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When Do Companies Train Low-Skilled Workers? The Role of Institutional Arrangements at the Company and Sectoral Level

Philip Wotschack

Abstract

The article investigates how institutional arrangements at the organizational and sectoral level affect the likelihood and size of employer investments in continuing training for low-skilled workers in Germany. By building on comparative political economy and organizational theory, hypotheses are derived and tested. Regression analysis based on the IAB Establishment Survey (waves 2011 and 2013) shows evidence that the training participation of low-skilled workers is related to institutional differences between sectors and organizations. At the organizational level, structures of employee representation and formalized HR policies are positively associated with higher rates of training participation among low-skilled workers. Moreover, there is evidence that low-skilled workers benefit in organizational clusters that are characterized by structures of employee representation, formalized HR practices, and bargaining coverage. At the sectoral level, this study finds evidence that low-skilled workers in the health care and manufacturing sector are more likely to receive continuing training.

1. Introduction

In all European societies, low-skilled workers face particular labour market risks in terms of unemployment, bad working conditions or low pay (Eurofound 2009). These risks will further increase with on-going changes in the world of work, often leading to higher skill requirements and a shrinking demand for low-skilled work (Berger and Frey 2015; Dengler and Matthes 2019; OECD 2016). Continuing training forms a key measure to respond

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to these developments by improving skills, labour market opportunities and career prospects for this group of workers (Cedefop 2015; Martin and Rüber 2016; McVicar *et al.* 2016; Mohr *et al.* 2016: 553). It is the crucial question of this article how low-skilled workers can be better integrated in employer-provided continuing training. The focus is on the role of institutional arrangements at the organizational and sectoral level in Germany.

Like in many European countries (Abramovsky *et al.* 2011; Martin and Rüber 2016; Ramos and Harris 2012), training participation of low-skilled workers is low in Germany. According to representative data for Germany (in 2017), only one out of two companies has devoted (working) time or money to continuing training (IAB 2017). On average, one third of the employees participated in continuous training. While around 40 per cent of the skilled workers took part in continuing training, the share among the low-skilled workers (doing work that does not require a vocational degree) was only 20 per cent (IAB 2017; see also Janssen and Leber 2015: 6).

The low training participation of low-skilled workers raises questions for both the underlying obstacles and pathways to overcome these obstacles. While there is a relative broad literature on training participation in general (see Frazis *et al.* 2000; Grund 2012; Hansson 2007; Käpplinger 2007; Wiseman and Parry 2017), fewer studies have focused on the particular group of low-skilled workers (see Abramovsky *et al.* 2011; Bellmann *et al.* 2015; Martin and Rüber 2016; Mohr *et al.* 2016). Moreover, the role of the institutional context did not receive much attention, so far. Studies addressing the training participation of low-skilled workers have been mainly concerned with labour shortages (Bellmann *et al.* 2015) or task characteristics (Mohr *et al.* 2016). To my best knowledge, the role of institutional differences between organizations and sectors has neither been explored systematically nor addressed theoretically in previous research on training participation of low-skilled workers.

A qualitative study based on 10 firm-level case studies in Germany could identify a number of favourable institutional influences and mechanisms at the sectoral and company level (Wotschack and Solga 2014). Besides the (well-known) factors that increase in-company training in general (such as a shortage on the external labour market, technological change or an existing educational infrastructure), institutional embeddedness of the company proved to be an essential prerequisite for the integration of low-skilled workers through training programs. This includes diverse company agreements and collective regulations, long-term employment relations, worker representation, strong norms of solidarity, as well as tight cooperation between the corporate actors. Moreover, the high proportion of low-skilled workers who participate in further training could not be explained by a single characteristic. In fact, several factors worked together in specific constellations.

This article wants to extend previous research on continuing vocational training by addressing the question, how institutional differences between

organizations and sectors shape the training participation of low-skilled workers. The database is representative German IAB Establishment Survey by the German Institute for Employment research (IAB).

Theoretically, the study builds on the one hand on insights from comparative political economy. This literature emphasizes the importance of institutional arrangements, such as collective bargaining structures or the skill formation system, for labour market inequalities and social exclusion (see Carstensen and Ibsen 2019; Durazzi and Geyer 2019; Hall and Soskice 2001; Swank *et al.* 2008; Thelen 2009). However, the role and impact of these structures on continuing vocational training of low-skilled workers did not receive much attention so far. On the other hand, the article refers to insights from organizational theory (Abraham 2001; Beckert 1996; Granovetter 1985; Steinback *et al.* 2010). Leading is the idea that institutional arrangements at the organizational level (such as employee representations, formalized HR policies or long-term employment relationships) are able to counteract mechanisms of discrimination of low-skilled workers.

Germany that is in the focus of this study represents a prominent case of a coordinated market economy with a strong dual apprenticeship system, centralized collective bargaining and a strong regulation of continuing training activities at the company level (Allaart *et al.* 2009, 105). Since the 1990s, coverage in collective bargaining has been shrinking, however, due to increasing drop outs of firms (particularly smaller ones) and an increasing number of precarious workers (particularly in the service sectors) (Swank *et al.* 2008). As a consequence, there is evidence for a growing divide between coverage of skilled core workers in the manufacturing sector and a large number of low-skilled workers, who are not covered by the collective bargaining system (Sengenberger 1987; Thelen 2009: 482). Under this condition, inclusive unions and public policies and regulations gain importance for the inclusion of weak employee groups, as scholars from comparative political economy have pointed out (Doellgast *et al.* 2018; Thelen 2014).

Likewise, the dual apprenticeship system has become more segmented. The growing service economy is less often conforming to the standards of the traditional dual training system. There is evidence that the focus on standardized portable skills and exchangeable qualifications on occupational labour markets is partly replaced by a system more geared towards firm-specific skill needs (mainly in large firms) (Thelen 2009), less demanding (two-year) apprenticeships mainly in the service economy or school-based vocational tracks (like in the health and care sector) (Estévez-Abe 2005; Thelen and Busemeyer 2008). As a consequence, the need to obtain supplement qualifications, general and specific, has been increasing in these sectors. In contrast to the traditional dual-apprenticeship system that is characterized by larger upfront investments in general and firm-specific skills, continuous training investments over the life course might gain more importance (Thelen 2014) and foster life-long learning also for low-skilled workers.

This article wants to shed light on these issues by taking a closer look at the role of sectoral and organizational differences: How does the training participation of low-skilled workers vary between sectors and organizations with different institutional settings. Is there evidence that sectors (such as manufacturing) with centralized bargaining structures, strong unions and a traditional dual-apprenticeship system differ from service sectors where precarious employment is widespread (such as *Hotel Business and Gastronomy*) or sectors with strong public regulations or more school-based educational tracks (such as *Human Health and Social Work*)? And to what extent do organizations make a difference within and across sectors? How do institutional organizational arrangements and human resources strategies shape the training participation of low-skilled workers?

Empirically, the focus is on employer-provided continuing vocational training. By definition, continuing vocational training aims at teaching new skills or adapting existing skills to new technical and professional developments (Bellmann *et al.* 2015). Employer-provided continuing training forms an important area of continuing training in Germany. It includes all training measures, which are organized by companies or taking place in the company context, such as courses, teachings or workplace-related learning.

The role of employer-provided continuing training turns out to be ambivalent: on the one hand, it is by far the largest segment of continuing vocational training in Germany with a share of 72 per cent (BMBF 2019). On the other hand, it is primarily focused on maintaining and advancing the skills relevant to the needs and operations of the work process. In the fore are operational skill needs and short-term adaptation measures to respond to acute technological, organizational, or market-related changes. Long-term training programs that offer substantial career opportunities in terms of job mobility, professional reorientation or promotion to higher occupational positions are less present, as reflected by the very low percentage of certified further training measures (cf. BMBF 2015: 48).

