What makes education positional? Institutions, overeducation and the competition for jobs

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ABSTRACT

We compare three theoretical models for the relationship between schooling and labor market outcomes. On the one hand, the job competition model, which views education as a positional good with relative value on the labor market; on the other hand, the human capital and the social closure models, which view the value of education as absolute but differ in their expectations about returns to years of education above what required for the job. We analyze European countries using data from the European Social Survey (2010), and investigate the incidence of overeducation and the returns to years of overeducation in order to distinguish between the three theoretical models. We then relate these theoretical perspectives to institutions of the education system and of labor market coordination. Our empirical results indicate that education is more likely to function as a positional good in countries with weakly developed vocational education systems, where individuals have an incentive to acquire higher levels of education in order to stay ahead of the labor queue. However, no convincing support was found for the relationship we hypothesized between wage coordination and returns to years of overeducation.

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1. Introduction

A long-standing debate in sociology (Sørensen, 1979; Ultee, 1980) and economics (Hirsch, 1976; Thurow, 1975) has evolved around the question of whether education functions as a positional good in the labor market. According to the positional perspective, the value of qualifications on the labor market depends on the distribution of educational attainment for a given population of interest. When studying the job matching process, this population corresponds to the queue of applicants competing for a given job. Queuing theory (Thurow, 1975) describes the job matching process as a competition for jobs in which employers rank all available applicants within an imaginary queue, based on a number of characteristics, including educational attainment. To be hired, applicants have to be ranked ahead of all other job seekers. Education is a positional good in this model, as its value is relative to the educational attainment of other job seekers.

A corollary of queuing theory is that positional competition drives up overinvestment in education, as individuals have an incentive to stay ahead of the queue and overinvesting in education is a defensive strategy to maintain one's position in the queue. From this point of view, queuing theory differs from two alternative views on the relationship between education and job assignment that regard education as an absolute good: human capital theory (Becker, 1964; Mincer, 1974) and social closure theory (Brown, 1995; Collins, 1979; Weeden, 2002). If education is an absolute good, there is no need for individuals to overinvest in education, and the aggregate level of overeducation should be low.

In this study, we aim to accomplish two main goals. First, we compare three theoretical models – human capital theory, queuing theory and social closure theory – with regard to their predictions about the occurrence of overeducation in the labor market, and the wage returns resulting from educational mismatches. By considering these two outcomes simultaneously, we gain analytical leverage to separate these three theoretical models empirically.

Second, we test whether the occurrence of overeducation and its wage returns vary systematically across countries. In other words, we contextualize the three theoretical models in the institutional context in which employers and job seekers operate. Our argument is that institutions create incentives for job seekers to (over)invest in education, as well as for employers to reward schooling (over)investments. We expect the incidence of

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overeducation to be higher in countries with a low vocational orientation of the education system. In such systems, education is more likely to function as a positional good as vocational tracks are poorly developed and students can only attend higher education if they want to succeed in the labor market (*hypothesis 1*). With regard to the wage returns to overeducation, we hypothesize that wage-setting institutions limit employers' discretion in rewarding knowledge and skills over and above what is required for the job at hand. Returns to overeducation should be higher in countries with less regulated labor markets, where coordination among social partners is low (*hypothesis 2*).

To date, only a few sociological studies have related the study of overeducation to institutions (Barone & Ortíz, 2011; Levels, Van der Velden, & Allen, 2014; Levels, Van der Velden, & Di Stasio, 2014; Verhaest & Van der Velden, 2013). However, they drew quite freely from human capital theory, queuing theory and social closure theory to explain why overeducation occurs and why the extent to which it is rewarded varies across contexts. Our study builds on a recent strand of literature within comparative stratification research that argues that the three theories of job assignment should not be considered as rival explanations for the matching between education and jobs, but as *conditional* explanations, applicable in specific institutional contexts, or labor market segments (Bol, 2015; Goldthorpe, 2014; Matković & Kogan, 2012; Van de Werfhorst, 2009, 2011a,b).

Our contribution to the social stratification literature is twofold. First, we add an important nuance to the discussion on positionality presented in this special issue: instead of posing the question whether or not education is a positional good, we analyze the conditions under which employers are more or less likely to reward education because of its relative value. Our second contribution is to extend the sociological debate on the value of education as a positional good to the study of overeducation, an issue that has thus far primarily drawn the attention of economists (Groot & Van den Brink, 2000; Hartog, 2000; Leuven & Oosterbeek, 2011; McGuinness, 2006). Given the affinities between the concept of overeducation and that of credential inflation (Bills & Brown, 2011), and the fact that at times of educational expansion the inflation of credentials turns education into a positional good (Bol, 2015; Wolbers, De Graaf, & Ultee, 2001), merging these literatures seems theoretically relevant.

The paper is structured as follows. First, we introduce the three theoretical perspectives and discuss what each of them predicts about the occurrence of overeducation and its wage returns. Second, we discuss the institutional conditions under which we expect these theoretical models to apply. We then test our hypotheses with the 2010 wave of the European Social Survey (ESS).

2. Overeducation in the labor market: a comparison of three theoretical models

2.1. Education: absolute or positional good?

Three main groups of theories can be identified, in economics and sociology, about the relationship between education and labor market outcomes. These theoretical perspectives propose different explanations for why education matters to employers during the hiring process, and for the wage returns that result from the match between job seekers and jobs: human capital theory, queuing theory and social closure theory (for extensive reviews: Bills, 2003; Goldthorpe, 2014; Van de Werfhorst, 2011b).

Human capital theory was developed by economists (Becker, 1964; Mincer, 1974). According to this model, hiring transactions are determined by market mechanisms: employers compete to get the most productive applicant at the lowest cost and wages are set to reflect individual marginal productivity. An important assumption of human capital theory is that education is productivity-enhancing: each additional year of schooling is an investment in skills that increases individual productivity. Employers reward the differentials in productivity resulting from different skill endowments by offering higher wages.

A critical response to human capital theory was put forward by signaling and screening theories (Arrow, 1973; Spence, 1973), arguing that education does not directly increase individual productivity, but simply signals productivity potential. Educational attainment correlates with unobservable aspects (e.g. willingness to learn, readiness to sustain effort, perseverance, capacity to acquire new knowledge and skills) that make individuals more productive in the labor market. Employers, while hiring, have only imperfect information about applicants and rely on education as a signal of the training costs that they will have to incur upon hiring a given candidate. Any job-relevant knowledge and skills will be learned through on-the-job training and employers screen applicants based on educational qualifications in order to save on training costs.

