as psychology and culture. To see this, note that 2% of non-interns in the sample graduate from psychology but 5% of interns have completed studies in this field. However, a large number of graduates, also go for an internship in more applied fields such as engineering, architecture, and the hard sciences. Interestingly, looking at employment rates by field of study the picture emerges that the choice of doing an internship is mostly unrelated to labour market opportunities (Beckmann et al., 2013; Cammelli, 2006).

Figure 1: Illustration of Common Paths of Transition



For the further analysis, it is worth discussing the various paths which could lead graduates into direct hire jobs shown in Figure 1. This will also help define the counterfactual of interns if they had never done an internship. Individuals could go straight to work after graduation or search for a while before finding an employment. About 45% of the German graduates in the sample start working within the first month after graduation, 40% find employment after a few months of search. Alternatively, gradu-

ates may take the same paths via an internship. 5% of graduates start an internship right after graduation, 10% after a few months of job/internship search.

Gross job search for non-interns lasts 4.67 months, while interns take 6.3 months to find work, including the duration of their internship which naturally prolongs job search due to locking-in effects (Van Ours, 2004). Conditional on searching for a job, i.e. when a job is not started straight after university, non-interns search on average for 4.84 ($\sigma = 3.11$) months. 36% of internships are started straight after graduation. Conditional on searching, internships are started after 5.16 (σ =2.94) months of search. Months of search or inactivity prior to working or starting an internship are therefore similar for interns and non-interns. It thus seems as if the internship is used as a substitute for further job search.

Table 2: Number of internships and their durations (Germany)

	Mean duration (Std. Dev.)	N
Internship 1	4.07 (3.02)	726
Internship 2	3.76 (3.15)	110
Internship 3	3.70 (2.72)	33
Internship 4	5.00 (2.45)	7
Internship 5	7.5 (0.71)	2

The data allows some further inspection into the descriptive characteristics of internships. As stated previously, this paper assumes that internships are a means of transition into the labour market. This is in line with statistics shown in Table 2 which shows the number of internships, and their mean durations. The table confirms that

internships have indeed a short-term character, lasting on average 3-4 months. There is no evidence for long-lasting *floundering* in repeated internships. The majority does only one internship before starting to work in a direct-hire job.

Finally, Table 3 displays the main reasons for choosing to do an internship. The table reveals that most graduates (77%) value internships as a way to accumulate work experience and specialisation. They hope the internship to serve them as a stepping stone towards a desired position afterwards. More than 50% believe in facilitating their consecutive job search. Some were even promised a regular job following the internship. A smaller fraction of graduates (39%) opt for an internship because they have not yet found another job.

Overall, the picture emerges that internship participation among German graduates is mostly voluntary, and that graduates see it as an investment into their future career from which they expect positive returns.

Table 3: Motivation to do an internship

	Mean	Std.Dev
Acquire work experience	0.7678	0.4226
Facilitate job search through internship	0.5373	0.4990
Felt need for specialization	0.3951	0.4893
No other job found	0.3865	0.4874
Was promised a job after internship	0.2790	0.4489
Others	0.1976	0.3985

5 Estimation Strategy and Results

5.1 Identification and Estimation of the Propensity Score

Ahead of empirical analysis of the effects of internships on early labour market outcomes, it is important to discuss the identification strategy which underlies estimation. An important issue in this respect is to consider whether individuals choose to do an

internship by preference for this type of training, or whether they would prefer finding a direct-hire job straight away. If interns are inherently different from non-interns, an estimation of the effects of internships would compare two different groups of graduates and would thus be confounded by these differences and fail to measure the effect of the internship in isolation.

Following the descriptive statistics from the previous section, it seems reasonable to consider that graduates prefer a direct hire job over an internship, but also that they prefer an internship over continuing to search for a job, and inactivity. Furthermore, the following analyses will assume that graduates search broadly for employment, meaning that they may, at the same time, look for direct hire jobs and internships. If graduates receive internship and job offers with a random arrival rate, some graduates will receive a job offer, others an offer for an internship at first. In consequence, if graduates wish to end inactivity quickly, it would also be a stochastic outcome whether they start their professional career in a direct hire job or in an internship.

The estimation will be based on these identifying assumptions and make use of propensity score matching based on Rosenbaum and Rubin (1983). Matching estimators are commonly used in observational data analysis where an exogenous variation in treatment assignment is absent.[5] The necessary assumption to implement propensity score matching is *selection on observables*, also known as *unconfoundedness*, meaning that all relevant characteristics for determining treatment participation and outcomes are observed.

In the context of internships, this means that all relevant characteristics up to the start of the internship must be observed. The most important determinants can be expected to involve the field of study and type of degree that was achieved, general cognitive and non-cognitive ability, and job search effort. These are all key determinants of labour market success combining both worker specific characteristics and

[5]See for example the seminal application of propensity score matching from Dehejia and Wahba (1999).

factors relating to the labour market conditions, such as demand for graduates from particular fields. Furthermore, the socio-demographic background should be factored in as it likely affects graduates' network and necessesity to find paid work quickly, that is, whether they are liquidity constraint. All of these features are observable in the data (see below for further detail). Other characteristics which may be important determinants of both, the likelihood to conduct an internship and labour market performance relate to workers' ability, including factors relating to their social agility and interpersonal skills. While these features are generally difficult to observe, they will be proxied in this research by extra-curricular activities.

The propensity score theorem states that if unconfoundedness is satisfied, conditional on observing all important characteristics, the selection into the treatment is as good as random. This means, for a given propensity score, it is equally likely for a particular graduate to start her professional career with an internship, or a direct hire job.

Consequently, in this analysis, the propensity score describes the probability of doing an internship for a given set of observable characteristics. More specifically, the propensity score will be based on a comprehensive model using the wealth of observable charactistics provided in the graduate panel. The score is estimated using a logistic regression on the internship dummy with several controls as shown below. All control variables are included in the model as dummy variables in order to achieve the most flexible specification.[6]

$$internship_i = \beta_0 + \beta_1 Demogr_i + \beta_2 Degree_i + \beta_3 Cogn_i + \beta_4 Ext.curr_i + \beta_5 Search_i + \varepsilon_i$$

As shown in the model equation above, the score is estimated using various socio-

[6] Alternatively, one could introduce control variables via linear, higher order terms and interactions into the propensity score estimation.

