Signals and closure by degrees: The education effect across 15 European countries

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Abstract

Stratification research has extensively studied country-differences in the strength of the relationship between education and labor market outcomes. This research has mostly neglected the different mechanisms that could explain *why* education is rewarded. In this paper we argue that not only the strength of the relationship, but also the mechanisms explaining *why* education is rewarded differ between countries. National institutions affect how employers see education, what it brings to the organization, and how workers signal their potential productivity. Empirically we focus on the partial effects of qualifications on top of years of education in 15 European countries. We find that strongly vocationally oriented and differentiated schooling systems have relatively strong net effects of qualifications on occupational status, which is explained by stronger signalling by qualification levels in those countries. Furthermore, in coordinated market economies we find that vocational education leads to higher status jobs relative to liberal market economies, which is explained by higher levels of closure implemented by coordination institutions.
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1. Introduction

For a long time social scientific research focused on the labor market returns to education and found indisputable proof for the relation between someone's education and someone's position in the labor market: individuals with more education have, on average, a better labor market position than their lower educated counterparts. In this paper our main focus is on occupational class position as the labor market outcome of education. All different kinds of other labor market outcomes (income, being employed, and so

on) are positively related to educational attainment as well. The education effect on labor market outcomes thus is an evident one, though earlier research showed that this relation is institutionally embedded, and the strength and pattern differs between institutional contexts (Allmendinger, 1989; Kerckhoff, 1995, 2001). Institutions, both on the supply and demand side of the labor market, mediate the relationship between education and labor market position. The vocational orientation and the level of differentiation in a countries educational system are institutional indicators that have proven to influence the strength of the association between education and labor market outcomes. Shavit and Müller (1998) argue that in countries with a strong vocational sector the incidence of unskilled workers is lower than in countries where education supplies school-leavers with general skills. Allmendinger (1989) finds

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the same results and furthermore argues that the level of standardization influences the transition from school to work of graduates.

While these studies mainly dealt with the influence of institutional context on the strength and pattern of the education effect on labor market outcomes, we argue that the mechanisms that explain the education effect on labor market outcomes differ across institutional settings as well. Although authors from different fields compare several of the possible the mechanisms by which education pays off (e.g. Arrow, 1973; Bowles, Gintis, & Osborne, 2001; Weiss, 1995), none of them embedded their findings in an institutional perspective. Here we will contextualize our findings by combining individual data with institutional characteristics. The baseline argument is that the explanation why education affects someone's socioeconomic attainment depends on the institutional context he or she is in. This approach leans on neo-institutionalistic assumptions about the influence of institutions on individual behavior (e.g. Nee, 2005).

The empirical focus of this paper will be on the effects of different components of education: the effects of degrees and years of schooling on occupational status position. By examining partial effects of degrees controlled for years of schooling, and by examining the influence of national institutions with regard to educational systems and employment relations on these partial effects, we are able to scrutinize whether institutions affect how education is used in the matching process of individuals to occupations. We have three research questions (1) Does the effect of degrees controlled for years of schooling differs across countries? (2) Is the relative size of the effect of degrees controlled for years of schooling dependent on characteristics of the educational system and labor market coordination? (3) What does the findings tell us about theories that explain the education effect on labor market outcomes?

2. Theoretical background

While we know that education pays off, an interesting question remains: why do individuals with higher levels of schooling have more desirable work outcomes than the lower educated? There is a variety of theories that could explain this causal relation (for an overview see Bills, 2003; Weiss, 1995). Here our starting point is the effect of degrees[1] controlled for years of schooling, and what this design can tell us about mechanisms for the

education effect on labor market outcomes. In the second part we sum up three institutional indicators that can help contextualizing these mechanisms.

2.1. Degrees controlled for years of schooling

Earlier, mainly economic, research clearly showed that degrees indeed have effects on labor market outcomes controlled for years of schooling (Belman & Heywood, 1991; Hungerford & Solon, 1987; Heywood, 1994; Jaeger & Page, 1996). The main proposition of these 'sheepskin' studies was that if two persons attained the same amount of schooling (quantitatively measured as years of schooling) they should be equally skilled, equally productive, and thus equally rewarded: diplomas are not expected to have an effect controlled for years of schooling. This proposition clearly reflects human capital theory, which argues that schooling provides skills and knowledge that are valued in the labor market (Becker, 1964). It makes "education [. . .] an investment of current time and money for future pay" (Freeman, 1986: 367). All these economic studies, however, found large partial effects of degrees controlled for years of schooling. This non-linearity in the education effect has been interpreted as support for alternative explanations for the education effect than offered by human capital theory. Educational qualifications are held to represent 'sheepskins' that are rewarded for reasons other than skills learned in school, for instance because of selection and sorting happening in the educational system.