Nevertheless, access to employer-provided training plays an important role for the employability, labour market opportunities and quality of work of low-skilled workers (McVicar *et al.* 2016; Mohr *et al.* 2016). It responds faster and more targeted to current developments and new requirements in the world of work. The measures also have a more direct practical relevance and the workers remain involved in processes of learning, which both help to reduce barriers on the side of low-skilled workers to participate in training (Beer 1999: 192). Even when the outcomes in terms of professional qualifications and individual capabilities tend to be small, in-firm training extends existing competencies and maintains employment security and employability. A recent study (Bertelsmann Stiftung 2018) even found evidence that a considerable share of low-skilled workers in Germany works in positions that would actually require a professional qualification. It suggests that employer-provided training has helped these

workers to achieve such positions without participating in formal training programs.

2. Theory and hypotheses

Previous research has identified determinants that increase the likelihood of employer investments in continuing training (e.g. Frazis *et al.* 2000; Grund 2012; Käpplinger 2007: 5; Neubäumer *et al.* 2006: 451; Oosterbeek 1998). It showed evidence that the probability of training investments is higher in larger establishments, certain sectors (such as *Education, Health and Care* sector), in companies with a good business situation, labour shortages or with modern production facilities (see Bellmann *et al.* 2010; Ramos and Harris 2012; Wiseman and Parry 2017). Moreover, a high engagement in initial vocational training (Düll and Bellmann 1998), the presence of employee organizations, cooperative work relations (Nienhüser *et al.* 2006), institutionalized HR practices (Käpplinger 2007; Osterman 1995) or employee-oriented HR policies (Frazis *et al.* 2000; Hansson 2007) have been proven to be favourable influences.

However, most of these studies focus on characteristics that affect continuing training participation in general. Studies with a focus on the training participation of low-skilled workers are rarer. They show evidence that training participation of low-skilled workers varies between countries, sectors and firms of different sizes. It is higher in the Scandinavian countries and countries with more public spending on education (Martin and Rüber 2016), in certain sectors (such as *Education*, or *Human Health & Social Work*), in larger firms, in firms reporting labour shortages (Bellmann *et al.* 2015) or for low-skilled workers reporting higher task flexibility (Mohr *et al.* 2016; Sanders and de Grip 2004).

Theoretically, differences in training participation are usually explained by processes of selection (by employers) and self-selection (by employees) (Frazis *et al.* 2000; Ramos and Harris 2012; Wozny and Schneider 2014). Barriers at the individual level, such as the missing subjective perception of existing continuing education needs, lack of interest in continuing education, subjective learning barriers or external constraints (such as family demands) can prevent training participation — even when there are good opportunities at the organizational level (Martin and Rüber 2016; Shields 1998). Many of these factors most frequently apply to low-skilled workers (Dobischat *et al.* 2002; Mohr *et al.* 2016). Form the viewpoint of the employers, the willingness to train workers decreases with a lack of financial resources or perceived need for training, or when expected returns to training seem to be low or uncertain (Abramovsky *et al.* 2011; Acemoglu and Pischke 1998; Wiseman and Parry 2017).

Problems of uncertainty are a common explanation for variations in firms' training activities (Gerner and Stegmaier 2009; Oosterbeek 1998; Ramos and Harris 2012). Transaction cost theory stresses the risk of opportunistic

behaviour (Neubäumer *et al.* 2006; Williamson 1985). From the worker's perspective, desired returns to training (such as financial benefits, job security or promotion) can be denied by the employer. Employers, in contrast, bear the risk that training investments do not lead to the desired gains in productivity. Moreover, returns to training are jeopardized by career interruptions or employer change ('poaching') (Mohrenweiser *et al.* 2019). In order to cope with these risks, organizations can introduce contractual arrangements (governance structures). Since it is costly to establish such arrangements, transaction costs are increasing and make continuing training more costly.

The transaction cost approach offers one important explanation for the overall low level of training activities of employers and employees. However, existing group differences in the participation in further training are not fully explained. Some groups of employees (such as older employees or low-skilled workers) show rather low rates of training participation, although the risk of opportunistic behaviour is limited due to the poorer employment prospects of these groups making it more difficult to change the employer. Alternative theoretical accounts, such as filter theory, explain the lower training participation of low-skilled workers by the (mis)attribution of low and/or uncertain returns to training (Arrow 1973). According to this view, employers tend to ascribe lower returns and greater risk of loss of training investments to low-skilled workers. Since they are not able to predict training-related gains in productivity, they focus primarily on groups of people, where returns to training seem high and safe. Certain personal characteristics, such as the educational degree (measured in certificates), gender, age or employment relationship, serve as an indirect indicator signalling lower risk and more gains in productivity. As a consequence, high-skilled, young, male, full-time employed workers are more likely to receive continuing training (Asplund 2005).

When we follow filter theory, there is a good reason to be pessimistic about the chances of low-skilled workers to participate in continuing training. As long as mechanisms of statistical discrimination are at work, the negative signal of a low or missing qualification (as an indicator of low or uncertain returns to training) might counteract training participation, even when the company is more likely to invest in training in general. Due to the stigma of a missing qualification, low-skilled workers would still be the last who are integrated in employer-provided training. This raises the question how mechanisms of statistical discrimination can be cancelled out or at least reduced for low-skilled workers.

Institutional theories emphasize the importance of the social context for (solving) problems of uncertainty in economic exchange relations (Abraham 2001; Beckert 1996: 142; Granovetter 1985) and stress the importance of institutionalized structures and regulations (Carstensen and Ibsen 2019; Durazzi and Geyer 2019; Martin and Swank 2004; Sengenberger 1987; Theelen and Busemeyer 2008; Thelen 2009). When we apply insights from these theories to the issue of (overcoming) low training participation of

low-skilled workers, we can derive the following hypotheses on the role of institutional influences at different levels:

2.1. Institutional influences at organizational level

At the organizational level, institutionalized regulations and structures of employee representation can counteract the discrimination of low-skilled workers by establishing alternative criteria for the distribution of training investments (hypothesis *H1*). I would expect a favourable influence of employee representations and collective agreements. When training investments are not (solely) driven by the economic criterion of efficient returns but codetermined by employee representations (that are formally obliged to represent the entire work force also regarding issues of continuing training), mechanisms of statistical discrimination should lose their power (*H1.1*). Collective agreements link wage levels to achieved skill levels, tasks or work experience of employees. By doing so, they set indirect incentives for low-skilled workers to participate in continuing training in order to achieve higher wages. Some collective agreements (e.g. in the metal and electrical industry) even lay down rules for continuing training. However, these rules are mostly of procedural nature. Their impact on actual training behaviour of firms is weak, since they do not establish binding regulations but rather encourage employers to evaluate the skill demands of the work force (Bahnmüller and Hoppe 2012). Since such evaluations can help to detect skill needs of low-skilled workers, I would nevertheless expect a positive effect on their training participation when the firm has collective bargaining agreements (*H1.2*).

2.2. Human resources strategies

Following organizational theory (Steinback *et al.* 2010), workplace inequalities are also determined by formal organizational practices (such as institutionalized regulations and HR policies). Across sectors and organizations, training participation of low-skilled workers should vary with the type and shape of HR strategies, ranging from market and cost-driven strategies on the one hand to more institutionalized and employee-oriented practices on the other hand. I expect that low-skilled workers are better off when training investments are governed by formalized, employee-oriented HR policies (hypothesis *H2*). When HR policies are concerned with issues of employability, low-skilled workers should receive more training due to their poorer employability (*H2.1*). When the performance of low-skilled workers is evaluated on a regular base by formalized measures, decisions on training participation should be based on (more) actual information on the real productivity of workers, and less on (negative) signals and ascribed attributions by single managers (*H2.2*). I expect a similar effect when long-term employment relationships provide more information on the performance of low-skilled workers (*H2.3*).