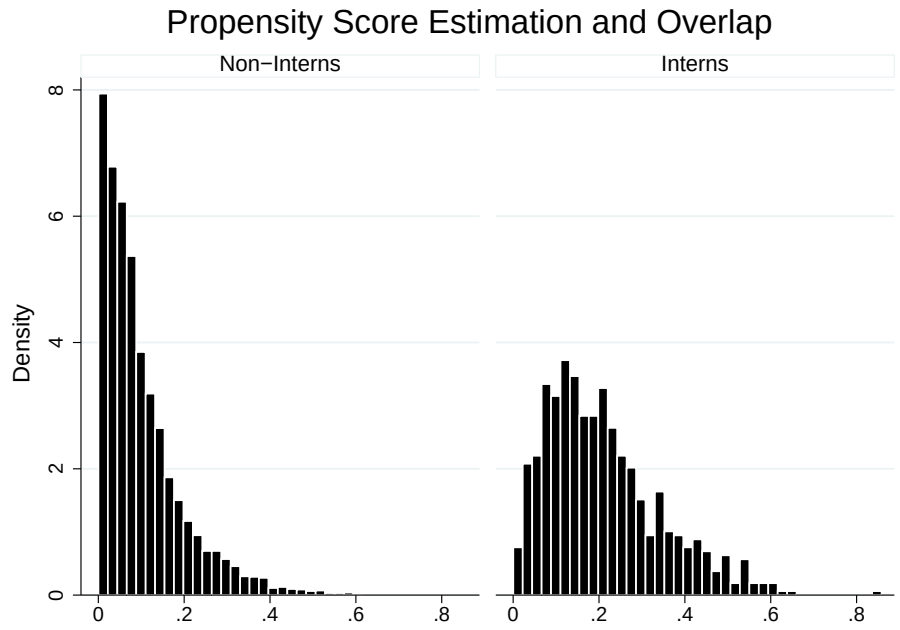
demographic controls including gender, age, martital status, and parents' educative background. To account for differences in study curricular the family of degree controls includes the field of studies as well as the type of degree attained (i.e. bachelor, master, diploma etc.). Another important group of control variables which could simultaneously impact internship participation as well as later labour market outcomes proxy for cognitive ability, namely study duration, grades at univeristy and high school. Next, controls for extra-curricular activities such as whether a graduate has previous work experience, worked during studies, studied towards an additional degree, studied abroad, or has done an internship during studies as part of the curriculum are added. Finally, I add controls for job search such as when job search was initiated, and whether the graduate undertook any activities to enhance future labour market outcomes (e.g. study quickly, choose specific courses, consider entrepreneurship to enhance experience etc.). Note that all these observable characteristics which are used to measure the likelihood of internship participantion are pre-determined to the treatment, thus conforming with unconfoundedness.[7]

An important visual inspection supports the valididty of the estimation strategy. Figure 2 shows that there are control and treated individuals for any combination of observables in the data, hence the necessary overlap condition following Rosembaum, Rubin is satisfied. Finally, to identify matching pairs of statistically similar individuals based on the propensity score, I apply caliper matching. Given the extensive overlap, I am able to use a tight caliper of 0.05 without leaving many observations unmatched. This caliper ensures a high quality of the matches, though results remain qualitatively unchanged for larger and even tighter calipers.[8]

Due to the nature of estimating observational data, neither the unconfoundedness assumption nor the unbiasedness of the propensity score can be tested. However, the richness of the survey data at hand leaves relatively little space for severe distortions

[7]The propensity score estimation can be seen in Appendix A.2.
[8]The results using other calipers may be obtained on request.

Figure 2: Overlap of the Propensity Scores



due to unobservables and all of the following results remain robust using also different specifications of the propensity score.[9]

5.2 Propensity Score Matching for Employment

Table 4 displays the propensity score matching results for employment outcomes in the German graduate panel. The matched sample contains 6,377 individuals.[10] The first row of each estimation shows unconditional means of employment for treated and control individuals (i.e. for interns and non-interns), their difference, standard errors and a T-test of significance. The second row shows the same measures for the matched sample. The first column of the second row displays the unconditional mean employ-

[9]Different specifications of the propensity score are provided in the Appendix A.2 together with various matching analyses as robustness tests in Appendix A.3.3. Moreover, Ichino et al. (2008) perform a sensitivity analysis of matching estimators through simulating systematic failures of the unconfoundedness assumption. Their results argue in favour of matching estimators for high quality data sources which effectively capture all pre-determined characteristics that influence treatment participation and outcomes.

[10]273 control individuals and 6 treated individuals are off support and remain unmatched.

ment of interns who lie on common support. Visible from this column, the average employment rate one year after graduation is already high at around 84-87% and remains relatively constant until five years after graduation. The Controls column gives the estimated counterfactual outcome based on the matched controls. The difference of means depicts the average treatment effect on the treated (ATT). The ATT describes the estimated difference in employment for non-interns, had they done an internship. It amounts to significant -7.0% during the first wave and becomes insignificant five years after graduation (0.9%). The matching thus indicates an immediate, but short-lived, negative effect of internships on subsequent employment. The findings from Table 4 hold also if the sample is split by gender. Both male and female interns are less likely to be employed one year after graduation, and catch up thereafter.[11]

Table 4: Results from Propensity Score Matching, Employment

Sample	Treated	Controls	Difference	S.E.	T-Stat
	Employment Status approx. 1 year after graduation				
Unmatched	0.836	0.869	-0.033	0.014	-2.42
ATT	0.835	0.905	-0.070	0.015	-4.64
	Employment Status approx. 5 years after graduation				
Unmatched	0.852	0.861	-0.010	0.014	-0.71
ATT	0.853	0.844	0.009	0.015	0.63

5.3 Results for Monthly Earnings

Having established the effects of internships on employment, I now look at differences in monthly earnings.