Although there are some problems related to such an interpretation of degree effects, we think that the sheepskin design is particularly useful in a cross-national comparison. The differential net effects of degrees across countries may reveal something about how education is used by employers and employees in different institutional contexts. Earlier results were mainly based on single-country studies, and although degrees have an effect controlled for years of schooling, the sizes of these effects differs considerably between countries (Ferrer & Riddel, 2002; Gibson, 2000; Mora, 2003; Park, 1999). The only comparative study of the non-linearity of the education effect that we are aware of indeed found cross-national differences (Trostel, 2005).

We argue that cross-national variation in the effect of degrees controlled for years of schooling can be expected on the basis of three different theories (1) differential signalling by means of degrees across countries, (2) differential closure by means of credentialization across countries and (3) differential levels of a measurement problem of educational attainment by looking at years of schooling.

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[1] The concepts of degrees, diplomas and qualifications are used interchangeably.

2.1.1. Signalling productivity

Following the sheepskin literature, what could be one explanation for degree effects is the idea of a degree as a signal. The main reason why it is especially the degree that is important is the information asymmetry between employers and employees: "to hire someone [. . .] is frequently to purchase a lottery" (Spence, 1973: 356). Employers have little information about who they hire: they purchase lottery tickets without knowing their odds for success; they have little knowledge about the future productive capacities of their potential employees. Even if acquired skills are productive, employers will find it hard to discover the level of productivity. This information problem is solved by signals that potential employees send to employers. Individuals with more education signal a higher level of productivity.

Employers screen workers on the basis of the signals sent out by workers/applicants (e.g. Arrow, 1973; Stiglitz, 1975; Wolpin, 1977). Degrees are particularly relevant as signals, as they represent unobserved skills of potential workers, such as ability, commitment, and perseverance. Cross country variation in the effect of degrees controlled for years of schooling could be explained by the fact that degrees are not an equally strong signal in different countries. Degrees are more relevant than years of education to study cross-national variation; years of schooling can also function as a signal but will do that largely independent of the institutional structure. Many of the discussed studies focus on earnings instead of occupational class position as the labor market outcome. The theoretical assumptions drawn from these researches are applicable to occupational class position as well since it mediates the relationship between education and earnings.

2.1.2. Credentialing theory

A second explanation for cross country variation in the non linearity of the education effect is brought forward by credentialism (Berg, 1970; Collins, 1979). Credentialization theory argues that degrees function as a means of closure. In the historical process of monopolizing professions, degrees and licenses were set up to create exclusionary barriers (Brown, 1995; Freidson, 1970). The neutral concept of "degree" is replaced by the more loaded concept of "credential", a means of closure by which people are included not for what they can do but for what they possess. Credentials give entrance to occupations and one's level of productivity is irrelevant for the returns that education brings on the labor market (Weeden, 2002).

A very obvious form of credentialized closure concerns legally constrained entrance to occupations by means of licensing or certification (Bills, 2004). One cannot become a surgeon without the right licenses and degrees. But also less legalized forms of closure exist, for instance resulting from negotiations between employers' and employees' organizations about the protection of skilled workers. Trade unions are particularly serving the interests of workers in the middle of the skills distribution (Checchi et al., 2010). Access to skilled occupations is regulated by bargaining of trade unions and employers, in particular for the skilled working class having vocational qualifications. Thus, degrees may be rewarded not only because of the potential productivity they signal, but also because access to occupations is regulated on the basis of educational credentials/qualifications (Bills & Wacker, 2003).

2.1.3. Measurement problem

A final explanation for cross country variation in the effect of degrees controlled for years of schooling is that years of schooling is a problematic measurement of educational attainment. When we try to compare degree effects across countries we assume that years of schooling represents more or less the same educational level within and between countries. This is of course not true: in Sweden ten years of schooling brings you to a different point in the educational system as in, for example, the Netherlands. After nine years of schooling in Sweden you have attained the "Grundskola", the primary education system that is the same for everyone. In the Netherlands, however, with nine years of schooling you can be in five different tracks, with different educational levels. One could argue that especially in differentiated educational systems years of schooling is a bad measure, as an equal number of years can lead to many different levels of education. On the other hand one could argue that the factual number of years of education is more informative about educational attainment in more differentiated systems, as the same qualification level can be obtained by different routes of varying lengths. In any case, both perspectives lead to a bias in our cross-national findings. Therefore, to rule out the measurement problem explanation, the institutional explanations should also be found if we only analyze one country, and seek institutional variation to exist between industries within this country.

2.2. Cross country variation: the role of institutions

In this paper we study the influence that an educational system has on the size of the diploma effects controlled for years of schooling. Characteristics of educational systems influence the behavior of individuals.

The focus here will not be on the entire educational system, but merely on two aspects: the level of differentiation and the vocational orientation. Furthermore we will focus on the level of labor market coordination to disentangle the signalling explanation from the credentialization argument.

2.2.1. Differentiation and vocational orientation of the educational system

Hypothesis 1. (External) differentiation refers to the extent to which students are placed in separate school types during secondary education. In countries where the educational system is externally differentiated, separate school types exist with their own educational programs. In less differentiated educational systems students are located in the same school, for the most part even in the same class, independent of ability level. Differentiation influences the behavior of employers and employees because the signal of a degree from a diversified system may be stronger than that of a less diversified system. More school types imply more different types of degrees, each representing another type of student. For employers it is therefore easier to select on the basis of degrees in more differentiated systems and the sorting function of education gets stronger. We therefore hypothesize that the effect of degrees controlled for years of schooling gets stronger the more externally differentiated the educational system is.