Part of this signaling framework, the job competition model proposed by Thurow (1975) describes the allocation of job seekers to vacant jobs as a double queuing process. Within the job queue, jobs are ranked according to technical complexity and training demands. Within the labor queue, applicants are ranked based on observable characteristics, and education is one of the main criteria that determines the ranking. Top-ranked applicants in the labor queue are assigned to top-ranked jobs in the job queue. From a demand-side perspective, the labor market is a market for training slots: employers rely on education as a screening device to identify applicants with high productivity potential and place them ahead of other applicants in the labor queue. From a supply-side perspective, the competition for training slots creates an incentive for job seekers to acquire more and more education in order to stay ahead of the labor queue. Education functions as a positional good in this competition: it is not the absolute level of education that matters for access to jobs, but the educational attainment *relative* to that of other job seekers (Hirsch, 1976; Thurow, 1975; Ultee, 1980).

Human capital theory and queuing theory share a common assumption: they both acknowledge the relationship, whether direct or indirect, between education and productivity (for a discussion: Goldthorpe, 2014; Van de Werfhorst, 2011b). On the contrary, a third theoretical approach, credentialism theory, has been discussed by sociologists. Although this perspective is rather heterogenous in that various interpretations have been advanced in the literature (e.g. Bol & Weeden, 2015; Brown, 1995; Collins, 1979; Weeden, 2002), we focus our discussion on the theoretical approach that has been labeled as *credentialist hiring*, a process that refers to the allocation of individuals to occupational destinations on the basis of educational qualifications and that is structured by "processes of professionalization, occupational regulation, and other forms of status closure [that] constrain the discretion of employers to hire based on criteria other than educational credentials" (Bills & Brown, 2011: 1).

According to this perspective, which we refer to as the social closure model, educational qualifications are formal entry requirements that regulate access to occupations, generating an artificial shortage of labor that is legally allowed to perform specific job tasks (Weeden, 2002). What matters to employers is the match between specific qualifications and specific occupations; as years of education that are not certified for the occupation of destination have no particular value in the labor market, individuals have no incentive to be overeducated to stay ahead of the labor queue. With regard to returns to education, the closure perspective also disputes the assumption, central to human capital theory, that wages directly reflect the productivity-enhancing effect of education.

Table 1
Three theories for the relationship between education and job assignment, and their applicability across different institutional contexts.

	Human capital	Queuing	Social closure
Value of education on the labor market	Absolute: productivity-enhancing	Relative: positional good	Absolute: legitimized credential to enter occupations
Incidence of overeducation	Low	High	Low
Returns to years of overeducation	Non-zero	Zero	Zero
Theories in context			
Vocational orientation	+	−	+
Wage-setting coordination	−	+	+

Note: The signs in the bottom panel indicate the expected relationship between the three theoretical models and the institutional context. As an example, the queuing model is more likely to explain the relationship between education and labor market outcomes in countries where vocational orientation is low.

Closure scholars either deny the relationship between education and productivity, or consider it irrelevant. Under the closure logic, wages are far less unconstrained than from a human capital theory point of view: pay scales are negotiated with social partners and a given qualification corresponds to a given pay level, irrespective of interpersonal differences in productivity.

In the next section, we derive predictions from the three theories about the occurrence of overeducation in the labor market and the wage returns associated with each year of overeducation. Considering the main theme of this special issue, we first discuss why this is an appropriate research design to identify whether education has a positional value.

2.2. Overeducation and positionality

The debate on education as a positional good and the overeducation literature share a common rationale. Queuing theory, on which the positional good model is based, is often discussed in the economics literature to explain the persistence of overeducation in the labor market (Hartog, 2000; Leuven & Oosterbeek, 2011; McGuinness, 2006), as education is a defensive necessity for individuals to preserve their relative position in the labor queue. A common finding of the overeducation literature is that overeducated employees earn, on average, more than individuals employed in the same job but with the required level of education, but less than individuals with the same number of years of education who are employed in a job that matches their education. Returns to overeducation are generally half to two-thirds of the returns to required education (Hartog, 2000: 135). Van de Werfhorst (2011b) suggests to interpret this rate of return as an average, as countries may differ in the extent to which overeducation gets rewarded. We build on this insight and discuss the expectations that can be derived about the incidence of overeducation and the returns to years of overeducation from the three models.[1] As can be seen in Table 1, the consideration of these two labor market outcomes simultaneously gives us analytical leverage to tease the three theoretical models apart.

Starting with the positional good model, two aspects are crucial in Thurow's queuing theory: the fact that positional competition creates an incentive for individuals to acquire more education than needed for a given job, which makes them overeducated; and the fact that any investment in education over and above what is required for the job does not pay off, as productivity is attached to the job and not to the individual. According to queuing theory, overeducation should be a persistent phenomenon in the labor market, as "people with high educational levels are always preferred to persons with lower levels, even if the job does not require

that particular level of schooling" (Van de Werfhorst, 2011b: 532). From queuing theory, one could also derive predictions about wages. As firms cannot readily adjust their production techniques to changes in individual productive capacity, wages do not fully reflect differences in skills and depend more on the job held than on the job holder. As a consequence, returns to years of education that are not required for the job should be zero.

Opposite predictions can be derived from the human capital framework. Overeducation, if present, would only be a temporary phenomenon: the market clearing mechanism would decrease returns to education as a result of an increase in the supply of graduates, making the overinvestment in education less valuable. Firms will adapt their production process to any increase in supply and wages will reflect the marginal product of workers. Under the human capital logic, wages correspond to the level that individuals are willing to accept given their human capital and returns to years of overeducation should be non-zero as they reflect accumulation of skills (see the discussion in McGuinness, 2006).

Finally, according to the social closure model, education is a formal requirement for entry into occupations and qualifications requirements are decided collectively by social partners, and the assessment of standards and skill profiles is strictly regulated. This perspective leaves little room for the occurrence of overeducation. A similar reasoning applies to wage returns. Returns to years of overeducation should be close to zero, as pay levels are negotiated by social partners on the basis of educational requirements. Regardless of differences in productivity between employees with different years of education, rigid pay scales should limit wage variation between overeducated employees and employees with the required qualifications.

3. The institutional bases of positional competition

Previous studies noted that the queuing model does not apply to the same degree in all countries or labor market segments (Bills, 2003; Van de Werfhorst, 2011b). In line with these studies, we expect that institutions of the education system create the conditions for people to overinvest in education and that institutions for wage-setting coordination limit employers' discretion in rewarding individual productivity on the job.

3.1. Prevalence of overeducation

In some institutional contexts, employers can rely on the education system for the supply of productive skills; in other contexts, newly hired employees have to be trained within the organization. Our focus here is on the vocational orientation of the education system, as a measure of the opportunities available to students to opt for a vocational or a general training, and of the fit between qualifications and positions in the occupational structure.