In the earnings dimension, the data offers an additional observation. The German graduate panel does not only report current earnings during the first wave, i.e. approx.

[11] See Table 10 in the appendix for the matching results by gender.

1 year after graduation, but also the monthly earnings of the first job. Naturally, the earnings analyses take into consideration only individuals who report earnings. It therefore does not consider individuals who do not work. When comparing earnings between interns and non-interns, this considers their salaries in direct-hire jobs, i.e. post-internship earnings.

Table 5: Results from Propensity Score Matching, Earnings

Sample	Treated	Controls	Difference	S.E.	T-Stat
	Monthly Starting Earnings				
Unmatched	6.988	7.295	-0.306	0.040	-7.58
ATT	6.993	7.205	-0.212	0.044	-4.82
	Earnings approx. 1 year after graduation				
Unmatched	7.251	7.431	-0.180	0.036	-5.01
ATT	7.251	7.372	-0.121	0.040	-2.99
	Earnings approx. 5 years after graduation				
Unmatched	7.980	8.079	-0.099	0.024	-4.04
ATT	7.980	8.001	-0.020	0.025	-0.82

Table 5 displays the results for all earnings outcomes. The matched sample contains 4,226 individuals.[12] In parallel to the employment analysis, the ATT measures an earnings gap of significant -21.2% at job start. This gap decreases quickly with the first months of experience, but still amounts to a significant -12.1% one year after graduation. The earnings results thus consolidate the negative effects of internships indicated for employment. Analogous to the employment results, there is convergence in earnings within five years. The ATT after five years is only -2.0%, and becomes insignificant.

Interestingly, this time the measured treatment effect seems to be driven mostly by men. In fact, in Table 6, the ATT one year after graduation is null for women but large

[12] 87 control and 2 treated individuals are off support and remain unmatched. The sample size has especially fallen because of the use of log-earnings, dropping all individuals reporting zero earnings.

and statistically significant for men (-26.8%). This points towards an early appearance of a gender wage gap already at job start. Female earnings of interns and non-interns alike remain below the respective wages of men.

Table 6: Results from Propensity Score Matching, Earnings, by Gender

	Panel A: Women					**Panel B:** Men				
Sample	Treated	Controls	Difference	S.E.	T-Stat	Treated	Controls	Difference	S.E.	T-Stat
	Monthly Starting Earnings									
Unmatched	6.970	7.097	-0.126	0.051	-2.49	7.027	7.540	-0.513	0.063	-8.18
ATT	6.970	7.081	-0.110	0.054	-2.04	7.034	7.454	-0.420	0.079	-5.29
	Earnings approx. 1 year after graduation									
Unmatched	7.222	7.247	-0.024	0.045	-0.54	7.313	7.661	-0.348	0.055	-6.37
ATT	7.222	7.268	-0.046	0.049	-0.92	7.318	7.587	-0.268	0.072	-3.75
	Monthly earnings 5 years after graduation									
Unmatched	7.922	7.934	-0.012	0.031	-0.39	8.105	8.256	-0.151	0.036	-4.21
ATT	7.922	7.913	0.009	0.031	0.30	8.107	8.170	-0.064	0.040	-1.57

5.4 Results for Work and Life Satisfaction

In the matching analyses, the effects of post-graduate internships on earnings and employment are negative. However, the descriptive statistics suggest that graduates opt voluntarily into internships because they actually expect positive returns from them. The next step of the analysis is therefore to look at the effects of internships on work and life satisfaction.

Possibly, graduates choose to do an internship because they expect to find a job that suits them better in dimensions other than pay. To this end, I look at various satisfaction measures, which are reported in the graduate panel. The satisfaction scales go from 1 to 5 where higher values imply larger satisfaction levels. I again match individuals based on the propensity score to subsequently measure differences in satisfaction levels for each measure. Table 7 reports the ATT and T-tests for each measure.[13]

[13]The full matching tables are displayed in Table 11 in the Appendix.

Table 7: Results from Propensity Score Matching for different work satisfaction measures during first wave

Satisfaction Measure	ATT(Internship)	T-Stat
Job Security	-0.174	-2.02
Earnings	-0.262	-2.99
Career Perspectives	-0.446	-5.25
Skill Match	-0.417	-5.59
Work-Life-Balance	-0.216	-2.69
Working Atmosphere	-0.277	-4.56
Job Contents	-0.332	-5.03
Current Position	-0.293	-3.79
Work Conditions	-0.285	-4.03
Training Possibilities	-0.382	-4.63
Bring own ideas into job	-0.397	-5.78
Family-Friendly-Policies	-0.270	-3.33

Note: The above table only reports the ATT and respective T-statistics from the Propensity Score Matching analyses for Interns in comparison to Non-Interns. The full version of the table may be found in Appendix 11.

Evidently, interns are not more satisfied with their jobs than non-interns. All differences in satisfaction levels are negative and significant.

6 Discussion

The preceding results have shown negative, though short-lived, effects of internships on initial labour market performance. Employment and earnings trajectories of interns are characterized by a catching-up to their non-intern peers within a few years.

The results need to be discussed in light of the identification strategy. In the absence of an exogenous, random assignment, such as in a controlled or naturally occurring experiment, it is important to consider the validity of the results and potential biases due to self-selection into the internship.

A selection bias would, for example, arise if interns were inherently different from other graduates due to underlying personal characteristics which are not observed in the data. For example, if interns were a negative selection of all university graduates in

the sense that they are less productive workers compared to non-interns. This would mean that graduates who take up internships may otherwise have been unable to find direct-hire jobs. Consequently, it would not be surprising to observe lower starting wages for these individuals. A gap in starting wages would thus not be causal to the internship but merely a reflection of the quality difference between the groups of graduates.