Hypothesis 2a. The second dimension on which educational systems differ is the form and extent of vocational training. Education can either provide students with more general or more specific skills, and the amount to which they do so differs between educational systems. Educational systems differ in the organization of vocational education (Muller & Gangl, 2003; Shavit & Muller, 1998). Systems that are highly vocationally specific provide students with job-relevant skills, while less vocationalized systems produce more generally skilled employees. In highly vocational systems students gain very specific degrees and it is especially these degrees that are strong signals for employers. The argument for this institutional characteristic is the same as for differentiation: more variability in degrees leads to better information on degrees. The vocational characteristic adds the dimension of specificity of skills. In a differentiated educational system degrees from different tracks could signal more general skills, while the assumption is that vocational degrees, and thus more specific skills, are a stronger signal. Degrees show better information on the future productivity of the vocationally trained.

In countries where education is more vocational we expect that degrees are more important for occupational attainment.

Hypothesis 2b. We furthermore analyze this second hypothesis by looking at between-industry variation in one country: the Netherlands. As argued above, one reason for country variations in the partial effect of degrees controlled for years of schooling may be that countries differ in the extent to which years of schooling adequately measures educational attainment. To avoid this measurement problem, we analyze one single country and compare industries that differ with regard to the vocational orientation, assuming that qualifications in more strongly vocationally oriented industries represent more clearly the (potential) productivity that employers reward than in weakly vocationalized industries. This leads to the hypothesis that degrees have a stronger partial effect on occupational status in industries that can more strongly rely on a vocationally educated workforce.

2.2.2. Labor market coordination

While in more vocationally oriented educational systems degrees may be stronger indicators of productivity, it is furthermore true that those countries are also the ones with higher levels of labor market coordination between employers and employees. In addition to studies that showed that credential closure takes place at the level of occupations (Weeden, 2002), it is plausible that a society's level of coordination of employment relations also affects the level of regulation of access to occupations anticipated by credentialization theory. In coordinated market economies, the 'tri-partite' negotiations between trade unions, employers' organizations and the state are involving broad agendas comprising of diverse issues, including training, selection and protection. For negotiations on such a combined set of complex issues it is regarded crucial that coordination of employment relations takes place in a setting outside the market (Culpepper & Finegold, 1999; Soskice, 1994). This distinguishes coordinated market economies from liberal market economies.

The inclusion of skilled workers into the labor market, notably those with a vocational qualification, is regarded to be most successful in a context where employment protection is guaranteed (Breen, 2005; Estevez-Abe, Iversen, & Soskice, 2001; Iversen & Soskice, 2001). Only under the condition of sufficient employment protection employees will be willing to invest in vocational training, as vocational training implies the acquisition of specific skills reducing the range of occupations that can be accessed (Iversen & Soskice, 2001).

Hypothesis 3. Concerning credentialization it is evident that more coordination will lead to more regulation with regard to the criteria that are used for selection, including the regulations around the protection and inclusion of people with vocational qualifications. This leads us to expect that in coordinated market economies people with vocational degrees have a particularly high occupational status, in comparison to liberal market economies

Given that this credentialization argument is different from the skills-producing characteristic of vocationally oriented schooling systems, it is important to include both the vocational orientation of the system and the level of labor market coordination in the analysis. Thus far only one study has examined the impact of educational institutions and coordination institutions simultaneously in a quantitative manner (Andersen & Van de Werfhorst, 2010). However, that study was concerned with varying strengths of effects of education across countries, and was not aimed at contextualizing the mechanisms by distinguishing between the effects of years of schooling and degrees.

3. Data and methods

For the analysis data from the European Social Survey (ESS) of 2006 is used. The ESS is designed to gather data about highly differing topics – from political habits to education and attitudes about immigrants – in 23 countries, of which 15 entailed the relevant information for our comparative research. In the single country study we selected the Dutch data from the European Social Survey of 2004 and the European Social Survey of 2006.

3.1. Country comparative design

For the cross country design we fit a two-level random intercept model to study the non-linearity of the schooling effect in Europe. Occupational status is regressed on individual data (years and level of schooling) while taking specific institutional characteristics on the country level into account. Only individuals between the age of 24 and 65 who were at the time of the survey employed are included in the research.

The dependent variable is the International Socioeconomic Index of Occupational status (ISEI), a variable that defines someone's position in the occupational structure (Ganzeboom, Treiman, & De Graaf, 1992). The central idea of the measure is that occupation is the bridge between education and income, and therefore is a

good measure for socio-economic status. The ESS does not include individual wages or earnings, which is the common dependent variable to test sheepskin effects. However, occupational status is a useful measure for our purposes for two reasons. First, the impact of national institutions on the matching process of individuals to jobs refers to access to particular occupations, not necessarily to wage levels. Second, if we would focus on income there is the risk that our results are conflated with wage-compressing institutions that also vary across countries. Occupational status measured with ISEI is developed for comparative research and thus better suitable for our study. ISEI is measured on a scale from 16 (lowest socio-economic status) to 90 (highest socioeconomic status).