From a supply-side perspective, in highly vocationally oriented countries (e.g. Germany, Austria, Switzerland), vocational

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[1] Thus, we are not proposing a measure of the positionality of education itself, but rather we discuss the outcomes that can be expected on the labor market if the tenets of the positional good model (incentive to overinvest in education and no pay off for years of education additional to the ones required for a given job) hold.

education is a viable alternative to higher education. Vocational qualifications reflect the curricular needs of stakeholders, are standardized and widely portable in the labor market, and lead to relatively good job prospects. Thus, vocational education is a safety net that shelters individuals from unemployment (Müller & Shavit, 2000). At the same time, the strong positioning of the vocational sector diverts students from academic tracks that lead to higher education and more prestigious occupational positions (Hillmert & Jacob, 2003; Müller & Shavit, 2000; Powell & Solga, 2011). In these countries, employers tend to sort on specific skills or on formal entry requirements, as predicted by the human capital or the social closure models, respectively. From a demand-side perspective, job assignment is based on the horizontal correspondence between fields of study and detailed occupations and years of schooling in a field unrelated to the occupation of destination are not relevant for employers (Di Stasio, 2014; DiPrete, Bol, Ciocca, & Van de Werfhorst, 2014).

In less vocationally oriented contexts (e.g. United States, Britain), on the other hand, job-relevant skills have to be learned at the workplace through formal or informal on-the-job training. In these countries, employers 'train in-house' and search for indicators of trainability while hiring. Vocational training lacks the institutional foundations that make it such a successful model of skill formation in the German-speaking cluster (Finegold & Soskice, 1988), and is largely viewed as a remedial option for the under-achievers (Solga, 2002). Based on this discussion, we hypothesize that overeducation should occur more frequently in countries with weaker vocational education systems, as it is a defensive strategy for applicants to stay ahead of the labor queue (see bottom part of Table 1).

3.2. Returns to years of overeducation

We also analyze whether the institutional context affects wage returns to overeducation. Wage setting is a process that in some countries is more institutionalized and collectively regulated than in others. The comparative political economy literature (Hall & Soskice, 2001) distinguishes between coordinated market economies, in which employers jointly coordinate their actions with other social partners and the support of non-market institutions, and liberal market economies, in which employers' coordination largely follows the logic of the market.

The strength of educational credentialing as a closure strategy varies across institutional contexts (Bol & Weeden, 2015). In highly coordinated systems, social partners establish formal educational requirements to regulate entry into occupations, and collectively set the rewards that correspond to each specific level of education. In these countries, educational attainment over and above formally required education should pay off relatively less than in weakly coordinated countries, and positional advantages should be rewarded to a lower extent. Thus, our second hypothesis is that wage coordination institutions should limit the extent to which positional advantages are converted into wage gains, as regulations on wage-setting impose a cap on returns to education investments.

4. Data and method

4.1. Data

To investigate overeducation from a cross-national perspective, we rely on the 2010 wave of the ESS, a cross-national survey that collects, every two years, individual level data on a large number of themes: welfare attitudes, work orientation, citizen involvement, subjective well-being, attitudes towards politics, etc. Each country provides a randomly drawn sample of private households residents

aged 15 and over, regardless of nationality, citizenship or language. Countries aim for a minimum effective achieved sample size of 1500 residents (or of 800 in countries with target populations of less than two million). Besides the main questionnaire, each ESS round includes a few rotating modules. We use the 2010 round for the analysis, as the rotating module on "Work, family and well-being" contained an item that can be used to calculate whether or not respondents are overeducated. Our analytical sample consists of individuals aged between 25 and 45. We excluded older respondents as processes of job matching vary over the life course: training received in formal education may become obsolete at later stages of one's career or other sources of human capital may become more important, making it difficult to interpret the substantial meaning of being formally overeducated (Leuven & Oosterbeek, 2011).

4.2. Method

We analyze two dependent variables: (1) overeducation, and (2) earnings. In the first set of analyses, we study if the amount of overeducation co-varies systematically with the vocationality of education systems. The second set of analyses tests whether returns to overeducation are correlated to a country-level indicator of wage-setting coordination. A growing body of research argues that multilevel studies using countries as the second level violate a number of important assumptions, especially when the N at level 2 is small (e.g. Bryan & Jenkins, 2013; Stegmueller, 2013). Since we study only 20 countries, we use two-step multilevel models, where we first estimate country-specific regressions and save point estimates for both the incidence and returns to overeducation for each country separately. In a second step, we then analyze these point estimates as dependent variables.

When using two-step multilevel models, the relationship between the outcome of interest and macro-level indicators can be visualized very easily in scatter plots, which show whether the studied relationship is driven by outliers, and which countries follow the predicted pattern. An analytical issue when using two-step multilevel models is the estimation uncertainty of the first step, i.e. the point estimates that are the dependent variables in the second step are predicted with differing levels of uncertainty across countries. This uncertainty is expressed by the standard error of the mean (for the incidence of overeducation) and by the standard error of a regression coefficient (for the wage effects of overeducation). To deal with this issue and model the uncertainty of our dependent variable, we corrected the standard errors of our macro-level regression for heteroscedasticity using the procedure described by Lewis and Linzer (2005; see also Heisig, 2011).

In the first step, we take the mean level of overeducation with the standard error of the mean to indicate the prevalence of overeducation in a country. The second measure we generate in the first step is a point estimate of the returns to overeducation, obtained by regressing z-standardized log hourly wages on a z-standardized measure of years of overeducation, in order to be able to compare the effect of overeducation across countries. The reported effect sizes show the increase in wages, expressed in standard deviation units, for a one standard deviation increase in years of overeducation. In these models we use several control variables (see Section 4.3.3). The point estimate for years of overeducation then reflects the returns to a year of overeducation over and above the returns to years of required education. We save the point estimates and standard errors of the estimates and use these in the second step of the two-step models. Importantly, considering the different mechanisms of labor market allocation of men and women, we ran all analyses separately by gender.

We present both the simple bivariate results in the form of scatter plots, where we do not account for the uncertainty of

Table 2
Descriptive statistics of all variables used in the analysis, for the full sample.