2.3. Institutional influences at sectoral level

The comparative political economy literature goes beyond the economic rationales of single employers by focusing on the role of coordinating macro-level institutions, such as the system of collective bargaining, public policies or the skill formation system (Hall and Soskice 2001; Swank *et al.* 2008; Thelen 2009; Thelen 2014). Germany traditionally stands for a coordinated market economy with rather strong centralized bargaining structures and a (dual) training system based on standardized (portable) and firm-specific training. Both institutional arrangements are traditionally represented by the large German manufacturing sector. At the same time, coverage rates under both arrangements are decreasing, mainly due to shrinking bargaining coverage, varying training standards and more precarious jobs in the growing service economy (Thelen and Busemeyer 2008; Thelen 2009). As a consequence, the risk of inequalities between and within sectors increases. The literature suggests that public policies and inclusive unions are the keys to overcome this dualism (Doellgast *et al.* 2018; Thelen 2014).

Following the comparative political economy literature, I assume that institutional differences between sectors are related to (a) public policies and legal regulation, (b) dualism between dominant and more resourceful sectors (such as manufacturing) and weaker sectors (such as the service economy) and (c) collective bargaining, particularly in service sectors (such as Hotel Business and Gastronomy), where the workers have the least bargaining power. Regarding the integration of low-skilled workers in continuing training, I expect the following differences between sectors (hypothesis H3).

Training participation of low-skilled workers should be higher in sectors with more public regulation and school-based training (such as *Human Health and Social Work*) as compared to the private sector (*H3.1*). In the private sector, larger upfront investments in portable and firm-specific skills (dual apprenticeship system) might lower the firm's overall need to provide supplement training at later stages of the life course. Firms in sectors with (initial) school-based training, in contrast, face a higher need to provide supplement qualifications in order to enable their workers to meet firm and job-specific skill demands (Thelen 2014). Low-skilled workers might benefit from this overall higher engagement of firms in continuing training. Moreover, they have to conform to legal provisions on skill requirements and continuing training that establish a stronger demand for training also for low-skilled workers (Bechmann *et al.* 2012; Hilbert *et al.* 2014).

When the role of manufacturing is large (as it is the case for Germany), the risk of dualism between core workers (in the manufacturing sector) and workers in the service sector increases (Sengenberger 1987; Thelen 2014: 74). As a consequence, the training participation of low-skilled workers will be higher in the manufacturing sector as compared to the service economy (due to dualism) (*H3.2*).

Eventually, I expect that the training participation of low-skilled workers will vary with firms' bargaining coverage. I expect a positive impact of

collective agreements in sectors with low bargaining coverage and a large share of weak employee groups, such as *Hotel Business and Gastronomy* (*H3.3*). Trade unions in this sector should be more concerned with issues of precarious employment and inequality among the work force (as compared to the manufacturing or public sector). Only a minority of employers in this sector is part of an employer association and has collective bargaining coverage (Schneider and Vogel 2018). In this respect, having collective bargaining coverage and being part of an employer association expresses a stronger interest in issues of employability and solidarism (see also Martin and Swank 2004).

3. Research design, methods and variables

The IAB Establishment Panel (Fischer *et al.* 2009; Ellguth *et al.* 2014), waves 2011 and 2013, is used in order to test the outlined hypotheses. Data access was provided via on-site use at the Research Data Centre (FDZ) of the German Federal Employment Agency (BA) at the Institute for Employment Research (IAB) and subsequently remote data access. The IAB Establishment Panel provides elaborated information on company characteristics of about 12,000 German companies per year, including a detailed measure of employer-provided continuing training participation for different groups of employees. The Panel is based on a random sample selected from all German companies registered at the German Federal Employment Agency's (BA). The data collection was done via oral interviews with employers or employer representatives based on a standardized questionnaire. The following analyses refer to the wave 2011 because of its particular thematic focus on institutionalized HR practices. Information on training participation in 2013 is used in order to observe how the selected organizational and sectoral characteristics are related to training participation over time.

Following the definition of the Institute for Employment Research (IAB), the focus is on employer-sponsored continuing training only. Thus, only training activities, which were (at least partly) funded by the employer in terms of investments of time and/or money, are taken into account. All analyses are based on a (merged) subsample of 4,009 establishments that participated in wave 2011 and 2013 (Appendix Table A1). According to the IAB questionnaire, low-skilled workers are 'workers doing jobs that require no professional qualification'. This definition is based on the current job and not on the level of qualification of the employees. The data give detailed information on training participation rates of low-skilled workers. Yet, no information is provided on the intensity, length and type of training (e.g. in terms of rates of formal or non-formal training, fresh-up courses or advanced training). The dataset also faces common method bias, since dependent and independent variables come from the same source. Nevertheless, the dataset is an established and authorized source of representative firm-level information in Germany.

Dependent Variables

Regression analyses are used to test the hypotheses. The first dependent (dummy) variable is training investments (yes/no) in low-skilled workers in the first half of 2013. It refers to the question: 'was your establishment active in continuing vocational training in the first half of the year?' When the answer was 'Yes, working hours and/or financial resources were provided for continuing training', and 'low-skilled workers' (at least one) participated in continuing training (in 2013), the establishment was considered to support training of low-skilled workers. The second dependent (metric) variable measures training participation rates of low-skilled workers in 2013, defined as the share of low-skilled workers who received training. It is calculated by dividing the number (or cases) of low-skilled workers who received training by the total number of low-skilled workers in the establishment.

Explanatory Variables

Most independent variables have been observed in 2011. Only for the business situation, labour shortages, investments in EDP and recent innovations (regarding work organization, products, services or the production process), retro perspective information referring to 2010 was used.

Institutional Influences at Organizational Level

A dummy variable was created indicating whether or not there is a works council or other form of employee representation in the company. If this is the case, it is assumed that the interests of low-skilled workers receive more attention in HR policies. Based on the question whether or not a collective agreement applies to the establishment, a dummy variable was constructed.

HR Strategies

Whether or not the HR policies are institutionalized is measured by the question: 'Does your establishment work with': (a) 'written plans for staff development?', (b) 'formally laid down procedures for appointments?', (c) 'job descriptions for the majority of jobs?', (d) 'written target agreements with employees?', (e) 'written evaluations of job performance?'. A factor analysis (main component analysis) confirms that one factor explains 62 per cent of the total variance. The dummy variable for formalization of HR policies is encoded with a value of 1 for all companies that exhibit a positive factor charge, otherwise with the value 0.

Differences in the orientation of HR policies are measured by the following indicator: 'How important are the following strategies for your establishment to meet future needs for skilled workers?' HR policies are classified as employee oriented (vs cost-cutting and outsourcing strategies) when they conform highly to the following strategies: 'keeping older workers longer in the company', 'long-term personal development of employees', 'improving the reconciliation of family and working life', or 'creating attractive work

conditions'. A factor analysis confirms that one factor explained the four items of 47 per cent of the total variance. The dummy variable for an employee-oriented HR policy has a value of 1 for all establishments with a positive factor charge.

Long-term employment relationships: I assume that low-skilled workers have longer employment periods, when the company reports that all employees have permanent employment contracts. Since the indicator only refers to formal long-term employment (contracts), the actual period of employment of low-skilled workers can deviate of course. However, alternative measures of factual fluctuation provided by the dataset do not differentiate between specific groups of employees, such as low-skilled workers. For that reason, they are not included in the indicator, but considered only as a control variable.

Institutional Influences at Sectoral Level

Sectoral differences are investigated by using dummy variables for 15 sectors (according to the study by Bechmann *et al.* 2012: 94). Moreover, I carry out separate analyses for three selected sectors (*Manufacturing, Hotel Business and Gastronomy* and *Human Health and Social Work*) representing different institutional settings regarding collective bargaining, skill formation and public regulation.