The main independent variables on the individual level are the total number of years of schooling and educational level. In contrast to the first studies on the non linearity of the education effect, years of schooling is self-defined instead of calculated from information about the highest educational level. We classify educational qualifications using the newly developed ES-ISCED, which is an adjustment of ISCED with a more evident classification of vocational and general types of education. ES-ISCED was developed in a comparative project using country experts, and uses the country-specific educational codes in the ESS data to achieve a harmonized classification of education (Schneider, 2008). Categories I and II are merged and represent lower secondary education or lower. Category IIIa is upper secondary education of a general nature, giving access to university, while category IIIb is upper secondary education with a focus on vocational training. The fourth category, ES-ISCED IV is merged with V1 and represents all post-secondary education and the first stage of tertiary education. The final category, V2, stands for tertiary education second stage. Age and gender (female = 1) are used as individual level control variables.

On the country level two variables measure institutional variability with regard to education: the level of external differentiation and the vocational specificity of a country's educational system. Vocational specificity is measured by looking at the percentage of students that are enrolled in secondary vocational education (OECD, 2002). External differentiation is based on OECD data as well; here the measure is retrieved with a factor analysis over three indicators: the age of first selection, the number of tracks at 14 years old and the total number of tracks in secondary education. Labor market coordination is a measure that is based on a factor analysis of two indicators: union den-

Table 1
Summary statistics country comparative design.

	Cross country data				Dutch single country data			
	Mean	St. dev.	Min.	Max.	Mean	St. dev.	Min.	Max.
Years of education	13.19	3.59	0	30	13.74	4.10	1	28
Educational level (ES-ISCED)								
ES-ISCED I/II (lower secondary or lower)	0.18	0.39	0	1	0.30	0.46	0	1
ES-ISCED IIIb (upper secondary—vocational)	0.30	0.46	0	1	0.24	0.43	0	1
ES-ISCED IIIa (upper secondary—general)	0.18	0.38	0	1	0.18	0.38	0	1
ES-ISCED IV/V1 (post-secondary, first stage tertiary)	0.21	0.40	0	1	0.18	0.39	0	1
ES-ISCED V2 (higher tertiary)	0.13	0.34	0	1	0.10	0.30	0	1
Age	44.41	11.47	24	65	44.12	11.39	24	65
Gender (female = 1)	0.54	0.50	0	1	0.54	0.50	0	1
International Socio-economic Status (ISEI)	43.32	16.27	16	90	47.27	16.11	16	90
Tracking Index	0.20	0.92	−1.17	1.55				
Vocational Index	0.65	0.73	−1.18	1.66	45.12	9.55	25.71	66.67
Coordination Index	−0.01	0.96	−1.46	1.37				

sity and the level at which coordination takes place in a country (OECD, 2004). All three measures are relative, which means that they are constructed on the basis of information of the other countries.[2] Summary statistics on all used variables are shown in Table 1.

3.2. Single country study

The modeling strategy for the single country study is the same as the country comparative design; with the exception that the higher level in this multilevel random intercept model is not the countries but the industries within a country (the Netherlands). Individuals are nested within industries, in this case 48 different industries, classified in accordance to the NACE v1.1 categorization.[3] Only industries that had at least 5 observations are included in the analysis. All the individual level data are the same as in the country comparative design. The used sample again includes only those who are between the age of 24 and 65 and are employed. Vocational training at the industry level is measured as the aggregate percentage of graduates who say that job-specific skills that are learned in school and is based on Dutch school leaver surveys for the years 1999–2003 (HBO-monitor and WO-monitor), gathered by the Research Center for Education and the Labor Market (ROA). Summary statistics for this design can be found in Table 1.

4. Results

4.1. Country comparison

The empirical results are presented in eight models, each adding more explanatory variables on both individual and country-level. In the first model only years of education is taken as a predictor for occupational status. The second model adds dummies for highest attained degree. In models III–VIII country-specific variables about the educational system and labor market, as well as the cross level interaction effects between these country-level variables and respectively the individual level measurements of degrees and years of schooling are included (Table 2).

Model 0: No independent variables

Model I: Years of schooling + controls

Model II: Model I + highest attained educational level

Model III: Model II + level of differentiation + level of vocational orientation + level of labor market coordination

Model IV: Model II + level of differentiation + interactions between level of differentiation and highest attained degree + interaction between years of schooling and level of differentiation

Model V: Model II + level of vocational orientation + interactions between level of vocational orientation and highest attained degree + interaction between years of schooling and level of vocational orientation

Table 2

Random intercept models with ISEI as dependent variable.