Variable	Men sample				Women sample			
	Mean	SD	Min	Max	Mean	SD	Min	Max
Experience	17.173	6.979	0	34	16.828	7.164	0	34
Experience squared	343.595	245.254	0	1156	334.540	248.263	0	1156
Full-time employee (1 = yes)	0.958	0.201	0	1	0.811	0.392	0	1
Occupational group:								
Military	0.005	0.070	0	1	0.001	0.035	0	1
Legislators, senior officials, and managers	0.098	0.297	0	1	0.056	0.231	0	1
Professionals	0.178	0.383	0	1	0.245	0.430	0	1
Technicians and associate professionals	0.166	0.372	0	1	0.247	0.431	0	1
Clerks	0.071	0.255	0	1	0.136	0.343	0	1
Service and sales	0.096	0.294	0	1	0.188	0.391	0	1
Skilled agricultural and fishery	0.008	0.091	0	1	0.005	0.072	0	1
Crafts and trades	0.186	0.389	0	1	0.014	0.118	0	1
Plant and machine operators	0.129	0.335	0	1	0.028	0.164	0	1
Elementary	0.064	0.245	0	1	0.079	0.270	0	1
Parent's highest level of education:								
Low	0.325	0.468	0	1	0.332	0.471	0	1
Medium	0.365	0.481	0	1	0.356	0.479	0	1
High	0.310	0.463	0	1	0.313	0.464	0	1
Native resident (1 = yes)	0.882	0.323	0	1	0.896	0.305	0	1
Ln wage	1.849	1.573	−4.158	3.856	1.652	1.531	−4.158	3.861
Years of education	14.170	3.291	1	21	14.725	3.308	0	21
Required years of education	11.892	2.564	8	21	12.106	2.666	8	21
Overschooled years of education	2.646	2.495	0	12	2.910	2.479	0	13
Underschooled years of education	0.367	1.224	0	15	0.292	1.133	0	15
Slope of years of education on ln wage	0.051	0.017	0.027	0.090	0.057	0.015	0.015	0.081
Slope of required years of education on ln wage	0.341	0.103	0.138	0.544	0.333	0.141	0.119	0.862
Slope of overschooled years of education on ln wage	0.103	0.122	−0.060	0.377	0.124	0.105	−0.072	0.345
Slope of underschooled years of education on ln wage	−0.102	0.200	−0.807	0.157	−0.038	0.165	−0.575	0.190

Source: ESS Round 2 (2010), respondents aged 25–45 (*N* = 2646 for males, *N* = 2480 for females).

measurement of the point estimates.[2] Next to this, we present multivariate models, where we give more evidence for a statistical pattern. We acknowledge that the results we present are mainly descriptive, as the low number of countries does not allow us to include a large number of control variables at the country level. It is important to note that, neither empirically nor theoretically, we expect a separable causal effect of the vocational orientation of an education system or of wage-setting institutions on the prevalence and returns to overeducation. Rather, we argue that institutions and overeducation are related, co-evolve, and strengthen each other.

4.3. Individual level variables

4.3.1. Overeducation

Overeducation is the main variable of interest. The overeducation literature showed the sensitivity of this variable to the way it is measured (Verhaest & Omey, 2006). As objective, up-to-date indicators of job requirements are not available in our dataset, we consider worker self-assessments to be the best available measure, in line with Hartog (2000). The wording of the question on the required amount of education is the following: "How many years of education beyond compulsory education is required to work in the occupation you are currently working in?" By adding country-specific information on the length of compulsory education, we obtain the total years of required education (Tahlin, 2007). Overeducation is then calculated as the difference in years of schooling

between the acquired and required years of education. As an example, a respondent working in a job for which he or she reports that 16 years of education are required will be overeducated by a year if he or she has obtained 17 years of education. In a similar vein, the respondent will be undereducated by two years if he or she reports 14 years of education.[3]

In our models, we use the indicator of overeducation both as a dependent variable (prevalence of overeducation) and as an independent variable (when we regress log earnings on overeducation) in the first step of a two-step model. Descriptive statistics for all the variables used in this study are reported in Table 2. Table 3 shows the mean years of education, required education, overeducation and undereducation separately for each country, as well as the scores for each country on the three institutional indicators (described below).

4.3.2. Earnings

Earnings refer to gross wages, and respondents can refer to any pay period (month, hour, year). We then recalculated self-reported earnings into hourly wages. Finally, as it is well known that outliers in the earnings distribution can have strong effects in regressions to the mean, we delete both the 1% lowest and 1% highest earners in all countries. In our models we analyze the natural logarithm of hourly wages.

We use a specification of the earnings function that is widely known as the ORU model. In this model, years of attained

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[2] For all models, we checked for DFBeta's and did not find large outliers. Large outliers are defined as having a DFbeta that exceeds an absolute value of 1. In one figure (Fig. 2, see below, where we look at the relation between vocational enrolment and the prevalence of overeducation for females) we find that Great Britain just crosses this threshold, but a closer inspection of that figure shows that removing Great Britain would only make the observed pattern stronger, and thereby does not affect our results. Furthermore, since the number of observations in the scatter plots tend to be low, we use the adjusted r^2 instead of the regular r^2.

[3] Respondents could also answer "Don't know" or not provide an answer. The question is only asked for those currently having a job, so a third missing option is "Not applicable". In our sample, very few respondents did not know (67) or did not answer (11) how many years of compulsory education were required for their job. Much more people are in the not applicable category (2448), but these are to a large extent people that answered that no compulsory schooling was required (1622) or respondents that did not have a job at the time of the survey. These missings are not unevenly distributed across countries.

Table 3
Descriptive statistics of main independent and dependent variables, by country.

Country	Men sample					Women sample					Macro-level indicators				
	Sample size	Years of education	Required years of education	Years of overeducation	Years of undereducation	Sample size	Years of education	Required years of education	Years of overeducation	Years of undereducation	Vocational orientation index	Dual system index	Corporatism index	% Unemployed (females)	% Unemployed (males)
BEL	131	14.5	11.8	2.8	0.4	116	15.0	11.8	3.3	0.2	0.9	3.3	1.2	7.3	6.0
CHE	118	11.6	12.5	0.8	1.7	89	12.6	12.4	1.1	1.0	1.1	58.3	-0.7	4.2	2.8
CYP	52	13.5	10.8	2.6	0.6	53	13.5	10.3	2.7	0.3	-1.2	.	-0.6	4.4	3.3
CZE	156	13.1	11.0	1.8	0.1	121	13.1	11.3	1.8	0.2	1.7	35.5	-0.7	7.1	4.3
DEU	220	14.3	12.3	2.3	0.4	167	14.2	12.5	1.9	0.5	0.9	45.0	0.7	8.6	8.5
DNK	141	15.2	13.1	2.3	0.7	135	15.5	12.9	3.2	0.7	0.5	47.7	0.5	3.6	3.5
ESP	149	14.6	12.0	2.4	0.4	123	15.5	12.6	3.0	0.4	-0.0	2.8	0.5	11.4	8.1
EST	99	13.6	10.0	3.2	0.0	119	14.2	9.8	4.0	0.0	-0.4	30.9	-0.8	5.6	7.6
FIN	166	15.0	12.7	2.1	0.1	142	16.1	13.4	2.7	0.1	0.7	10.5	0.7	6.1	5.8
FRA	153	14.2	12.7	2.0	0.7	178	15.0	12.6	2.6	0.3	0.4	11.3	-0.5	7.6	6.4
GBR	124	14.3	12.6	1.9	0.2	160	14.7	12.7	2.1	0.4	0.5	0.0	-1.8	3.7	4.4
GRC	123	13.3	10.3	2.2	0.3	117	13.9	10.2	3.2	0.1	-0.3	5.1	-0.0	11.6	4.9
HUN	95	13.9	12.0	1.8	0.2	91	14.9	12.4	2.4	0.1	-0.7	13.2	-0.7	7.2	6.7
IRL	138	14.9	10.4	4.3	0.0	154	15.0	10.8	4.2	0.1	-0.4	3.8	0.2	4.1	6.1
NLD	135	15.1	12.9	2.4	0.4	128	15.3	13.2	2.4	0.4	1.3	20.0	1.0	4.8	2.7
NOR	213	14.6	12.2	2.6	0.4	146	15.9	12.1	3.6	0.0	0.9	13.3	0.7	2.2	2.5
POL	138	14.2	10.9	3.0	0.0	93	15.1	11.5	3.6	0.1	0.3	6.5	-0.9	10.4	8.8
SVK	58	13.6	11.7	1.4	0.3	102	13.7	12.2	1.7	0.3	1.5	31.7	-0.2	12.5	9.9
SVN	81	12.7	11.8	1.2	0.4	99	13.3	12.6	1.2	0.6	1.1	3.7	1.2	5.3	4.1
SWE	156	13.9	11.9	2.1	0.2	147	14.9	12.7	2.2	0.2	0.7	0.0	0.4	5.0	5.0