Control Variables

By building on previous studies (see e.g. Behringer and Käpplinger 2008; Bellmann and Leber 2011; Bellmann *et al.* 2015), a number of standard control variables were included in the analysis: company size (four categories based on the number of employees), compound operation (is the companies part of a corporate network), workforce composition (metric variables for the proportion of women, part-time workers, workers older than 49 years, low-skilled workers and high-skilled workers, holding a university degree), region (company located in eastern or western part of Germany), technical level of equipment ('up to date'), expected employment development in the coming year ('stable' or 'rising') and whether training participation rates are based on the number of persons (who received training) or number of trainings (cases).

Moreover, I included dummy variables for the profitability in the last fiscal year (2010) ('very good' or 'good'), labour shortages ('When you think about the upcoming next two years, do you expect problems to find suitable candidates with appropriate professional qualifications?'), innovations (2010) regarding work organization, products, services or production, investments in EDP (2010) ('computers, information and communication technology') and infrastructure for training ('Does the establishment conform to existing statutory requirements for the provision of initial vocational training?').

Eventually, investments in continuing training (all workers) and training participation rates of skilled workers are included as additional variables, in order to control for the overall training inclination of the firm.

4. Empirical findings

Logistic and OLS regression analyses have been carried out in order to study the role of different social and economic determinants in continuing training participation of low-skilled workers (Table 1). Regarding the role of the institutional organizational context, the analyses confirm the positive impact of employee representations (*H1.1*) on both the chance of training investments in low-skilled workers (M2) and their training participation rate in 2013 (M1, M1). In contrast to hypothesis *H1.2* on the positive impact of collective agreements, there is no evidence for significant effects on training investments or training participation rates of low-skilled workers.

With regard to the role of *HR strategies*, the analysis provides evidence that both the likelihood of training investments and rates of training participation are significantly higher for low-skilled workers when their company is characterized by formalized HR practices (*H2.1*) or employee-oriented HR policies (*H2.2*). However, the effect of employee-oriented HR policies on training participation rates of low-skilled workers is only significant on a 10 per cent level.

Hypothesis *H2.3* on the positive impact of long-term employment relationships is not confirmed by the data. There is even evidence for an opposite effect: companies with (exclusively) permanent employment contracts are less likely to invest in training of low-skilled workers and train fewer low-skilled workers.

Regarding the role of *institutional sectoral characteristics,* the analyses provide evidence for the expected differences (hypothesis *H3*). Firms in the sector *Human Health and Social Work* show a higher probability to support training of low-skilled workers in 2013 (as compared to the *Manufacturing* sector) (Table 1). They also have significantly higher participation rates. This pattern is in line with hypothesis *H3.1*. It supports the argument that sectors with more school-based vocational education and legal regulation of skill requirements (such as *Human Health and Social Work*) are characterized by higher rates of training participation among low-skilled workers. However, due to the limitations of the data, it is not possible to evaluate to what extent this effect is related to legal regulation or school-based vocational education.

Additional analyses (not presented here) show that firms in most service sectors are more likely to train their work force in general. In contrast to the manufacturing sector, where larger upfront investments in portable and firm-specific skills (due to the dual apprenticeship system) lower the need for supplement training at later stages of the life course (Thelen 2014), firms in the service economy are more likely to invest in supplement qualifications in order to meet firm and job-specific skill demands. However, regarding training investments focused on low-skilled workers, this pattern rather looks the opposite (Table 1). In line with hypothesis *H3.2*, firms in most service sectors (such as *Trade*, *Hotel Business and Gastronomy*, *Financial and Insurance Services*, *Business and Professional Services*, *Education and Public*

TABLE 1
Determinants of Training Participation of Low-Skilled Workers in 2013

Models M1: Logistic regression; average marginal effects; standard errors in parentheses
Model M2: OLS regression; standardized coefficients, standard errors in parentheses

Model	*Continuing training low-skilled workers yes/no M1 (2013)*	*Training participation rate low-skilled workers M2 (2013)*
Explanatory variables (wave 2011)		
Collective agreement	0.00 (0.01)	0.00 (0.01)
Formalized HR practices (IC)	0.06** (0.02)	0.06** (0.01)
Employee-oriented HR policies (NC)	0.03** (0.01)	0.02(*) (0.01)
Long-term employment contracts (TC)	−0.03* (0.02)	−0.03* (0.01)
Works councils or employee representation	0.04** (0.02)	0.04** (0.01)
Control variables		
Large company (> 250 employees)	Ref.	Ref.
Medium-sized company (50–249 employees)	−0.05** (0.02)	−0.01 (0.01)
Small company (10–49 employees)	−0.08** (0.02)	−0.04* (0.02)
Very small company (< 10 employees)	−0.15** (0.03)	−0.09** (0.02)
Compound operation	0.02 (0.01)	0.01 (0.01)
Business situation (2010) very good or good	0.00 (0.01)	0.00 (0.01)
Stable employment development	−0.01 (0.02)	−0.01 (0.01)
Proportion of women	0.09** (0.03)	0.05* (0.02)
Proportion of highly qualified workers	−0.18** (0.05)	−0.10** (0.03)
Proportion of older workers (50+)	−0.02 (0.04)	0.01 (0.02)
Proportion of part-time workers	0.04 (0.03)	0.04(*) (0.02)
Proportion of low-skilled workers	0.29** (0.03)	0.08** (0.02)
Labour shortages (skilled workers) (2010)	0.03* (0.01)	0.04** (0.01)
Investments in EDP (2010)	0.02(*) (0.02)	0.01 (0.01)
Recent innovation (2010)	0.01 (0.01)	−0.00 (0.01)
Modern technical equipment	0.02 (0.01)	0.01 (0.01)
Infrastructure for vocational training	−0.00 (0.02)	−0.00 (0.01)
Region (West Germany)	0.02(*) (0.01)	0.01 (0.01)
Investment in continuing training in 2013	0.23** (0.02)	/
Training participation rate of skilled workers (2013)	/	0.26** (0.01)
Training participation rate based on persons (not cases)	/	0.15** (0.01)
Sectors (15 dummy variables)	See Table 2	See Table 2
Pseudo R^2/ adjusted R^2	0.20	0.18
n (establishments)	4,009	4,009

(*) significant on 10% level; * significant on 5% level; ** significant on 1% level.
Source: IAB Establishment Panel, waves 2011 and 2013; own calculations (only companies with low-skilled workers).

Administration) were less likely to train their low-skilled workers in 2013. Moreover, they were training fewer low-skilled workers (Table 2, models M1 and M2).

The effects of collective bargaining coverage are explored by separate regression analyses (Table 3). For most sectors (including *Manufacturing*),

TABLE 2
Determinants of Training Participation of Low-Skilled Workers in 2013

Model M1: Logistic regression; average marginal effects; standard errors in parentheses
Model M2: OLS regression; standardized coefficients; standard errors in parentheses

Model	*Continuing training low-skilled workers yes/no M1 (2013)*	*Training participation rate low-skilled workers M2 (2013)*
Explanatory and control variables	See Table 1	See Table 1
Sectors (15 dummy variables)		
(1) Manufacturing	Ref.	Ref.
(2) Agriculture and Foresting	0.07 (0.04)	−0.02 (0.03)
(3) Mining and Quarrying	0.00 (0.10)	0.03 (0.07)
(4) Electricity, Gas, Water supply	−0.04 (0.04)	−0.02 (0.03)
(5) Construction	−0.01 (0.03)	−0.02 (0.02)
(6) Trade	−0.10** (0.02)	−0.05** (0.02)
(7) Transport and Warehousing	0.00 (0.03)	0.00 (0.02)
(8) Information and Communication	−0.12 (0.08)	−0.02 (0.04)
(9) Hotel Business and Gastronomy	−0.06* (0.03)	−0.05** (0.02)
(10) Financial and Insurance Services	−0.16** (0.05)	−0.12** (0.03)
(11) Business and Professional Services	−0.07** (0.02)	−0.06** (0.02)
(12) Education	−0.12** (0.04)	−0.07** (0.03)
(13) Human Health and Social Work	0.04 (0.02)	0.06** (0.02)
(14) Other Services	−0.02 (0.04)	−0.05 (0.03)
(15) Public Administration	−0.09** (0.03)	−0.08** (0.02)
Pseudo R^2/adjusted R^2	0.20	0.18
n (operations)	4,009	4,009

(*) significant on 10% level; * significant on 5% level; ** significant on 1% level.
Source: IAB Establishment Panel, waves 2011 and 2013; own calculations (only companies with low-skilled workers).

collective bargaining coverage does not have a significant effect on training participation of low-skilled workers. In contrast to hypothesis *H3.3*, we do not find the expected effect for the sector *Hotel Business and Gastronomy* (models M4a and M6b). Surprisingly, collective bargaining coverage in the sector *Human Health and Social Work* has significant positive effect on the likelihood that firms invest in training for low-skilled workers (model M5a). Yet, there is no significant effect on the training participation of low-skilled workers (model M5b).