	Model 0	Model I	Model II	Model III	Model IV	Model V	Model VI	Model VII	Model VIII
Individual level									
Age		0.0756***	0.0900***	0.0898***	0.0867***	0.0902***	0.0895***	0.0892***	0.0865***
		[0.00954]	[0.00884]	[0.00885]	[0.00881]	[0.00880]	[0.00883]	[0.00880]	[0.00881]
Female		−0.222	−0.667***	−0.667***	−0.620***	−0.629***	−0.705***	−0.653***	−0.652***
		[0.214]	[0.198]	[0.198]	[0.197]	[0.197]	[0.198]	[0.197]	[0.197]
Years of schooling		2.451***	0.866***	0.866***	0.856***	0.725***	0.863***	0.751***	0.870***
		[0.0309]	[0.0419]	[0.0419]	[0.0418]	[0.0535]	[0.0431]	[0.0549]	[0.0430]
ES-SCED I/II (lower secondary or lower)			Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
ES-ISCED IIIb (upper			3.851***	3.839***	3.968***	5.223***	4.075***	4.982***	3.973***
secondary—vocational)			[0.328]	[0.328]	[0.338]	[0.436]	[0.332]	[0.441]	[0.340]
ES-ISCED IIIa (upper secondary—general)			10.08***	10.06***	9.124***	8.666***	9.586***	8.736***	8.895***
			[0.381]	[0.381]	[0.397]	[0.471]	[0.387]	[0.481]	[0.401]
ES-ISCED IV/V1 (post-secondary, first stage			15.03***	15.01***	14.71***	13.27***	15.08***	13.01***	14.57***
tertiary)			[0.416]	[0.416]	[0.417]	[0.511]	[0.430]	[0.538]	[0.433]
ES-ISCED V2 (higher tertiary)			24.86***	24.85***	24.67***	24.83***	24.85***	24.62***	24.54***
			[0.519]	[0.519]	[0.520]	[0.631]	[0.531]	[0.655]	[0.532]
Country level									
Differentiation of education system				1.029	−1.482*				−1.012
				[0.854]	[0.886]				[0.895]
Vocational orientation of education system				0.524		−2.507**		−1.955*	
				[1.029]		[1.109]		[1.137]	
Labor market coordination				0.846			2.158**	2.196***	2.298***
				[0.726]			[0.859]	[0.849]	[0.831]
Cross level interactions									
Years of schooling * Differentiation					0.0530				0.0362
					[0.0462]				[0.0466]
ES-SCED I/II * Differentiation					Ref.				Ref.
ES-ISCED IIIb * Differentiation					0.948***				1.377***
					[0.366]				[0.379]
ES-ISCED IIIa * Differentiation					3.231***				2.782***
					[0.436]				[0.450]
ES-ISCED IV/V1 * Differentiation					3.438***				3.537***
					[0.465]				[0.475]
ES-ISCED V2 * Differentiation					1.886***				1.915***
					[0.568]				[0.579]
Years of schooling * Vocational						0.180***		0.162**	
						[0.0632]		[0.0635]	
ES-SCED I/II * Vocational						Ref.		Ref.	
ES-SCED IIIb * Vocational						−1.066**		−0.700	
						[0.446]		[0.468]	
ES-SCED IIIa * Vocational						2.173***		1.509***	
						[0.483]		[0.512]	

Table 2 (*Continued*)

	Model 0	Model I	Model II	Model III	Model IV	Model V	Model VI	Model VII	Model VIII
ES-SCED IV/V1 * Vocational						3.587***		3.679***	
						[0.597]		[0.610]	
ES-SCED V2 * Vocational						0.778		0.819	
						[0.750]		[0.768]	
Years of schooling * Labor market coordination							−0.131***	−0.133***	−0.133***
							[0.0465]	[0.0465]	[0.0468]
ES-SCED I/II * Labor market coordination							Ref.	Ref.	Ref.
ES-SCED IIIb * Labor market coordination							0.899**	0.670*	1.024***
							[0.353]	[0.368]	[0.365]
ES-SCED IIIa * Labor market coordination							−1.496***	−0.947**	−0.925**
							[0.408]	[0.432]	[0.419]
ES-SCED IV/V1 * Labor market coordination							−0.346	0.484	0.452
							[0.467]	[0.476]	[0.475]
ES-SCED V2 * Labor market coordination							0.312	0.710	0.624
							[0.573]	[0.584]	[0.582]
Constant	43.33***	7.794***	19.01***	18.57***	19.38***	20.69***	19.16***	20.34***	19.29***
	[0.733]	[0.862]	[0.968]	[1.087]	[0.930]	[1.126]	[0.960]	[1.130]	[0.916]
$\sigma^2 u$	7.81**	4.49**	7.45**	6.15**	6.25**	6.39**	7.07**	6.01**	5.73**
	[2.95]	[1.71]	[2.78]	[2.30]	[2.34]	[2.39]	[2.64]	[2.26]	[2.15]
$\sigma^2 e$	257.60***	185.00***	157.00***	157.00***	155.50***	155.11***	156.12***	154.77***	155.02***
	[2.86]	[2.05]	[1.74]	[1.74]	[1.72]	[1.72]	[1.73]	[1.72]	[1.71]
Log likelihood	−68311	−65613	−64281	−64280	−64204	−64184	−64238	−64166	−64178
Test against model		0	1	2	2	2	2	5	6
Df		3	4	3	6	6	6	6	6
Chi-squared		5394.50	2663.66	2.81	154.58	194.20	87.66	76.90	12.22
Significance		0.00	0.00	0.42	0.00	0.00	0.00	0.00	0.06
Observations	16279	16279	16279	16279	16279	16279	16279	16279	16279
Number of groups	15	15	15	15	15	15	15	15	15

Standard errors in brackets.

* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

Model VI: Model II + level of labor market coordination + interactions between level of coordination and highest attained degree + interactions between years of schooling and level of labor market coordination

Model VII: Model III plus interactions of models IV and VI

Model VIII: Model III plus interactions of models V and VI

In model I we see that years of schooling has, as expected, a large and significant effect on someone's occupational status position. Each year of schooling adds 2.5 on the scale of occupational status. An unexpected finding is that females score slightly better, although the improvement on the scale of ISEI is very small. We furthermore find that while the vast majority of variance can be found at the individual level within countries, there is also a significant between-country variation.

Model II adds the dummy-variables for educational level and thereby completes the standard model to study the non-linearity in the education effect. We find that the added effects of degrees are significant and increase as the educational level increases. This means that having a degree of a tertiary program (ES-ISCED categories IV/V1 and V2) increases your occupational status by 15 or 24.9 points controlled for years of schooling, with lower secondary schooling as a reference. Our data shows the same results as most research on this topic; degrees have an effect controlled for years of schooling and therefore indicate that the effect of schooling on occupational status is non-linear; the effect of education increases as the educational level increases. By adding dummies for degrees the effect of years of schooling on ISEI is now three times as small. Around the mean intercept of the different countries there is a variance of 7.35, indicating that countries differ and that sheepskin effects are not the same in all countries. This is a finding on itself, however, it is interesting to study the reasons why this is the case.

In models III–VII our explanation, characteristics of educational systems, is studied by adding contextual variables on the country-level. In model III the indicators of external differentiation, vocational training and labor market coordination are added, all three having an insignificant effect on someone's status position. This is not surprising; we do not expect that an educational system, or a labor market, in itself influences the response variable. What is essential for our Hypotheses 1 and 2a is the cross level interaction effect between educational

degrees and the level of vocational orientation and differentiation. In models IV and V these two hypotheses are investigated.

In model IV the cross-level interaction between the level of differentiation of an educational system and individual educational degrees are added. We find significant effects for both interaction terms, and the added effect of education on occupational status is larger when the educational level is higher. An interesting finding is that in both models IV and V the interaction effects between the country level variables and ES-ISCED category IV/V1 (tertiary, professional) is larger than the interaction effect between the country level variables and ES-ISCED category V2 (second stage tertiary). A degree that provides more specific skills pays off more the more stratified or vocationally oriented an educational system is. One of the reasons why degrees from more vocational education lead to a higher occupational status is that the more specific a degree is, the stronger its signalling function is: better signals lead to higher returns. Finally, in both models an interaction term between years of schooling and the institutional variables is added to make sure that the other interaction effects really concern degrees and not merely education. In model IV the interaction between years of schooling and level of differentiation has a small, insignificant effect, while the interaction term between years of schooling and vocational orientation is considerable. Overall the data implies that the effect of educational qualifications on occupational status gets larger when the level of differentiation of an educational system increases. We therefore find support for Hypothesis 1, which argued that the effect of dummies for degrees on occupational status gets larger the more stratified an educational system is. Also, this model has a significantly better fit than model II and we can state that by adding the contextual data the explained variance decreases significantly.

In model V the interaction effects tell more or less the same story: when an educational system is more vocationally oriented the effect of someone's highest level of education on occupational status outcomes increases. Degree effects are stronger and more apparent in countries with more vocationally oriented educational systems. Both models IV and V show that there is a significant relation between educational systems and the effect of degrees controlled for years of schooling and both have a better fit than model II—signifying that it is important to take these cross-level interactions into account. Hypothesis 2a, that argues that selection in vocationally oriented systems selection takes place more on the basis degrees, is accepted as well. Both of these results point to the use of degrees as signals, in the next series of mod-

els we try to filter out the credential explanation of our findings.

In models VI–VIII we study Hypothesis 3, which states that in more coordinated market economies people with vocational degrees have a higher occupational status than in liberal market economies. In model VI the level of labor market coordination and cross level interactions between this indicator and the two measures of education are added. All cross level interactions, except one, are negative or insignificant. As expected, the one type of degree that pays off more the more coordinated markets are is the vocational one: ES-ISCED IIIb. This degree is valued higher in more coordinated labor markets as a result of the role that employers take here. These results therefore point much more towards a credentialistic explanation for vocational degrees: the pay off of a vocational degree controlled for years of schooling is for a part due to its role as a credential. It is now key to control these findings and see if the cross level interaction still stands when we add the cross level interactions between vocational orientation and educational degrees (model VII) and level of differentiation and educational degrees (model VIII). In model VII we see that the results we found in the previous models remain the same: the more vocationally oriented an educational system, the high the effect of degrees controlled for years of schooling. The same goes for the level of differentiation, as is showed in model VIII. More important, in both models the cross level interactions between degrees and labor market coordination remain significant, pointing to a credential explanation that is different from the skills-producing characteristic of vocationally oriented schooling systems. We therefore accept our third hypothesis as well.