I conjecture that this type of selection is not driving the results. If interns were indeed a negative selection of all graduates, then the earnings and employment differentials should persist over time. Instead, the detrimental effects of internships are short-lived and interns fully catch up with their non-intern peers within a few years after graduation. The catching up process is grounded both in employment and wage-growth. Interns must see their salaries raise quicker than non-interns. Otherwise, post-internship wages would develop in parallel to non-intern wages and remain permanently at a lower level.

The catching up and the absence of other observable differences between the two groups suggest that the internship is indeed the cause for the early career employment and earnings differences. Possibly, the internship lowers individuals' reservation wages.

As discussed at the outset of this paper, there are different reasons why internships could trigger adverse effects at job entry without having lasting effects. To begin with, recall that internships last only a few months, so they do not cause important differences in the accumulation of work experience in comparison to non-interns. Also, the earnings gap is largest for starting earnings. Thus, at a point at which both types of workers do ot possess work experience. This also discards any theories relating to human capital accumulation. Otherwise, because interns possess experience from the internship, they should earn more than non-interns, not less. The results also speak against scarring effects caused by internships (see Cockx and Picchio (2013) for a review). Internships are a short-term activity, and signs indicating floundering in

numerous internships, which could cause long-term harm to human capital accumulation, are absent. Furthermore, the initial gap in earnings is temporary, and there are no measurable *scars* remaining five years after graduation.

It therefore seems plausible that asymmetric information, and negative signalling are important ingredients to the findings. More precisely, two mechanisms might be simultaneously at play. First, if employers perceive interns as the negative selection of all graduates, and second, if interns are themselves unsure about their type, low wage offers could lead to an initial, though short-lived, equilibrium match (Greenwald, 1986; Kahn and Lange, 2014). Search behaviour (Sattinger, 1995) and liquidity constraints (Chetty, 2008) may further encourage such suboptimal employer-employee matches. On the one hand, the internship may lower job seach intensities. On the other hand, once the internship is finished, individuals may be in a hurry to find paid work to overcome liquidity constraints, thus accepting lower earnings than unconstraint individuals.

Later on, through the acquisition of experience and tenure, as suggested for example by Gibbons et al. (2005), workers and employers learn about unobserved skills and move to higher earnings matches. This is in line with a large strand of literature that links job switching to wage growth (Topel and Ward, 1992; von Wachter and Bender, 2006; Del Bono and Vuri, 2011; Oreopoulos et al., 2012; Gius, 2014). Von Wachter and Bender 2006 like also Oreopoulos et al. (2012) suggest that wage growth through job-shopping is particularly steep for higher skilled workers.

The effects of internships on earnings differ in magnitude between men and women. It is tempting to relate this disparity to general differing labour market conditions between the genders. The German labour market generally seems to quickly absorb new graduates (Ryan, 2001; von Wachter and Bender, 2006). Because graduates could rather easily find direct-hire jobs right after graduation in Germany, the above described negative signalling effects of internships might be stronger for men than for women. The positive effects due to screening of female workers through an internship

might offset negative signalling. If employers can test workers, and save initially on social security payments, before deciding to hire them, internships might be a regular path into employment just as other short-term contracts (Dolado et al., 2002; Ichino et al., 2008). This fits into findings by Oreopoulos et al. (2012) that the most able individuals succeed to overcome initial adverse labour market conditions at job entry. It could be that the best (female) interns can separate from the crowd of young job seekers and find decent job matches.

Finally, interns are not more satisfied with their jobs. It therefore does not seem to be the case that interns find jobs which stimulate them in other regards than pay, for example through interesting work contents. Indeed, work satisfaction is highly correlated with earnings and in particular equality of earnings compared to peers (Card et al., 2012). Interns could be unsatisfied with their jobs especially if they know that their non-intern peers with similar qualifications seem to earn more at job start.

7 Conclusion

Over the last decade, internships have gained a reputation of facilitating the entry to the labour market. A growing number of graduates do internships following their graduation in order to then find a direct-hire job. The phenomenon of the so called *Generation Internship* has gained momentum at university placement agencies as well as in the public press. However, their effects on labour market dynamics have never been carefully analysed. Contrary to interns' expectations, who believe internships will help them transition into work, I find that internships are rather harmful to the university to work transition. Internships can serve as a means of orientation for graduates, but employers do not seem to value them.

I used a propensity score matching model which controls for a large number of observable pre-internship charateristics of graduates to estimate how interns and non-interns perform in employment, earnings and work satisfaction. The results show

negative outcomes for interns in all dimensions. German interns are less likely to work, earn between 12 and 21% less, and are less satisfied with their jobs during the first year following graduation. These effects decrease with work experience and vanish completely within five years after graduation.

I conjecture that the initial detrimental effects of internships are due to asymmetric information and negative signalling. Employers seem to believe that interns were unable to find a direct-hire job, thus believing them to be a negative selection of all interns, and hence offer them lower earnings. Graduates may readily accept such contracts if they are unaware of their actual value to the employer, as well as when they are liquidity constraint after years of studying.

Although interns are not measurably different from non-interns in key characteristics, and there do not seem to be relevant patterns of selection into or out of the panel waves, it remains an open question whether they are different in unobservables such as attitudinal factors that impact success during job interviews and wage negotiations. Future work may want to look more carefully at the mechanisms leading to differences in hiring decisions of interns and non-interns, for example through an experimental approach. This would at the same time address potential issues with the unconfoundedness assumption that underlies my analyses.

To conclude, interns underperform non-interns particularly at the immediate labour market entry and catch up later. Job-shopping and learning effects, are probable causes of the convergence to non-intern performance in employment and earnings. With experience, workers and employers learn about unobservable skills of the interns, and consider these skills in subsequent wage negotiations. Indeed, a large, and lasting, negative effect would be difficult to reconcile with the fact that graduates enroll into internships voluntarily. Therefore, short term practical work experiences should rather be conducted during studies, for example through mandatory internships. This way, students may acquire the orientation they lack from theoretical studies, without re-

ceiving the negative label a post-graduate internship seems to put onto them.

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A Appendix:

A.1 Descriptive Statistics

I here display augmented versions of the descriptive statistics displayed in Section 4. Table 8 shows means of key characteristics for the selected samples of my analyses and confronts them with the same means of individuals who were excluded from the analyses due to panel drop-out. That is, I compare individuals who answered to all survey waves to those who answered only the first wave.