Source: ESS Round 5 (2010), Bol and Van de Werfhorst (2013), OECD.

education are decomposed in: years of required education (E^r), years of overeducation (E^o), years of undereducation (E^u). The model can be formally written as:

$$\ln w_i = \delta_r E_i^r + \delta_o E_i^o + \delta_u E_i^u + x_i'\beta + \varepsilon_i$$

where δ_r, δ_o, and δ_u are the returns to required education, overeducation, and undereducation, and x' is a vector of individual characteristics.

For our analysis, it is worth noting that both the human capital and the queuing model are nested in the ORU model (Leuven & Oosterbeek, 2011: 303). The Mincerian equation that is central to human capital theory is a particular case of the ORU model in which returns to the three components of attained years of schooling are constrained to be the same, regardless of job requirements ($\delta_r = \delta_o = -\delta_u$). This restriction reflects the assumption that years of schooling, regardless of whether or not they are required for the job, increase wages. The equation corresponding to the queuing model is also a particular case of the ORU model. In this case, returns to required schooling are positive and returns to years of under- or overeducation are set to zero ($\delta_o = \delta_u = 0$) to reflect the assumption that "marginal products are inherent in jobs and not in individuals" (Thurow, 1975: 85). Also following the social closure model returns to years of under- or overeducation are set to zero ($\delta_o = \delta_u = 0$), to reflect the idea that employers have low discretion in wage-setting.[4]

4.3.3. Control variables

In the models where we predict log hourly wages, we add various controls next to the main independent variables (overeducation, undereducation, and required education). First, we include an indicator of work experience (constructed as the difference between the school leaving age and the current age of the respondent). Since it is well known that experience has a non-linear effect, we also include a squared term of work experience. We furthermore control for migrant status (1 = native), type of employment (1 = fulltime), major occupational group (1 digit ISCO-08). Finally, we control for the highest level of educational attainment of the parents, categorized in low (ISCED 1–2), medium (ISCED 3–4), and high (ISCED 5–6).

4.4. Country level variables

For the country-level variables, we rely on the indicators of education systems provided by Bol and Van de Werfhorst (2013). The vocational orientation index is obtained after performing a principal factor analysis from two indicators that measure the proportion of students in upper secondary education that is enrolled in vocational education in a given country. This index captures the relative size of the vocational sector in the secondary education system. We also rely on the vocational specificity index of Bol and Van de Werfhorst (2013). This indicator reports the proportion of upper secondary vocational students enrolled in dual training programs that alternate formal learning in schools and training at the workplace. Earlier studies showed that both the vocational orientation and the vocational specificity are important characteristics of vocational education systems (Bol & Van de Werfhorst, 2013; Breen, 2005). Although both variables do of course correlate, this

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[4] Recently, Levels, Van der Velden, and Allen (2014) referred to the ORU model and applied an 'institutionalist' perspective to their study of cross-national variation in returns to years of overeducation. They found that in countries where wage coordination is strongly institutionalized a larger part of the relationship between overeducation and wages remain unexplained, after controlling for skills, compared to countries with a less extensive coverage of collective bargaining agreements (see also Carbonaro, 2006).

correlation is not very high ($R = 0.34$ in our sample of countries), indicating that the indicators measure distinct institutional characteristics.

To measure the degree of institutionalization of wage-setting, we use an index of corporatism recently developed and validated by Jahn (2014). The index is obtained after performing a factor analysis on the following indicators: authority and concentration of collective actors, role of the government in wage bargaining, level at which wage bargaining takes place (i.e. centralization), degree of involvement of trade unions and employers in decisions about social and economic policies, coordination of wage bargaining and coverage of collective agreements. Indicators are taken from the database on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts compiled by Jelle Visser (2011). We standardized the variable for the countries in our sample.

Although degrees of freedom at the country level are limited, we controlled for two additional macro variables that may affect the incidence of overeducation in the labor market, and otherwise