Although we find that especially vocational degrees seem to function as a credential, a large part of the remained explained variance by degrees is due to its function as a signal of skills, as shown in models III–V. We argue that both are important and, although by different characteristics, are dependent on institutional context. The third explanation, which argues that the findings are biased by measurement problems that occur especially in more stratified educational systems, is discussed using the single country data.

4.2. Results of single country study

Our single country study uses fewer models since we can only insert one higher level variable: the level of vocational orientation (Table 3).

Model 0: No independent variables
Model I: Years of schooling + controls

Model II: Model I + highest attained educational level
Model III: Model II + vocational orientation of the industry + interaction terms between vocational orientation and highest attained educational level
Model IV: Model IV + interaction term between vocational orientation and years of schooling

In Table 3 we see in model I that the effect of educational degrees controlled for years of schooling is large and significant. The explanatory power of years of schooling is almost three times as small when we bring in the dummies for degrees in model II, and the effect of degrees on occupational status increases as the level of the degree increases. In the case of the Netherlands we find that degrees have a large and significant effect controlled for years of schooling. In comparison to the cross country model, females do relatively worse than males. The industry as a level seems an important one; in models I and II around 15 percent of the explained variation is explained between industries, while 85 percent is still caused by within industry differences. Industries matter, and it makes therefore sense to add contextual variables to the industry level to see if these could improve the model even more.

Once again we do not expect the industry-level indicator of the importance of vocational training to have a direct effect on individual occupational status; following Hypothesis 2b we are more interested in the way this interacts with the variable of highest earned degree. The data shows that the effect of educational degrees on occupational status (and thus the non linearity in the education effect) is larger as the importance of vocational programs in a certain industry increases. Even more important is that this effect is stronger for higher degrees (with the least difference between ES-ISCED IV/V1 and V2), and that it has no effect for those who only finish secondary schooling. Since their education provides them with a degree that signals no specific skills it comes as no surprise that the effect of these degrees does not increase when industries get more vocational. In model IV when the interaction term between years of schooling and vocational orientation is added the interaction effect between degrees and vocational orientation remains significant, we therefore accept our Hypothesis 2b. This means that degrees give returns, and that this is more the case the more vocationally oriented the industry is.

Because all industries are within one country and thus one educational system, the claim that the effect of degrees controlled for years of schooling is caused by measuring problems is refuted. Although

Table 3
Random intercept model with ISEI as response variable[a].

	Model 0	Model I	Model II	Model III	Model IV
Individual level					
Age		0.00820	0.0303	0.0304	0.0286
		[0.0243]	[0.0235]	[0.0234]	[0.0235]
Female		−1.392[**]	−0.935[*]	−0.810	−0.833
		[0.592]	[0.561]	[0.560]	[0.561]
Years of schooling		1.521[***]	0.526[***]	0.528[***]	−0.0258
		[0.0763]	[0.0959]	[0.0955]	[0.468]
ES-SCED I/II (lower secondary or lower)			Ref.	Ref.	Ref.
ES-ISCED IIIb (upper secondary—vocational)			4.967[***]	0.789	2.362
			[0.760]	[3.828]	[4.042]
ES-ISCED IIIa (upper secondary—general)			9.589[***]	−2.006	0.130
			[0.866]	[4.163]	[4.522]
ES-ISCED IV/V1 (post-secondary, first stage tertiary)			14.11[***]	1.470	4.667
			[0.952]	[3.935]	[4.741]
ES-ISCED V2 (higher tertiary)			17.16[***]	−0.715	4.094
			[1.274]	[4.929]	[6.335]
Industry level					
Vocational orientation				−0.271[**]	−0.391[**]
				[0.117]	[0.154]
Cross level interactions					
Years of schooling * Vocational					0.0121
					[0.0100]
ES-SCED I/II * Vocational				Ref.	Ref.
ES-SCED IIIb * Vocational				0.103	0.0688
				[0.0860]	[0.0906]
ES-SCED IIIa * Vocational				0.268[***]	0.221[**]
				[0.0926]	[0.100]
ES-SCED IV/V1 * Vocational				0.288[***]	0.219[**]
				[0.0851]	[0.103]
ES-SCED V2 * Vocational				0.401[***]	0.296[**]
				[0.105]	[0.137]
Constant	44.95[***]	26.44[***]	31.80[***]	43.08[***]	48.67[***]
	[1.349]	[2.016]	[1.960]	[5.173]	[6.941]
$\sigma^2 u$	74.98[***]	47.04[***]	36.27[***]	34.44[***]	34.50[***]
	[17.10]	[11.05]	[8.80]	[8.42]	[8.44]
$\sigma^2 e$	185.84[***]	156.23[***]	140.21[***]	139.07[***]	138.97[***]
	[5.53]	[4.65]	[4.17]	[4.14]	[4.14]
Log likelihood	−9340	−9135	−9007	−8997	−8996
Test against model		0	1	2	3
Df		4	4	5	1
Chi-squared		411.60	255.09	20.54	1.46
Significance		0.00	0.00	0.00	0.22
Observations	2303	2303	2303	2303	2303
Number of groups	48	48	48	48	48

Standard errors in brackets.