In Table 8, there are no evident patterns of attrition bias. Interns and non-interns have similar key characteristics if they answered both panel waves, or only the first. They show important similarities in control dimensions, such as age, gender and university grades, as well as in the outcome dimensions earnings and employment. It would be worrying for the validity of the estimation results if there were evident patterns of attrition. For example, if the most successful graduates did not reply to the second wave due to busy professional lives, the results would be downward biased due to attrition.

Table 8: Attrition analysis using Panel Drop-Outs

	Interviewed both waves				Interviewed only first wave			
	Non-Interns		Interns		Non-Interns		Interns	
Variable	Mean	std. dev	Mean	std.dev	Mean	std. dev	Mean	std.dev
Age	26.96	(3.55)	27.02	(3.13)	26.97	(3.40)	27.10	(3.21)
Female	0.58	(0.49)	0.68	(0.47)	0.54	(0.50)	0.66	(0.47)
Grades	1.85	(0.55)	1.84	(0.54)	1.89	(0.55)	1.96	(0.53)
Study Duration	5.17	(1.51)	5.51	(1.45)	5.13	(1.55)	5.32	(1.50)
Log-Starting-Earnings	7.282	(0.81)	6.977	(0.87)	7.279	(0.79)	7.042	(0.82)
Log-Earnings 1 year after grad.	7.417	(0.71)	7.239	(0.78)	7.392	(0.72)	7.245	(0.74)
Log-Earnings 2 years after grad.	8.032	(0.509)	7.960	(0.47)				
Employment 1 year after grad.	0.869	(0.34)	0.836	(0.37)	0.844	(0.36)	0.783	(0.41)
Employment 5 years after grad.	0.861	(0.35)	0.851	(0.36)				
Job search (in months)	2.255	(2.41)	4.337	(3.59)	2.173	(2.27)	4.631	(3.76)
N	5730		730		4741		586	

A.2 Propensity Score Estimation

The following table shows the outcome of the logit estimation of the propensity score as described in section 5.1.

Table 9: Propensity score estimation - various specifications

	Propensity score specifications				
	(1)	(2)	(3)	(4)	(5)
	Demographic controls				
Female	0.249***	0.173***	0.180***	0.200***	0.141***
	(0.044)	(0.050)	(0.051)	(0.051)	(0.053)
Age	–0.000***	0.000*	0.000**	–0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Marital status, single	0.006	0.148*	–0.054	0.113	0.061
	(0.326)	(0.085)	(0.348)	(0.087)	(0.090)
Marital status, partner	–0.034	0.084	–0.117	0.068	0.046
	(0.326)	(0.082)	(0.348)	(0.083)	(0.086)
Marital status, married	–0.108		–0.201		
	(0.332)		(0.354)		
Marital status, missing		0.194		0.098	0.026
		(0.354)		(0.364)	(0.383)
Children, missing		–0.169		–0.195	–0.257
		(0.349)		(0.352)	(0.366)
Children, yes	0.184		0.183		
	(0.350)		(0.350)		
Children, no	0.567*	0.319***	0.487	0.335***	0.288**
	(0.336)	(0.105)	(0.334)	(0.107)	(0.113)
Education parents, Abitur	0.044	–0.034	–0.010	–0.044	0.065
	(0.430)	(0.451)	(0.345)	(0.355)	(0.375)
Education parents, Fachhochschule	–0.059	–0.119	–0.099	–0.119	–0.009
	(0.433)	(0.454)	(0.347)	(0.357)	(0.377)
Education parents, Realschule	0.114	0.043	0.067	0.054	0.135
	(0.430)	(0.451)	(0.341)	(0.350)	(0.371)
Education parents, Volksschule	–0.044	–0.080	–0.053	–0.050	0.037
	(0.433)	(0.454)	(0.340)	(0.349)	(0.369)

Table 9: Propensity score estimation - various specifications

	Propensity score specifications				
	(1)	(2)	(3)	(4)	(5)
Education parents, PhD	0.130	0.145	0.152	0.096	0.062
	(0.103)	(0.109)	(0.109)	(0.111)	(0.113)
Education parents, University	0.087	0.093	0.098	0.083	0.047
	(0.076)	(0.079)	(0.079)	(0.081)	(0.083)
Education parents, none	0.005	–0.005			
	(0.538)	(0.563)			
Education parents, missing			0.028	0.045	0.124
			(0.564)	(0.572)	(0.578)
Education parents, not known	0.493	0.436	0.459	0.452	0.524
	(0.490)	(0.512)	(0.412)	(0.419)	(0.444)
Vocational educ. parents, missing	0.014	–0.013	–0.022	–0.022	–0.004
	(0.355)	(0.381)	(0.381)	(0.379)	(0.380)
Vocational educ. parents, Meister	0.021	0.031	0.032	0.020	0.018
	(0.070)	(0.073)	(0.074)	(0.074)	(0.076)
Vocational educ. parents, none	0.289	0.373*	0.395*	0.423**	0.423*
	(0.196)	(0.202)	(0.202)	(0.210)	(0.220)
Vocational educ. parents, not known	–0.410	–0.281	–0.272	–0.253	–0.279
	(0.307)	(0.328)	(0.328)	(0.332)	(0.342)
	Degree controls				
Study Field: Culture		–0.301**	–0.303**	–0.386***	–0.327**
		(0.144)	(0.145)	(0.148)	(0.153)
Study Field: Linguistics, Literature		–0.530***	–0.545***	–0.637***	–0.602***
		(0.158)	(0.160)	(0.164)	(0.169)
Study Field: Pedagogics		–0.604***	–0.627***	–0.650***	–0.666***
		(0.160)	(0.162)	(0.165)	(0.170)
Study Field: Sport		–1.534***	–1.572***	–1.503***	–1.350***
		(0.480)	(0.483)	(0.473)	(0.476)