Moreover, we find evidence that the role of HR practices and institutional influences at the firm level varies between sectors. Formalized HR practices are related to higher training participation rates among low-skilled workers in *Manufacturing* (models M3a and M3b) and *Hotel Business and Gastronomy,* (models 4a and 4b) but not in *Human Health and Social Work* (models 5a and 5b). Moreover, training participation of low-skilled workers is related to employee-oriented HR policies in the *Manufacturing* sector (models 3a and 3b). Within the three selected sectors, structures of employee representation are not significantly related to differences in training participation of low-skilled workers.

TABLE 3
Determinants of Training Participation of Low-Skilled Workers in Selected Sectors

	Manufacturing		*Hotel Business and Gastronomy*		*Human Health and Social Work*	
Model	*M3a (2013) Training (yes/no)*	*M3b (2013) Participation rate*	*M4a (2013) Training (yes/no)*	*M4b (2013) Participation rate*	*M5a (2013) Training (yes/no)*	*M5b (2013) Participation rate*
Explanatory variables (wave 2011)						
Collective agreement	1.12 (0.21)	0.01 (0.02)	1.91 (1.05)	0.02 (0.03)	0.57* (0.15)	−0.06 (0.04)
Formalized HR practices	2.23** (0.48)	0.08** (0.02)	1.56 (0.93)	0.07(*) 0.04)	1.30 (0.47)	0.01 (0.05)
Employee-oriented HR policies	1.41* (0.23)	0.04* (0.02)	0.97 (0.45)	0.02 (0.03)	1.17 (0.29)	0.00 (0.03)
Long-term employment contracts	0.76 (0.16)	−0.02 (0.02)	1.31 (0.72)	−0.04 (0.03)	0.56 (0.20)	−0.08 (0.05)
Works councils or employee representation	1.13 (0.24)	0.01 (0.02)	2.62 (1.61)	0.01 (0.04)	1.33 (0.40)	0.05 (0.04)
Control variables						
Large company (> 250 employees)	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Medium-sized company (50–249 employees)	0.70(*) (0.15)	−0.07** (0.02)	0.98 (1.34)	−0.17 (0.11)	1.15 (0.38)	0.15** (0.05)
Small company (10–49 employees)	0.41** (0.12)	−0.14** (0.03)	0.61 (0.83)	−0.13 (0.12)	1.28 (0.52)	0.18** (0.06)
Very small company (< 10 employees)	0.28* (0.16)	−0.19** (0.04)	0.39 (0.61)	−0.16 (0.12)	0.20* (0.13)	−0.08 (0.08)
Compound operation	1.56* (0.28)	0.03(*) (0.02)	0.19** (0.18)	−0.12** (0.04)	1.76* (0.47)	0.03 (0.04)
Business situation (2010) very good or good	1.26 (0.21)	0.02 (0.02)	0.76 (0.36)	−0.03 (0.03)	1.19 (0.29)	−0.02 (0.03)
Stable employment development	1.01 (0.25)	0.00 (0.02)	1.01 (0.79)	−0.03 (0.05)	1,57 (0.55)	0.05 (0.05)
Proportion of women	1.42 (0.67)	−0.00 (0.03)	5.44 (7.98)	0.05 (0.06)	4.24(*) (3.58)	0.05 (0.11)
Proportion of highly qualified workers	0.67 (0.60)	−0.09 (0.09)	0.00 (0.01)	0.07 (0.55)	0.04** (0.04)	−0.28** (0.10)
Proportion of older workers (50 +)	0.73 (0.44)	−0.01 (0.05)	0.26 (0.42)	−0.01 (0.07)	1.06 (0.76)	0.02 (0.09)
Proportion of part-time workers	1.48 (1.20)	0.04 (0.06)	4.58 (4.52)	0.02 (0.05)	2.11 (1.04)	0.09 (0.07)
Proportion of low-skilled workers	5.21** (1.99)	0.02 (0.04)	0.91 (0.87)	0.03 (0.06)	18.89** (13.45)	0.13 (0.09)
Labour shortages (skilled workers) (2010)	0.93 (0.16)	0.02 (0.02)	1.12 (0.57)	−0.02 (0.04)	1.43 (0.36)	0.09* (0.04)
Recent innovation (2010)	1.06 (0.22)	0.01 (0.02)	0.71 (0.35)	0.03 (0.03)	1.00 (0.24)	−0.04 (0.03)
Investments in EDP	1.56* (0.27)	0.01 (0.02)	0.86 (0.45)	−0.02 (0.04)	1.14 (0.29)	0.04 (0.04)
Modern technical equipment	0.95 (0.17)	−0.03(*) (0.02)	1.44 (0.69)	0.03 (0.03)	1.01 (0.28)	0.03 (0.04)
Infrastructure and staff for vocational training	1.33 (0.44)	0.02 (0.02)	1.00 (0.61)	−0.02 (0.03)	2.12* (0.0.68)	0.06 (0.04)
Region (West Germany)	1.48* (0.29)	0.01 (0.02)	1.16 (0.59)	−0.04 (0.03)	0.97 (0.27)	−0.06 (0.04)
Investment in continuing training in 2013	3.21** (1.03)	/	22.41** (14.99)	/	4.42(*) (3.43)	/
Training participation rate skilled workers 2013	/	0.34** (0.02)	/	0.33** (0.06)	/	0.40** (0.05)
TPR based on persons (not cases)	/	0.18** (0.02)	/	0.35** (0.04)	/	0.05 (0.04)
Pseudo R^2/adjusted R^2	0.22	0.24	0.36	0.28	0.29	0.31
n (operations)	1,097	1,097	278	278	500	500

(*) significant on 10% level; * significant on 5% level; ** significant on 1% level.
Note: Models M3a, M4a and M5a: logistic regression; odds ratio; models M3b, M4b and M5b: OLS regression; standardized coefficients, standard errors in parentheses.
Source: IAB Establishment Panel, waves 2011 and 2013; own calculations (only companies with low-skilled workers).

Apart from the outlined institutional influences, training participation of low-skilled workers is related to a number of additional firm characteristics (control variables). In line with findings from previous studies (see Bellmann *et al.* 2015), labour shortages increase the likelihood and participation of low-skilled workers in employer-provided continuing training (Table 1). Investments in EDP are related to a higher likelihood that companies invest in training for low-skilled workers. Smaller companies, in contrast, are less likely to invest time or money in continuing training of low-skilled workers and have lower training participation rates.

The share of low-skilled workers in the company has a particularly strong impact: establishments with a large share of low-skilled workers are characterized by a higher likelihood of investments in training for low-skilled workers and higher participation rates.

Eventually, the likelihood of training investments for low-skilled workers is positively related to compound operation, a lower share of high-skilled employees, and regional differences (firm located in West Germany). The analyses also show evidence that training participation rates of low-skilled workers are positively affected by a higher share of women or part-timers in the company and a lower share of high-skilled employees.