[a] A dummy of the ESS wave was included to check the dependence of this wave. Only in model I a significant negative effect was found.

[*] $p < 0.1$.

[**] $p < 0.05$.

[***] $p < 0.01$.

one can still argue that years of schooling is an imperfect measure–within the highly tracked Dutch educational system 12 years of schooling could include several switches between tracks and thus different destinations–the measure is far less imperfect than in the cross country design. Evidence that vocational orientation matters in the Netherlands gives support for the idea that vocational orientation is also a relevant

contextual variable across countries, and its influence on degree effects is not completely caused by measurement problems. The results of one case provide us more support for an institutionalist interpretation of the cross country results, where for both explanations (a degree as a credential or as a signal) support was found.

5. Conclusions

The goal of this research was to see if the effect of degrees on occupational status varies across countries and how this effect is related to structural institutional settings, in this case the educational system and the level of labor market coordination. The rationale behind this is that the mechanisms that explain the education effect on labor market outcomes are not equally important across institutional settings. Effects of degrees controlled for years of schooling give insight in the cross country or cross industry variation in the effect of degrees, and therefore supporting any theory that states that a degree increases ones labor market position. In this article we tried to give insight in which explanations might be important here. For both the idea that a degree is used to signal skills and credentialist theory, where degrees are essential for regulated entrance to closed occupations or industries, support was found. Looking at the interactions between labor market coordination and degrees we found that especially vocational degrees function as credential. The signalling function seems to be more important for the higher, tertiary, degrees.

While the results clearly point towards a cross country difference in the importance of different theoretical mechanisms, a critique is that this variation is dependent on the failure of years of schooling as a comparable measure. We studied one case and found that vocational orientation also increases degree effects at the industry level in the Netherlands. Since all industries are in the same country and thus the same educational system, years of schooling is a far better comparable measure and the interpretation of the data is less open for errors. The findings in the cross-country design can not be attributed to measurement error and the effect of degrees gets larger the more vocationally oriented and stratified an educational system is and the more coordinated a market is. Our findings at the industry level give support for the original explanation: institutional context influences the reasons why education pays off. In strongly vocationally oriented and differentiated schooling systems the relatively strong net effects of qualifications on occupational status is explained

by stronger signalling by qualification levels in those countries. In coordinated market economies our finding that vocational education leads to higher status jobs relative to liberal market economies is explained by higher levels of closure implemented by coordination institutions.

Appendix A.

Vocational specificity, level of differentiation and labor market coordination

Vocational specificity on country level is measured as the percentage of participants in upper secondary vocational training in 2002 (OECD, 2002). These percentages are then standardized around a mean of zero and with a standard deviation of 1. In this way the relative position of each country to each other on the scale of vocational orientation is determined. It is important to note that the measure is not constructed for the 15 countries under study but all OECD countries. In this way the measure is less dependent on case selection. The level of differentiation is constructed by combining three macro variables. First of all the number of tracks at age 14, secondly the year when the first differentiation starts, and finally the number of tracks in secondary education. All information was obtained from the OECD database (2002) and the European Union database of education (Eurydice, 2002). The three variables are standardized by using principal factor analysis. The level of labor market coordination is a variable that consists of two indicators (OECD, 2004): union coverage (%) and the level at which coordination takes place in a labor market (on a level of 1–5). Only for Russia and Slovenia an alternative source for both indicators of labor market coordination was used (Cazes & Nesporova, 2004). Each country score was derived from a principal factor analysis. In Table 4, descriptive information on all three country level variables is shown.

Table 4
Institutional indicators of the 15 countries.

Country	Level of differentiation	Level of vocational specificity	Labor market coordination
Belgium	1.08	0.91	1.02
Czech Republic	1.32	1.66	−0.11
Denmark	−0.45	0.31	1.37
France	−0.29	0.27	−1.33
Germany	1.55	1.31	0.07
Hungary	1.15	1.15	−1.39
Ireland	0.69	−1.18	0.45
Netherlands	0.65	1.03	0.01
Norway	−1.11	0.35	1.09
Poland	0.02	1.03	−1.46
Russian Federation	−0.43	−0.24	0.90
Slovenia	−0.04	1.38	0.25
Spain	−1.17	−0.34	−0.63
Sweden	−1.14	0.39	1.01
Switzerland	0.10	0.98	−1.25

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