drive our findings. A first concern is that in an economic downturn, job seekers may accept any employment opportunity that they can find, irrespective of whether they are overeducated for the job. We took the unemployment rate reported by the OECD for the five year average of the period 2005–2009, separately for men and women, as an indicator of the state of the economy in the year of the survey. A second concern is that investment in education may be lower in countries where higher education has a higher cost for students and their families. The OECD provides an indicator of annual average tuition fees (in USD) charged by tertiary institutions for full-time students. This indicator, however, is only available for a limited number of countries and does not take into account the fact that many countries subsidize students' education costs with grants and loans. Thus, we used an OECD indicator that captures the proportion of public educational expenditure that is dedicated to loans, grants and scholarships at the tertiary level. This indicator is available for a larger number of countries, and we consider it a better, albeit imperfect, proxy of a country's effort to partly cover tertiary education costs.
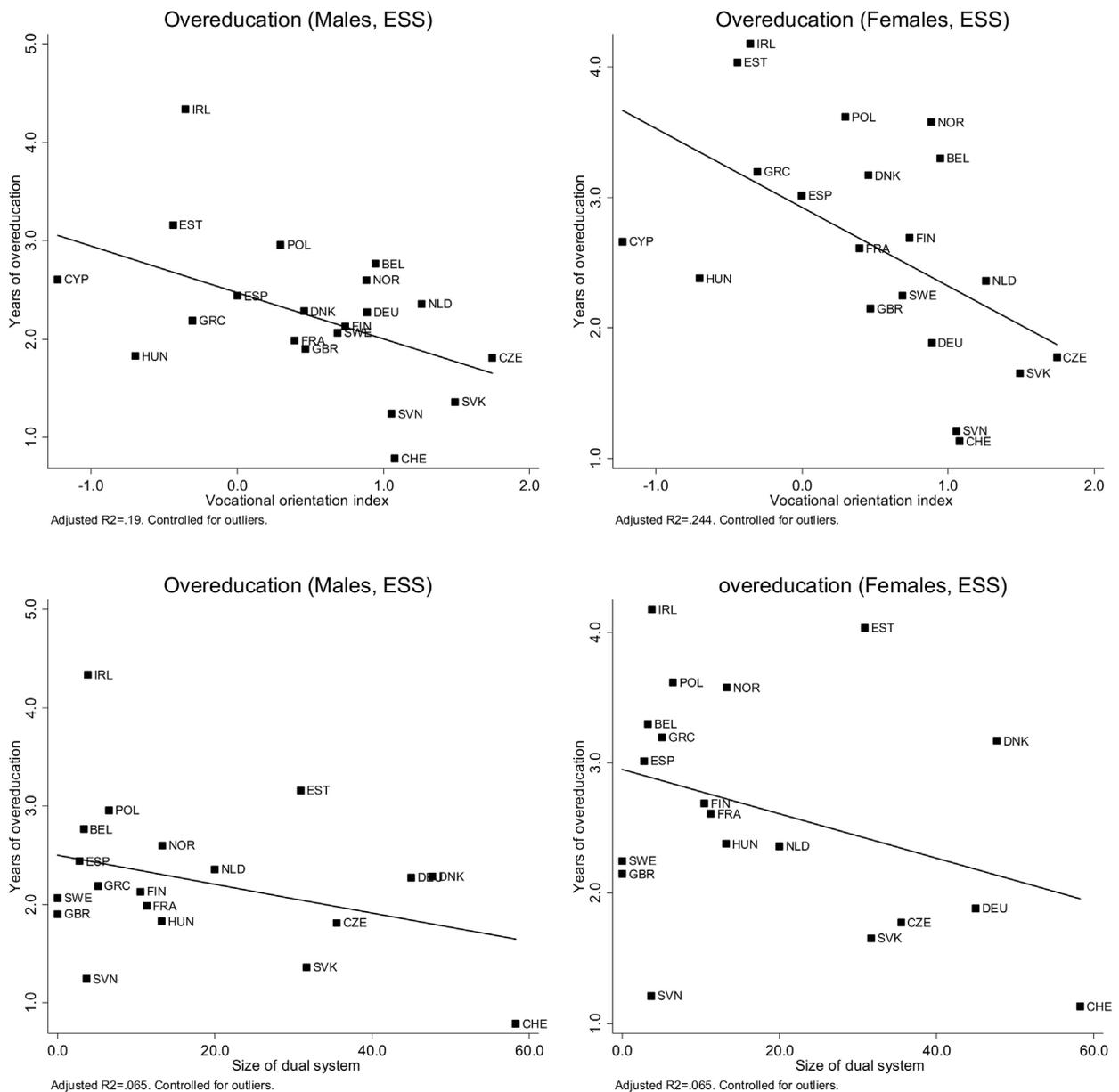

Fig. 1. Institutions and the incidence of overeducation, by gender.

Table 4
Incidence of overeducation and institutions. OLS regression.

	Men sample						Women sample					
	M1	M2	M3	M4	M5	M6	M1	M2	M3	M4	M5	M6
Vocational index	−0.480[*]			−0.584[*]	−0.556[*]	−0.463[*]	−0.616[*]			−0.850[**]	−0.808[**]	−0.615[*]
	(0.205)			(0.268)	(0.247)	(0.209)	(0.226)			(0.286)	(0.258)	(0.233)
Dual index		−0.015		−0.006				−0.017		−0.005		
		(0.010)		(0.010)				(0.011)		(0.010)		
Corporatism index			0.101	0.230					0.049	0.223		
			(0.215)	(0.205)					(0.250)	(0.219)		
Tuition fees					−0.009						−0.013	
					(0.024)						(0.025)	
Unemployment (%)						0.049						−0.011
						(0.073)						(0.060)
Constant	2.385[*]	2.414[*]	2.190[*]	2.548[*]	2.656[**]	2.197[**]	2.930[**]	2.939[**]	2.635[**]	3.192[**]	3.255[**]	3.006[**]
	(0.155)	(0.205)	(0.146)	(0.203)	(0.356)	(0.454)	(0.201)	(0.285)	(0.200)	(0.257)	(0.375)	(0.448)
Adjusted R^2	0.18	0.08	0.00	0.21	0.16	0.17	0.25	0.06	−0.05	0.33	0.32	0.21
N	20	19	20	19	19	20	20	19	20	19	19	20

Standard errors in parentheses. Standard errors corrected for heteroscedasticity.

[*] $p < 0.05$.
[**] $p < 0.01$.

5. Results

5.1. Education systems and the prevalence of overeducation

We start the presentation of the results by showing, in Fig. 1, the bivariate relationship between the incidence of overeducation on the vertical axis and our macro-level variables of interest on the horizontal axis: the vocational orientation of the education system in the above panels, the index of specificity in the bottom panels. For both genders, we see a clear trend: the more an education system is vocationally oriented, the lower the average investment in overeducation. This provides support for the idea that education functions less as a positional good in countries where the education system provides students with specific skills, and matches them to specific positions in the labor market. In countries with a weak vocational system, such as Ireland or Estonia, the amount of overeducation is much higher than in countries with strong vocational systems, such as Switzerland, the Czech Republic, and Germany.

The top panels of Fig. 1 give a first indication that the incidence of overeducation varies across institutional contexts. Somewhat surprisingly is the similar level of overeducation found in Great Britain and Germany, in spite of their very different vocational education sectors. However, our measure of vocational orientation simply captures the share of students within upper secondary education that are enrolled in vocational tracks, with no further information on the specific skills that are obtained. When we look at the proportion of upper secondary vocational students that are enrolled in dual training programs, the pattern of results is similar but less strong. Investment in overeducation (at the country level) tends to be lower in vocationally specific education systems.

As argued in Section 4.2, the point estimates of the mean years of overeducation are not estimated with similar precision in all countries. We therefore, as a final step, look at how the two indicators are related to the incidence of overeducation in multivariate models, which take into account the imprecision of the coefficients estimated in the first stage (Table 4). For both genders, in model 1 we see a negative and significant correlation between the vocational orientation of the education system and the mean years of overeducation. In countries with more vocationally oriented education systems, the incidence of overeducation is lower. This confirms the pattern of Fig. 1. Model 2 refers to the relationship between overeducation and the size of the dual system. We do not find any evidence of a significant correlation between the two variables. Importantly, the negative relationship between the index of vocational orientation and the incidence of overeducation remains

significant after controlling for the other two institutional characteristics in model 4, and after adding the two additional controls for tuition fees and unemployment, in models 5 and 6.

One may argue that additional controls should be added at the macro level. As suggested by one anonymous reviewer, welfare state policies, which also vary considerably across countries, may indirectly be associated with the overall level of overeducation that is registered in the labor market, as they affect the relative costs incurred by individuals during the search for a job. In our design, we are simply not able to control for a large number of different factors at the country level. Although we agree that the welfare state might affect the aggregate level of overeducation, we indirectly account for the reservation wages of job seekers when adding the macro level control for unemployment.