In-Depth Analyses — the Role of Institutional Configurations

Past research has shown that the investigated institutional influences in terms of employee representation, collective agreements, employee-oriented HR policies or formalized HR practices often occur together in characteristic configurations (Goedicke *et al.* 2006; Wotschack 2017; Wotschack and Solga 2014). These configurations might influence the training participation of low-skilled workers in addition to the single explanatory variables presented in the analyses above. In order to tackle this problem, it seems useful to explore characteristic types of companies (according to selected institutional characteristics) by using a cluster analyses (single and complete linkage procedure) and to study their impact on training participation of low-skilled workers.

The results of the cluster analysis (complete linkage method) suggest that the included institutional characteristics (bargaining coverage, employee representation, employee-oriented HRM and formalized HR practices) occur in distinct constellations (Table 4). Plausible solutions are suggested for three clusters (Calinski/Harabasz pseudo-F index: 3318), five clusters (Calinski/Harabasz pseudo-F index: 3107) and nine clusters (Calinski/Harabasz pseudo-F index: 3296). The three-cluster solution provides the best results and sufficiently large groups of cases.

Overall, we find three distinct institutional configurations. First, there is a large group of companies (cluster A: 'Low Embeddedness') that lacks most of the different institutional company characteristics. Only a minority of companies has employee representations (19 per cent) bargaining coverage (31

TABLE 4
Three Company Clusters in Terms of Institutional Embeddedness (Mean Values)

Cluster (share in %)	*Formalized HR practices*	*Employee-oriented HRM*	*Bargaining coverage*	*Employee representation*
A 'Low Embeddedness' ($n = 1{,}702$)	0.28	0.00	0.31	0.19
B 'Employee-Oriented HRM' ($n = 933$)	0.46	1.00	0.33	0.00
C 'Regulation' ($n = 1{,}374$)	0.91	0.64	0.83	1.00

Source: IAB Establishment Panel, wave 2011; own calculations (only companies with low-skilled workers).

per cent) or formalized HR practices (28 per cent). Employee-oriented HRM is completely absent.

Second, there is a rather small group (cluster B: 'Employee-Oriented HRM'), in which all companies report employee-oriented HR policies. Almost half of the companies (46 per cent) have formalized HR practices. Yet, employee representations are completely absent, and only a minority of companies reports bargaining coverage (33 per cent).

Third, there is a relatively large group of companies (cluster C: 'Regulation'), in which most of the institutional characteristics are present. All establishments of this cluster have employee representations. Formalized HR practices (91 per cent) are also widely used. Employee-oriented HR policies exist in two third of the companies (64 per cent). Bargaining coverage is widespread (83 per cent).

In order to study the role of these different institutional configurations in the training participation of low-skilled workers, three dummy variables (one for each cluster) were defined and added to the regression models instead of the single context characteristics (Table 5). The reference category is cluster A ('Low Embeddedness').

The analysis provides evidence that the three identified configurations of social embeddedness differ in both the likelihood of training investments (model M6a) and training participation rates of low-skilled workers (model M6b). Compared to the reference category (cluster A), companies in cluster C ('Regulation') are more likely to provide continuing training to low-skilled workers and show higher participation rates. Thus, the proportion of low-skilled workers, who participated in continuing training, is significantly higher than in the other two clusters. This finding is in line with hypothesis *H1* on the positive impact of institutional arrangements at the company level. Companies in cluster B ('Employee-Oriented HRM'), in contrast, are more likely to invest in training for low-skilled workers, but do not have significantly higher participation rates (as compared to cluster A). This finding confirms hypothesis *H2* on the positive impact of HRM practices. Both findings underline the importance of specific institutional configurations. Empirically, the selected company characteristics in terms of institutional

TABLE 5
Determinants of Training Participation of Low-Skilled Workers in 2013

Model 6a: Logistic regression; average marginal effects; standard errors in parentheses
Model 6b: OLS regression; standardized coefficients, standard errors in parentheses

Model	*Continuing training low-skilled workers yes/no M6a (2013)*	*Training participation rate low-skilled workers M6b(2013)*
Institutional company context (2011)		
Cluster A: Low Embeddedness ($n = 1{,}702$)	Ref.	Ref.
Cluster B: Employee-Oriented HRM ($n = 933$)	0.03(*) (0.02)	0.00 (0.01)
Cluster C: Regulation ($n = 1{,}374$)	0.07** (0.02)	0.05** (0.01)
Control variables	Same control variables as in Table 1	Same control variables as in Table 1
Pseudo R^2/adjusted R^2	0.20	0.20
n (establishments)	4,009	4,009

(*) significant on 10% level; * significant on 5% level; ** significant on 1% level.
Source: IAB Establishment Panel, waves 2011 and 2013; own calculations (only companies with low-skilled workers).

arrangements and HR policies cluster together in characteristic configurations that are related to significant differences in training participation of low-skilled workers.

Additional analyses (not presented here) show evidence that the three clusters are not correlated strongly with other company characteristics. In this respect, they may be understood as a relatively independent determinant of continuing training participation. Nonetheless, companies in cluster C ('Regulation') are more often characterized by supportive company characteristics in terms of training participation, such as large size, compound operation or sectors that are more active in training. The cluster A ('Low Embeddedness') is, however, less likely to be found in larger establishment.

In-depth-analyses (Appendix Table A2) provide evidence for sectoral differences. The explored clusters work differently in specific sectoral settings. In *Manufacturing*, cluster C ('Regulation') is related to both a significantly higher training probability and a higher share of trained low-skilled workers (as compared to cluster A). Cluster B ('Employee-Oriented HRM') relates to a higher training probability but not to higher training participation rates. In the *Hotel Business and Gastronomy* sector, cluster C ('Regulation') is only related to a higher likelihood of training investments. Training participation rates do not vary significantly between the different clusters. For *Human Health and Social Work,* no significant relationship is found.

Robustness Check

The analyses presented in this article suffer from problems of endogeneity since the data structure makes it impossible to use a panel approach with

fixed effects or first differences. As a consequence, the results might be jeopardized by biased variables and mistaken relationships. In order to tackle this problem, a broad range of control variables have been included in the analyses. All analyses have been controlled for general training incidence (training investments in 2013), training participation rates of skilled workers (2013) and investments in initial training. In addition (analyses not shown here), the share of apprentices in the company and the presence of specific training measures focused on older workers have been included in the models. With the exception of employee-oriented HR polices, the effects of the main explanatory variables (formalized HR practices, long-term contracts, structures of employee representation and cluster C 'Regulation') remain significant, confirming the robustness of the analyses.

Eventually, treatment-effect estimation (propensity score matching) was used to encounter unobserved time invariant and time variant heterogeneity. The analyses confirm the significant impact of formalized HR practices and employee representations for the likelihood that firms invest in training of low-skilled workers. It also provides evidence that the cluster 'Regulation' has a positive impact (though only at a 10 per cent significance level), while the cluster 'Low Embeddedness' has a negative impact (at a 10 per cent significance level). Regarding training participation of low-skilled workers, formalized HR practices and structures of employee representation have a significant positive effect. However, the effect of employee representations is only significant when training participation of skilled workers is excluded. With other words: Though structures of employee representation relate to significantly higher training participation rates of low-skilled workers, the relationship might be either caused by an overall positive impact of employee representations on training participation or by a third unobserved variable that relates to both training participation of skilled and low-skilled workers. A fixed effect model would be needed to explore this relationship further. Nevertheless, the analysis provides evidence that low-skilled workers in companies with employee representation have significantly higher levels of training participation. We do not find any evidence for a treatment effect of employee-oriented HR policies. So, it is likely that the weak effect in the regression models is rather caused by other observed or unobserved influences.

5. Discussion

Through the German case, the article explored an issue that is relevant across several countries: Though continuing training forms a key measure for low-skilled workers to improve their labour market position and to cope with fundamental changes in the world of work, their participation in continuing training remains very low. Given this dilemma, the question aises, how low-skilled workers can be better integrated in firm-provided continuing training. Their low training participation was understood as a problem of

uncertainty and lack of information. Because the returns and long-term objectives related to training are uncertain and jeopardized by opportunistic behaviour, companies tend to focus their training activities on employees from which they expect relatively high and secure returns to training. Since particularly low and uncertain returns to training are often attributed to low-skilled workers, this group is included less often in continuing training.