Table 9: Propensity score estimation - various specifications

	Propensity score specifications				
	(1)	(2)	(3)	(4)	(5)
Study Field: Social Sciences		–0.532***	–0.543***	–0.589***	–0.564***
		(0.137)	(0.140)	(0.144)	(0.148)
Study Field: Law		–0.218	–0.114	–0.121	–0.150
		(0.247)	(0.260)	(0.263)	(0.271)
Study Field: Business, Economics		–0.511***	–0.517***	–0.601***	–0.518***
		(0.129)	(0.133)	(0.138)	(0.143)
Study Field: Hard Sciences		–0.544***	–0.541***	–0.587***	–0.507***
		(0.181)	(0.182)	(0.186)	(0.192)
Study Field: Human Medicine		–0.023	–0.083	–0.151	–0.146
		(0.241)	(0.248)	(0.254)	(0.261)
Study Field: Agriculture, Land Studies		–0.600***	–0.613***	–0.685***	–0.692***
		(0.151)	(0.153)	(0.156)	(0.162)
Study Field: Engineering		–0.760***	–0.772***	–0.814***	–0.773***
		(0.134)	(0.135)	(0.139)	(0.144)
Study Field: Art		–0.473***	–0.484***	–0.570***	–0.515***
		(0.163)	(0.165)	(0.170)	(0.176)
Study Field: Chemistry and Pharmacy		–0.948***	–0.959***	–1.003***	–0.816***
		(0.223)	(0.225)	(0.232)	(0.239)
Study Field: Geo– and Biology		–0.299**	–0.324**	–0.375**	–0.412***
		(0.145)	(0.146)	(0.152)	(0.157)
Study Field: Architecture		–0.332**	–0.350**	–0.421***	–0.535***
		(0.154)	(0.157)	(0.160)	(0.166)
Degree: Master (Applied Sciences)		–0.648***	–0.631***	–0.550***	–0.489***
		(0.098)	(0.103)	(0.121)	(0.125)
Degree: Master (University)		–0.501***	–0.488***	–0.472***	–0.422***
		(0.093)	(0.094)	(0.097)	(0.101)
Degree: Bachelor (Applied Sciences)		–0.882***	–0.852***	–0.776***	–0.604***
		(0.178)	(0.185)	(0.193)	(0.204)

Table 9: Propensity score estimation - various specifications

	Propensity score specifications				
	(1)	(2)	(3)	(4)	(5)
Degree: Bachelor (University)		–1.081***	–1.048***	–1.009***	–0.679***
		(0.128)	(0.138)	(0.141)	(0.153)
Degree: State Examination		–1.113***	–1.044***	–0.991***	–0.815***
		(0.227)	(0.234)	(0.242)	(0.250)
Degree: Teacher qualification		–1.173***	–1.165***	–1.124***	–0.783***
		(0.121)	(0.123)	(0.129)	(0.138)
Second degree		0.400***	0.393***	0.398***	0.307***
		(0.050)	(0.051)	(0.052)	(0.054)
	Cognitive controls				
Study grades			–0.003*	0.010	–0.0031
			(0.0.39)	(0.040)	(0.041)
Study grades, missing			–0.207	–0.181	–0.095
			(0.187)	(0.192)	(0.196)
Secondary school grades, missing			0.324	0.483**	0.400
			(0.220)	(0.245)	(0.254)
Secondary school grades			0.005	0.009**	0.005
			(0.004)	(0.004)	(0.004)
Study duration			0.007	0.001	–0.011
			(0.010)	(0.010)	(0.011)
	Extracurricular controls				
Previous Vocation Educ., missing				–0.230	–0.321
				(0.572)	(0.577)
Previous work experience				–0.166***	–0.182***
				(0.059)	(0.060)
Type of school leaving certificate, missing				0.525	0.539
				(0.543)	(0.560)

Table 9: Propensity score estimation - various specifications

	Propensity score specifications				
	(1)	(2)	(3)	(4)	(5)
Type of school leaving certificate, Abitur				0.029	0.066
				(0.083)	(0.085)
Work during studies, missing				–0.438	–0.479
				(0.775)	(0.800)
Work during studies, always				–0.091	–0.053
				(0.081)	(0.083)
Work during studies, sometimes				0.142*	0.162**
				(0.075)	(0.077)
Studied abroad				0.170***	0.150***
				(0.056)	(0.058)
Internship abroad (during studies)				0.052	0.042
				(0.056)	(0.058)
Language course abroad				0.203**	0.198**
				(0.097)	(0.100)
Stay abroad, other				0.077	0.039
				(0.095)	(0.097)
Stay aborad, missing				–0.075	–0.008
				(0.470)	(0.489)
Internship during studies, missing				0.392	0.485
				(0.654)	(0.687)
Internship during studies, internal				–0.032	0.005
				(0.063)	(0.064)
Internship during studies, external				–0.025	–0.027
				(0.051)	(0.053)
Internship during studies, full semester				–0.051	–0.085
				(0.069)	(0.072)
	Job Search controls				

Table 9: Propensity score estimation - various specifications

	Propensity score specifications				
	(1)	(2)	(3)	(4)	(5)
Job search, missing					–0.299
					(0.192)
Job search, before graduation					–0.109
					(0.070)
Job search, not yet started					–0.432***
					(0.163)
Difficulties during job search, missing					–0.026
					(0.199)
Difficulties during job seach, few					0.178***
					(0.055)
Difficulties during job seach, different specialisation required					0.077
					(0.061)
Difficulties during job seach, different degree required					0.051
					(0.088)
Difficulties during job seach, different salary expectation					–0.040
					(0.075)
Difficulties during job seach, different working conditions expected					0.136
					(0.083)
Difficulties during job seach, not enough work experience					0.242***
					(0.058)
Difficulties during job seach, distance to workplace					–0.110
					(0.068)
Difficulties during job seach, lack of technical skills					0.115*
					(0.064)
Difficulties during job seach, work contents differed from expectation					0.006
					(0.060)
Difficulties during job seach, lack of work-life balance					–0.077