5.2. Education systems and the returns to overeducation

We now turn to the analysis of returns to years of overeducation. Fig. 2 plots the macro-level indicator of corporatism on the x-axis and the rewards to years of overeducation (over and above years of required education) on the y-axis. For males, the bivariate relationship with the index of corporatism is clearly negative: in more highly coordinated settings, returns to years of overeducation are lower. This is not the case for females. In Table 5, we test the robustness of this association in a two-step multilevel model. The relationship between corporatism and returns to years of overeducation is negative for males, in line with expectations, but not statistically significant. For females, there is no association between level of corporatism and returns to years of overeducation. We thus find no support for our second hypothesis.

The presence of gender differences in the incidence and returns to overeducation is not in itself surprising, considering that women and men have a different labor market attachment, and are affected differently by the institutional context. Indeed, it is common practice among stratification scholars to only focus on men in the analyses (e.g. Levels, Van der Velden, & Di Stasio, 2014). More surprising is the fact that the association between returns to education and our macro variable of corporatism is stronger for males. After inspecting Fig. 2, we note that in Norway returns to education are the lowest for men but very high for women, whereas in Greece the opposite pattern can be observed. We cannot, with the data at hand, tease out what may be driving these differences, which may better be explained by more focused single-country studies.
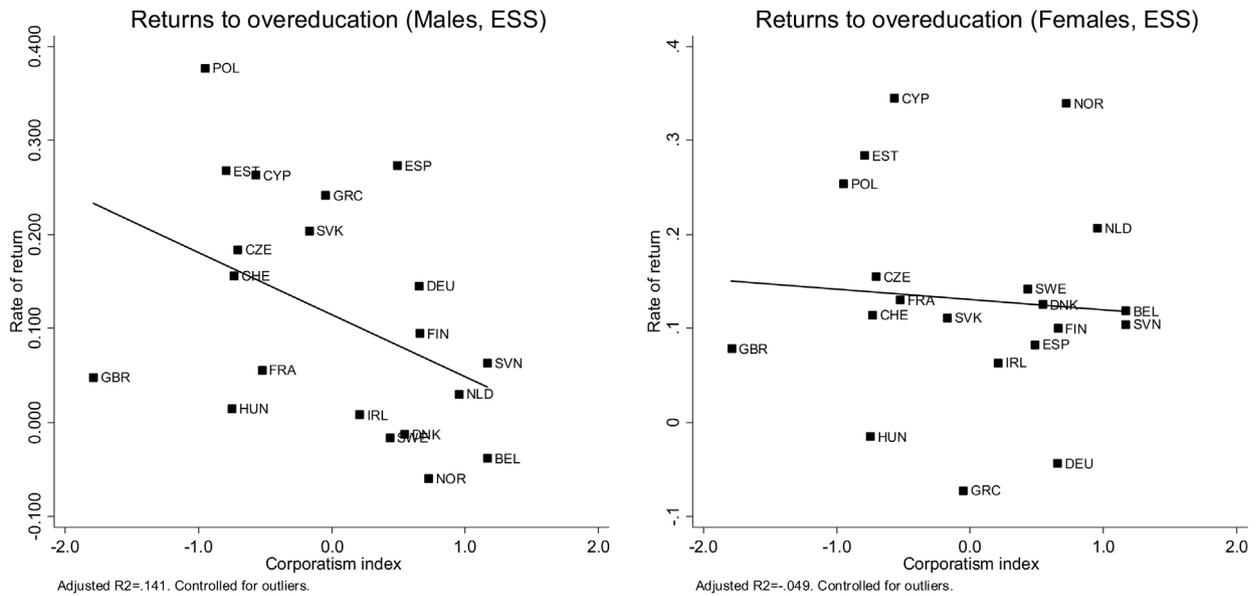
Fig. 2. Institutions and returns to years of overeducation, by gender.

Table 5
Returns to years of overeducation and institutions. OLS regression.

	Men sample						Women sample					
	M1	M2	M3	M4	M5	M6	M1	M2	M3	M4	M5	M6
Vocational index	−0.052			−0.057			0.015			0.054		
	(0.043)			(0.054)			(0.036)			(0.045)		
Dual index		0.001		0.002				−0.001		−0.001		
		(0.002)		(0.002)				(0.001)		(0.001)		
Corporatism index			−0.042	−0.032	−0.046	−0.039			0.001	−0.006	0.005	0.004
			(0.031)	(0.034)	(0.026)	(0.026)			(0.028)	(0.029)	(0.028)	(0.026)
Tuition fees					−0.010[*]						0.001	
					(0.003)						(0.004)	
Unemployment (%)						0.030[*]						−0.015
						(0.011)						(0.008)
Constant	0.129[**]	0.081	0.100[**]	0.102[*]	0.220[**]	−0.064	0.110[**]	0.122[**]	0.118[**]	0.102[*]	0.103	0.214[**]
	(0.035)	(0.039)	(0.026)	(0.042)	(0.049)	(0.063)	(0.031)	(0.032)	(0.023)	(0.036)	(0.055)	(0.054)
Adjusted R^2	0.02	−0.03	0.04	0.01	0.31	0.29	−0.05	−0.05	−0.06	−0.08	−0.12	0.09
N	20	19	20	19	19	20	20	19	20	19	19	20

Standard errors in parentheses. Standard errors corrected for heteroscedasticity.

[*] $p < 0.05$.

[**] $p < 0.01$.

5.3. A mapping of countries across the three models

If we consider the two outcome variables simultaneously (Fig. 3), we can map countries across the three theoretical models.

In the bottom-left quadrant, we find a cluster of Continental (Germany, France) and Central European countries (Hungary, Slovenia), with relatively low levels of overeducation and returns to years of overeducation that are closer to zero. This is what we would expect based on the social closure model. In these countries, the presence of a well-developed vocational training system provides occupation-specific skills; however, the extent to which skills and additional years of education affect wages is constrained by highly institutionalized wage-setting and a strong role of social partners in wage bargaining, in line with the results of Levels, Van der Velden, and Allen (2014). The inclusion of Great Britain in this cluster is, however, puzzling given its weaker vocational education sector and its low score on the corporatism index.

The upper-left quadrant corresponds to the human capital model and includes Slovakia and the Czech Republic. These countries have a rather high vocational orientation but their

economies rely on transnational corporations that resist wage-setting through collective agreements (Bohle & Greskovitz, 2007). In these countries a widespread distrust of social partners, who were perceived as remnants of the old communist regime, was an obstacle to the emergence of corporatism. Thus, although the education system provides occupation-specific skills and the incidence of overeducation is relatively low, weak labor market institutions leave room for individual bargaining between employers and employees, in line with human capital theory. Switzerland and the Netherlands are also part of the human capital model. Switzerland is an example of a country in which skill formation is collectively organized and vocationally oriented, but wage bargaining is relatively decentralized, which may explain the somewhat higher returns for years of overeducation. The Netherlands also has a strong vocational sector, but the involvement of firms in the provision of training is less strong than in Germany.