Against this background, the article explored the role of institutional arrangements at the organizational and sectoral level in Germany. To the best of my knowledge, previous research has not explored this question systematically. Most studies addressing institutional determinants have been concerned with variations in *overall* training participation (see Bellmann *et al.* 2010; Käpplinger 2007), while studies that investigate training participation of low-skilled workers have focused their interest on determinants like task characteristics or labour shortages (see Bellmann *et al.* 2015; Mohr *et al.* 2016).

By building on institutional and organizational theory, the article derived from the idea that institutional arrangements are able to foster training participation of low-skilled workers. By either providing more information on the actual productivity of low-skilled workers, or establishing alternative criteria for training investments (solidarism), they increase the chance that firms integrate (more) low-skilled workers in continuing training.

Analyses of data of the IAB Establishment Panel (waves 2011 and 2013) confirmed this expectation for a large part. In addition to key labour market and company characteristics (such as size, workforce composition and labour shortages), the institutional organizational and sectoral context shapes the training participation of low-skilled workers. At the organizational level, formalized HR practices are related to both a higher training probability and higher training participation of low-skilled workers. In addition, structures of employee representation increase the likelihood that firms invest in training for low-skilled workers. There is also evidence that training participation rates of low-skilled workers are significantly higher in firms with employee representations. However, additional analyses (propensity score matching) could not confirm a significant treatment effect. Further research using fixed effects models is needed to evaluate this relationship further.

In-depth analyses on configurations of institutional influences have shown that low-skilled workers benefit in organizational clusters that are characterized by structures of employee representation, formalized HR practices and bargaining coverage. This result is in line with findings of the newer organizational research stating that HR policies alone are often not able to counteract processes of statistical discrimination, but need to be supported by corporate actors (Steinback *et al*. 2010: 231).

However, no positive effect on training participation was found for companies with (exclusively) permanent employment contracts. On the contrary: low-skilled workers in these companies have a significantly lower training probability. One possible explanation relates to the indicator used in this study. Because of data limitations, the actual employment duration of

low-skilled workers was not considered. This might be problematic, since staff turnover can be high and prevent long-term employment relationships even when the establishment has (exclusively) permanent employment contracts. Another possible explanation refers to long-term effects of high temporal embeddedness. When companies with long-term employment relationships are more likely to train their unskilled work force, these training investments might already have taken place in the past. As a result, the need to train this group is decreasing over time and leading to a lower training probability.

At the *sectoral level*, the overall influence of collective agreements on the training behaviour of firms (regarding low-skilled workers) is weak. We only find evidence that collective bargaining coverage is positively related to the likelihood that the firm invests in training for low-skilled workers in *Human Health and Social Work*. Apart from that, firms covered by collective agreements do not train significant higher shares of low-skilled workers. This might be explained by the fact that most collective agreements in Germany do not address explicitly issues of continuing training (Bahnmüller and Hoppe 2012). If they do so (like in the metal or electric industry), regulations concerning continuing training are usually soft and not explicitly focused on low-skilled workers. As shown above, formalized HR practices at the organizational level have a stronger impact, in this respect.

In line with the predictions derived from the comparative political economy literature (Thelen and Busemeier 2008; Thelen 2009, 2014), the analyses provide evidence that firms in most service sectors are less likely to train their low-skilled workers than firms in the manufacturing sector (indicating dualism), while both the likelihood of training investments and participation rates in the sector *Human Health and Social Work* are significantly higher. School-based vocational education and public regulations that are more dominant in this sector (Bechmann *et al.* 2012; Thelen 2014) seem to foster training participation of low-skilled workers. Unfortunately, it is not possible with this dataset to study and disentangle the effects of the skill formation system on the one hand and public policies and legal regulations on the other hand. We should also be aware that higher rates of training participation in this sector are often resulting from short-term and task-oriented training measures that do not necessary lead to better career or income prospects for low-skilled workers.

Eventually, this study revealed interesting differences between sectors underlining the need to consider the sectoral context more carefully in future research and to explore the varying role of institutional arrangements for different sectors.

In the *Manufacturing* sector, HRM policies in terms of formalized HR practices and employee-oriented policies are related to both a higher likelihood of training investments and higher training participation rates among low-skilled workers. Moreover, the cluster analyses provide evidence that companies with institutional arrangements in terms of bargaining coverage, employee representation or formalized HR practices show significantly higher levels of training investments in low-skilled workers.

In the sector *Human Health and Social Work*, in contrast, skill requirements are to a large extent regulated at the legal level. Under this condition, institutional arrangements and HRM policies are of minor importance. However, collective bargaining coverage increases the chance of training investments for low-skilled workers. We do not find evidence that collective bargaining coverage relates to a better integration of low-skilled workers (solidarism) in precarious segments of the service economy, such as *Hotel Business and Gastronomy*. Low-skilled workers in this sector are particularly disadvantaged in terms of low employment security, part-time work and low pay. As the cluster analysis has shown, institutional arrangements at the firm level (in terms of collective bargaining coverage, employee representation or formalized HR practices) are related to a higher likelihood of investments in training for low-skilled workers, but not to higher participation rates. Formalized HR practices, however, seem to have a positive impact on training participation rates.

6. Conclusions

This study contributes to the existing body of literature on issues of social exclusion and inequality in coordinated market economies. Overall, the results underline the importance of institutional arrangements at the company and sectoral level for the training participation of low-skilled workers. It contributes to issues of social exclusion and inequality in coordinated market economies by exploring the role of institutional arrangements in continuing training participation of low-skilled workers.

In line with predictions from the comparative political economy literature, this study found evidence for a dualism regarding training gaps between sectors and workers. Low-skilled workers in most service sectors are less often included in employer-provided continuing training (as compared to the manufacturing sector). Scholars from comparative political economy have suggested that inclusive unions and public policies are important keys to overcome this dualism (Doellgast *et al.* 2018; Thelen 2014). However, the overall impact of collective bargaining on the training participation of low-skilled workers is low. Regardless, whether we look at core (*Manufacturing*) or precarious (*Hotel Business and Gastronomy*) segments of the German economy, collective agreements are not related to significant differences in terms of training participation. At the same time, the example of the sector *Human Health and Social Work* suggests that continuing training participation of low-skilled workers is related to public regulations and school-based vocational education both establishing a higher need to obtain supplement skills over the course of life. This finding supports the idea that large upfront investments in firm-specific and portable skills (as they are typical for the German dual-apprenticeship system) are related to rather moderate levels of life-long learning in Germany (Thelen 2014) with negative effects on the training participation of low-skilled workers.

One key finding of this study refers to the role of organizations. It showed evidence that the training participation of low-skilled workers is shaped by institutional arrangements and HR policies at the organizational level. This finding underlines the need to consider and study institutional differences between organizations more carefully. A cluster analysis could identify characteristic institutional configurations at the firm level that are related to variations in training participation of low-skilled workers. A major role is played by structures of employee representation and formalized HR practices, such as written plans for staff development, formally laid down procedures for vacant appointments, job descriptions, written target agreements or written evaluations of job performance. In contrast to most technical- or market-driven determinants, such as investments in EDP, recent innovations or labour shortages, which increase training demands for low-skilled workers in the short run, the effects of both employee representation and formalized HR practices are enduring and substantial.

For the large number of enterprises without employee representations and formalized HR procedures, substitute regulations and initiatives at the collective bargaining and state level are needed. The positive effect of public regulation was evidenced by high training participation rates among low-skilled workers in the sectors *Human Health and Social Work*. Collective agreements can play an important role, too. Yet, their overall impact on the training participation of low-skilled workers is still weak, indicating the need to incorporate more binding regulations in order to commit companies to take care of the long-term employability of their work force.