Table 9: Propensity score estimation - various specifications

	Propensity score specifications				
	(1)	(2)	(3)	(4)	(5)
					(0.079)
Difficulties during job seach, others					0.148*
					(0.083)
Not yet searched for a job					–0.189
					(0.153)
Constant	18.177***	–15.245**	–20.289**	–1.094	–2.179
	(6.623)	(7.698)	(8.630)	(10.083)	(10.477)
Demographic controls	Yes	Yes	Yes	Yes	Yes
Degree controls	No	Yes	Yes	Yes	Yes
Cognitive controls	No	No	Yes	Yes	Yes
Extracurricular controls	No	No	No	Yes	Yes
Job search controls	No	No	No	No	Yes
N	6443	6414	6414	6377	6377

A.3 Additional Results

A.3.1 Propensity Score Matching for Employment by Gender

Table 10: Results from Propensity Score Matching, Employment, by Gender

	Panel A: Women					**Panel B:** Men				
Sample	Treated	Controls	Difference	S.E.	T-Stat	Treated	Controls	Difference	S.E.	T-Stat
	Employment Status approx. 1 year after graduation									
Unmatched	0.831	0.858	-0.027	0.017	-1.60	0.848	0.885	-0.037	0.022	-1.67
ATT	0.832	0.910	-0.077	0.019	-4.12	0.854	0.898	-0.044	0.026	-1.71
	Employment status 5 years after graduation									
Unmatched	0.815	0.802	0.013	0.019	0.67	0.930	0.945	-0.014	0.016	-0.89
ATT	0.814	0.800	0.014	0.020	0.11	0.929	0.929	-0.001	0.019	-0.03

Notes: Results based on propensity score matching separately for men and women.
Using a caliper of 0.05, common support and matching with replacement.

Both men and women are less likely to be employed within one year of graduation if they conducted an internship during their transititon from university to work. Visible from 10 is also that men increase their employment rate over 5 years, while the employment rate of women appears to decline, likely due to childbearing.

A.3.2 Work and Life Satisfaction

The following Table 11 shows the full propensity score matching analyses for the different satisfaction measures.

Table 11: Results for Satisfaction from Propensity Score Matching, Germany

Sample	Treated	Controls	Difference	S.E.	T-Stat
Job Security					
Unmatched	2.130	1.937	0.194	0.074	2.60
ATT	2.115	2.291	-0.175	0.087	-2.02
Earnings					
Unmatched	2.307	2.268	0.039	0.078	0.50
ATT	2.301	2.561	-0.260	0.089	-2.93
Career Perspectives					
Unmatched	2.040	2.160	-0.119	0.077	-1.55
ATT	2.030	2.461	-0.432	0.086	-5.04
Skill Match					
Unmatched	1.691	1.782	-0.091	0.068	-1.34
ATT	1.677	2.080	-0.404	0.075	-5.37
Work-Life-Balance					
Unmatched	1.940	2.037	-0.096	0.073	-1.32
ATT	1.926	2.160	-0.235	0.081	-2.90
Working Atmosphere					
Unmatched	1.158	1.266	-0.107	0.055	-1.94
ATT	1.153	1.436	-0.283	0.061	-4.60
Job Contents					
Unmatched	1.427	1.509	-0.082	0.060	-1.36
ATT	1.416	1.742	-0.325	0.067	-4.88
Current Position					
Unmatched	1.782	1.770	0.012	0.068	0.18
ATT	1.768	2.052	-0.284	0.078	-3.65
Working Conditions					
Unmatched	1.566	1.650	-0.084	0.064	-1.30
ATT	1.556	1.849	-0.293	0.072	-4.10
Training Possibilities					
Unmatched	1.928	1.965	-0.038	0.074	-0.51
ATT	1.911	2.282	-0.371	0.083	-4.46

Note: N=6.377.

A.3.3 Robustness tests

This section shows selected tests to verify that the estimated results are robust across various specifications of the propensity score and matching models.

The previous results are based on a comprehensive model which takes into account all observable characteristics which could simulatenously influence the probability of conducting an internship, as well as labour market performance. This is in line with the literature on propensity score matching to avoid sources of bias resulting from omitted variables. However, to find out which controls within the preferred estimation model have an important effect on the final results, I estimate various models of the propensity score and run the matching analyses using these scores.

As a first step, in Table 13, I estimate the results separately using each set of controls individually. This means that I estimate the likelihood of conducting an internship controlling uniquely for socio-demographic background of graduates (Model 1), study degree controls (Model 2), cognitive controls (Model 3), extracurricular activity controls (Model 4), and search controls (Model 5).[14]

It becomes visible from these estimations that demographic, degree and search controls appear to be the key conditioning variables. By including each of the respective controls, the unconditional differences between interns and non-interns are reduced and converge towards the final effects which persist the inclusion of all control variables.

[14]The corresponding propensity score estimations can be obtained on request.