The bottom right quadrant corresponds to the queuing model, and is a more heterogeneous cluster of countries, including Northern European countries (Belgium, Ireland, Denmark and Norway), but also Greece. These countries show a relatively high incidence of
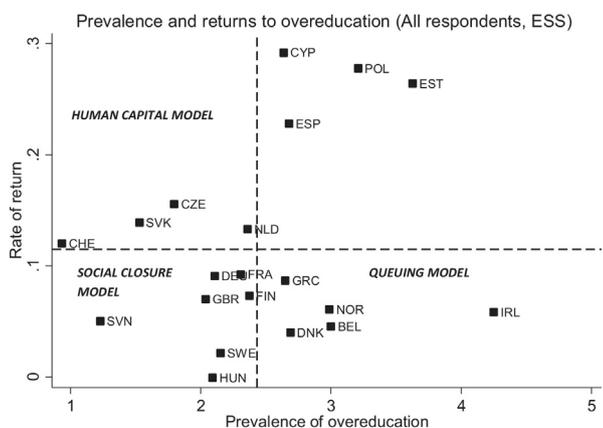
Fig. 3. Mapping of the three models across countries. *Note*: The dotted lines cross at the mean level of overeducation and mean returns to years of overeducation for the full sample.

overeducation and returns to years of overeducation that are close to zero. These are countries in which education is a positional good: the low vocational orientation of the education system does not provide clear signals of skills to employers, and the correspondence between qualifications and occupations of destinations is less tight than in countries belonging to the human capital or social closure clusters. The positioning of Denmark in this cluster, however, is rather puzzling, considering its rather strong vocational sector. Ireland, Belgium, Norway and Greece are commonly described as internal labor markets, and it is in these systems that employers are more likely to train in the firm, and consider education a signal of trainability. However, this is also a rather heterogeneous group, suggesting that further theorizing may be needed to understand the matching process in this group of countries (see also Gangl, 2002).

In sum, the large majority of the countries in our sample can be found in the quadrants that we have associated with the three models of human capital, queuing and social closure. In line with our hypothesis, countries that have a well-developed vocational sector tend to cluster in the human capital or social closure quadrants, indicating that education is less of a positional good in vocationally oriented education systems, where the aggregate level of overeducation is relatively low. A few countries, however, do not neatly fit any of the three models: Estonia, Poland, Cyprus and Spain. They combine a high incidence of overeducation with high returns. It is important to bear in mind, however, that both Estonia and Poland have been described as 'radically liberalized markets' with a predominantly general education systems and a labor market dominated by transnational corporations (Bohle & Greskovitz, 2007). The conceptual apparatus developed by stratification researchers may not be of much help to understand the relationship between education and labor market outcomes in contexts with labor market institutions that are radically different from the ones of Western European countries. Further theoretical development is needed to understand the relationship between education and labor market outcomes in such contexts. More generally, our study suggests that a more fine-grained mapping is needed than the simple dichotomy between occupational and internal labor markets, which already proved too crude to capture the complexities of institutional arrangements across European countries (Gangl, 2002).

6. Discussion and conclusion

In this study, we compared three widely influential theories on the relationship between education and labor market outcomes: respectively, the human capital, the job competition, or

the social closure model. We set out to answer the following questions: under which conditions does education function as a positional good in the labor market? What are the institutional arrangements that encourage job seekers to acquire education as a defensive strategy to stay ahead of the labor queue? In which settings is it likely that employers reward years of education that exceed the job requirements? In our empirical model, we estimated the incidence of and the returns to years of overeducation from a comparative perspective. Our argument builds on a fairly recent development in comparative stratification research that contextualizes the mechanisms why education is rewarded on the labor market in the structural and institutional settings in which employers and employees operate (Bol & Van de Werfhorst, 2011; Matković & Kogan, 2012; Van de Werfhorst, 2011a,b).

Results obtained from the ESS are partly in line with our expectations. In countries with a strongly vocationally oriented sector, overeducation occurs less frequently than in countries where only few students are enrolled in vocational programs, even after controlling for macroeconomic conditions. For males, we also find that returns to years of overeducation are lower in countries with more institutionalized wage-setting mechanisms, where wage coordination and the extension of collective agreements limit employers' discretion to reward interpersonal differences in productivity. As shown in Fig. 2, this relationship is negative, in line with expectations, but is modest, and not statistically significant.

While our focus is on the three theoretical models of human capital, queuing and social closure, we do acknowledge that the job matching process is affected by other variables than formal education alone, and that the importance of education for job sorting probably declines across the course of the career. Nevertheless, if we had limited our sample to labor market entrants to more neatly separate early career job matches, we would have probably overestimated the variation in the incidence of overeducation across institutional contexts, as younger employees in less regulated labor markets have more turbulent working histories at the start of their careers, which slowly stabilize over time.

Our study does not come without limitations. Although we argued that indicators of vocational orientation alone are not sufficient to distinguish between various models of job assignment, and that labor market institutions warrant closer attention, the explanation we proposed for the association between corporatism and returns to overeducation is somewhat wanting, as it does not find strong support in the empirical analysis. An important task for comparative researchers is thus to more systematically analyze wage-setting institutions, as previous studies have shown that they help explain cross-national differences in returns to education (e.g. Andersen & Van de Werfhorst, 2010; Carbonaro, 2006).

It is also important for future research to consider institutions that are important for those who are outside of the labor market. As an example, welfare state institutions may provide unemployed individuals with a safety net while they search for a job, increasing their reservation wage and giving them an alternative to simply accepting any job that they can find, reducing their risk to be overeducated (Pollmann-Schult & Büchel, 2005).

To conclude, this study has bridged two strands of research, the overeducation literature and the literature on education as a positional good, that traditionally developed within different disciplines. We showed that institutions channel the allocation of individuals to the labor market and can reduce the incentive to overinvest in education. In more vocationally oriented countries, relative educational attainment is less relevant because education is less likely to function as a positional good.

Future research may explore more into detail the relationship between dual systems and overeducation. Contrary to expectations, the incidence of overeducation was not significantly lower in countries with strongly institutionalized dual training programs.

As findings regarding the role of vocational education institutions in labor market allocation are mixed (cf. Bol & Van de Werfhorst, 2013; Breen, 2005), we believe that progress can be made by studying academically and vocationally trained employees separately (e.g. Levels, Van der Velden, & Di Stasio, 2014), and focusing on the way institutions may shelter these groups from positional competition. It is also important to note that educational expansion has thus far been discussed in relation to academic higher education only. Considering that some countries have expanded their vocational sector even within higher education, research on the interplay between educational expansion and vocational higher education institutions may reveal more nuanced patterns of positional competition.

Acknowledgments

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