Table 12: Robustness tests using each set of controls individually

	Panel A: Employment					**Panel B:** Earnings				
Sample	Treated	Controls	Difference	S.E.	T-Stat	Treated	Controls	Difference	S.E.	T-Stat
Model 1: Demographic controls, only										
						Monthly starting earnings				
Unmatched						6.990	7.294	-0.304	0.040	-7.55
ATT						6.990	7.267	-0.277	0.042	-6.54
						Outcomes approx. 1 year after graduation				
Unmatched	0.836	0.869	-0.033	0.013	-2.45	7.253	7.430	-0.177	0.036	-4.93
ATT	0.836	0.871	-0.035	0.015	-2.39	7.253	7.405	-0.151	0.039	-3.90
						Outcomes approx. 5 years after graduation				
Unmatched	0.851	0.861	-0.010	0.014	-0.71	7.979	8.078	-0.100	0.024	-4.08
ATT	0.851	0.852	-0.001	0.014	-0.04	7.979	8.061	-0.082	0.024	-3.51
Model 2: Study degree controls, only										
						Monthly starting earnings				
Unmatched						6.988	7.295	-0.307	0.040	-7.61
ATT						6.988	7.285	-0.297	0.043	-6.89
						Outcomes approx. 1 year after graduation				
Unmatched	0.837	0.868	-0.031	0.014	-2.33	7.252	7.431	-0.179	0.036	-5.00
ATT	0.838	0.903	-0.066	0.015	-4.43	7.252	7.429	-0.177	0.039	-4.50
						Outcomes approx. 5 years after graduation				
Unmatched	0.852	0.861	-0.009	0.014	-0.68	7.980	8.078	-0.098	0.024	-4.01
ATT	0.852	0.856	-0.004	0.014	-0.29	7.980	8.033	-0.053	0.024	-2.19
Model 3: Cognitive ability controls, only										
						Monthly starting earnings				
Unmatched						6.990	7.294	-0.305	0.040	-7.58
ATT						6.991	7.310	-0.319	0.042	-7.55
						Outcomes approx. 1 year after graduation				
Unmatched	0.836	0.869	-0.032	0.014	-2.41	7.254	7.430	-0.176	0.036	-4.93
ATT	0.836	0.876	-0.040	0.014	-2.76	7.256	7.448	-0.192	0.039	-4.97
						Outcomes approx. 5 years after graduation				
Unmatched	0.851	0.861	-0.010	0.014	-0.71	7.979	8.078	-0.100	0.024	-4.09
ATT	0.851	0.861	-0.010	0.014	-0.75	7.981	8.082	-0.101	0.023	-4.33
Model 4: Extracurricular activity controls, only										
						Monthly starting earnings				
Unmatched						6.988	7.295	-0.307	0.040	-7.61
ATT						6.987	7.307	-0.321	0.043	-7.50
						Outcomes approx. 1 year after graduation				
Unmatched	0.837	0.869	-0.032	0.014	-2.38	7.252	7.431	-0.179	0.036	-5.01
ATT	0.836	0.890	-0.054	0.015	-3.68	7.252	7.448	-0.196	0.039	-5.00
						Outcomes approx. 5 years after graduation				
Unmatched	0.852	0.862	-0.010	0.014	-0.71	7.980	8.079	-0.099	0.024	-4.05
ATT	0.853	0.860	-0.007	0.014	-0.51	7.981	8.076	-0.095	0.024	-4.02
Model 5: Job search controls, only										
						Monthly starting earnings				
Unmatched						6.990	7.294	-0.305	0.040	-7.58
ATT						6.990	7.251	-0.262	0.043	-6.10
						Outcomes approx. 1 year after graduation				
Unmatched	0.836	0.869	-0.032	0.014	-2.41	7.254	7.430	-0.176	0.036	-4.93
ATT	0.836	0.897	-0.061	0.015	-4.13	7.254	7.415	-0.161	0.039	-4.10
						Outcomes approx. 5 years after graduation				
Unmatched	0.851	0.861	-0.010	0.014	-0.71	7.979	8.078	-0.100	0.024	-4.09
ATT	0.851	0.855	-0.004	0.014	-0.26	7.979	8.038	-0.059	0.024	-2.46

Table 13: Robustness tests using sets of controls incrementally

	Panel A: Employment					**Panel B:** Earnings				
Sample	Treated	Controls	Difference	S.E.	T-Stat	Treated	Controls	Difference	S.E.	T-Stat
Model A: Demographic and study degree controls										
						Monthly starting earnings				
Unmatched						6.988	7.295	-0.306	0.040	-7.58
ATT						6.988	7.265	-0.277	0.043	-6.38
	Outcomes approx. 1 year after graduation									
Unmatched	0.836	0.868	-0.032	0.014	-2.36	7.251	7.431	-0.179	0.036	-5.00
ATT	0.836	0.908	-0.072	0.015	-4.81	7.250	7.414	-0.164	0.040	-4.14
	Outcomes approx. 5 years after graduation									
Unmatched	0.852	0.861	-0.009	0.014	-0.69	7.980	8.078	-0.098	0.025	-4.01
ATT	0.851	0.849	0.003	0.015	0.18	7.980	8.021	-0.042	0.024	-1.72
Model B: Model A + cognitive ability controls										
						Monthly starting earnings				
Unmatched						6.988	7.295	-0.306	0.040	-7.58
ATT						6.988	7.261	-0.273	0.043	-6.29
	Outcomes approx. 1 year after graduation									
Unmatched	0.836	0.868	-0.032	0.014	-2.36	7.251	7.431	-0.179	0.036	-5.00
ATT	0.836	0.907	-0.071	0.015	-4.76	7.251	7.410	-0.159	0.040	-4.01
	Outcomes approx. 5 years after graduation									
Unmatched	0.852	0.861	-0.009	0.014	-0.69	7.980	8.078	-0.098	0.024	-4.01
ATT	0.851	0.848	0.003	0.015	0.23	7.980	8.018	-0.038	0.024	-1.57
Model C: Model B + extracurricular activity controls										
						Monthly starting earnings				
Unmatched						6.988	7.295	-0.306	0.040	-7.58
ATT						6.988	7.257	-0.269	0.044	-6.15
	Outcomes approx. 1 year after graduation									
Unmatched	0.836	0.869	-0.033	0.013	-2.42	7.251	7.431	-0.180	0.036	-5.01
ATT	0.836	0.905	-0.069	0.015	-4.58	7.251	7.407	-0.156	0.040	-3.91
	Outcomes approx. 5 years after graduation									
Unmatched	0.852	0.861	-0.010	0.014	-0.71	7.980	8.079	-0.099	0.024	-4.04
ATT	0.851	0.848	0.003	0.015	0.24	7.980	8.019	-0.039	0.024	-1.58

Next, I estimate matching models with an increasing number of controls. Model A uses demographic and degree controls, Model B uses in addition to Model A also cognitive controls. Model C is augmented through the inclusion of extracurricular controls. The model used in the main part of this paper includes job search controls in addition to Model C.

As before, the most important changes are noted through the inclusion of demographic and degree controls. Controlling for cognitive ability and extracurricular activity has almost no impact on the overall results whereas job search controls are again important for estimating the effects of internships on labour market performance.