While this study found clear evidence that the decision of employers to invest in training for low-skilled workers is influenced by sector and company context, training participation rates of low-skilled workers were explained to a minor extent. Obstacles at the individual or household level, such as learning barriers, earning constellations or care demands, can prevent training participation despite given opportunities at the company level (Asplund 2005; Oosterbeek 1998). Future research should also address the problem of low training participation despite existing employer initiatives, for example by studying the role of different forms of learning, tailored to individual learning abilities or by including the (temporal) organization of learning activities (Dobischat *et al.* 2002; Wotschack 2019).

Independently from the social and institutional company context, some economic and market-related factors influence the likelihood that low-skilled workers receive continuing training. The chance increases when the company is of large size, faces labour shortages or employs a large share of low-skilled workers. In this respect, higher skill demands due to demographic change might increase the training opportunities for low-skilled workers. The willingness to invest into this group seems to be growing. However, previous research shows evidence that low-skilled workers still benefit less from labour market shortages than skilled workers (Bellmann *et al.* 2015; Seyda and Werner 2012). And, as we have seen in this study, institutionalized arrangements can make an important difference here.

Eventually, this study approached low training participation of low-skilled workers as a problem of discrimination by employers and investigated the role of different institutional arrangements in overcoming this problem. The question whether or not it is economically beneficial for the employer to train low-skilled workers (in a cost–benefit sense) remained outside the consideration. No distinction was made between 'efficient' or 'non-efficient' continuing training from the employer's point of view or in the sense of human-capital theory. There remains the possibility that certain institutional determinants (like employee representation) increase the training participation of low-skilled workers without any direct economic benefit for the firm. However, it is very difficult to evaluate what 'efficient' training is. There might be returns to training that are not very beneficial for the firm, but for the workers (by increasing their skills and job opportunities), for the labour market (by supplying better skilled workers) and the society (by saving social spending and contributing to social cohesion). Even from the employer's perspective, training of low-skilled workers that has little effect in the short run might be very beneficial in the long run, when labour shortages or technological and organizational change put more pressure on the firm. Employer-provided training is for a larger part short-term and task oriented. Investments in general occupational skills and professional qualifications are not in the core of the interest of employers. When low-skilled workers should get access to this important area of (formal) continuing training leading to professional qualifications, state initiatives, legal regulations and public policies are in demand.

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Appendix

TABLE A1
Descriptives Merged Data (Waves 2011 and 2013)

Variables	*Mean*	*Std. Dev.*	*Min*	*Max*
Investment in training (all workers) 2013	0.74 (0.54)	0.44	0.00	1.00
Investment in training for low-skilled workers 2013	0.23 (0.12)	0.42	0.00	1.00
Training participation rate all workers 2013	0.29 (0.24)	0.32	0.00	1.00
Training participation rate low-skilled workers 2013	0.12 (0.08)	0.29	0.00	1.00
Training participation rate skilled workers 2013	0.63 (0.78)	0.38	0.00	1.00
TPR (2013) based on persons (not cases)	0.60 (0.49)	0.49	0.00	1.00
Company size >250 (2011)	0.13 (0.01)	0.34	0.00	1.00
Company size 50–249 (2011)	0.29 (0.08)	0.45	0.00	1.00
Company size 10–49 (2011)	0.36 (0.38)	0.48	0.00	1.00
Company size 1–9 (2011)	0.22 (0.53)	0.41	0.00	1.00
Stable employment (2011)	0.85 (0.87)	0.42	0.00	1.00
Share of women (2011)	0.47 (0.52)	0.29	0.00	1.00
Share of high-skilled workers (2011)	0.08 (0.05)	0.15	0.00	0.97
Share of older workers (50+) (2011)	0.28 (0.27)	0.19	0.00	1.00
Share of part-time workers (2011)	0.28 (0.36)	0.26	0.00	1.00
Share of low-skilled workers (2011)	0.30 (0.37)	0.26	0.00	1.00
Region (West Germany) (2011)	0.71 (0.87)	0.45	0.00	1.00
Modern technical equipment (2011)	0.66 (0.62)	0.47	0.00	1.00
Business situation very good or good (2010)	0.42 (0.42)	0.49	0.00	1.00
Labour shortages (skilled workers) (2010)	0.35 (0.19)	0.48	0.00	1.00
Recent innovation (2010)	0.51 (0.39)	0.50	0.00	1.00
Investment in EDP (2010)	0.47 (0.31)	0.50	0.00	1.00
Collective agreement (2011)	0.49 (0.37)	0.50	0.00	1.00
Formalized HR practice (2011)	0.54 (0.26)	0.50	0.00	1.00
Employee-oriented HR policies (2011)	0.45 (0.37)	0.50	0.00	1.00
Long-term employment contracts (2011)	0.66 (0.40)	0.47	0.00	1.00
Work councils or employee representation (2011)	0.42 (0.19)	0.49	0.00	1.00
Sectors (2011)				
(1) Agriculture and Foresting	0.02 (0.02)	0.14	0.00	1.00
(2) Mining and Quarrying	/	/	0.00	1.00
(3) Electricity, Gas, Water Supply	0.02 (0.01)	0.13	0.00	1.00
(4) Manufacturing	0.27 (0.12)	0.45	0.00	1.00
(5) Construction	0.05 (0.07)	0.22	0.00	1.00
(6) Trade	0.14 (0.21)	0.34	0.00	1.00
(7) Transport and Warehousing	0.04 (0.04)	0.19	0.00	1.00
(8) Information and Communication	0.01 (0.01)	0.10	0.00	1.00
(9) Hotel Business and Gastronomy	0.07 (0.13)	0.25	0.00	1.00
(10) Financial and Insurance Services	0.02 (0.02)	0.14	0.00	1.00
(11) Business and Professional Services	0.10 (0.14)	0.30	0.00	1.00
(12) Education	0.03 (0.03)	0.18	0.00	1.00
(13) Human Health and Social Work	0.12 (0.12)	0.33	0.00	1.00
(14) Other Services	0.02 (0.04)	0.15	0.00	1.00
(15) Public Administration	0.08 (0.04)	0.27	0.00	1.00
$n = 4{,}009$				

Note: Weighted values in parantheses.
Source: IAB Establishment Panel, waves 2011 and 2013 (merged); own calculations (only companies with low-skilled workers).

TABLE A2
Determinants of Training Participation of Low-Skilled Workers in Different Sectors

Manufacturing *Model*	*Continuing training low-skilled workers yes/no* *M7a (2013)*	*Training participation rate low-skilled workers* *M7b (2013)*
Institutional company context (2011)		
Cluster A: Low Embeddedness ($n = 1{,}702$)	Ref.	Ref.
Cluster B: Employee-Oriented HRM ($n = 933$)	1.59(*) (0.38)	0.03 (0.02)
Cluster C: Regulation ($n = 1{,}374$)	1.82** (0.39)	0.05* (0.02)
Control variables	Same control variables as in Table 1	Same control variables as in Table 1
Pseudo R^2/adjusted R^2	0.21	0.30
n (establishments)	1,097	1,097

Hotel Business and Gastronomy *Model*	*Continuing training low-skilled workers yes/no* *M8a (2013)*	*Training participation rate low-skilled workers* *M8b (2013)*
Institutional company context (2011)		
Cluster A: Low Embeddedness ($n = 1{,}702$)	Ref.	Ref.
Cluster B: Employee-Oriented HRM ($n = 933$)	0.93 (0.47)	0.01 (0.03)
Cluster C: Regulation ($n = 1{,}374$)	3.02(*) (2.03)	0.04 (0.05)
Control variables	Same control variables as in Table 1	Same control variables as in Table 1
Pseudo R^2/adjusted R^2	0.35	0.23
n (establishments)	278	278

Human Health and Social Work *Model*	*Continuing training low-skilled workers yes/no* *M9a (2013)*	*Training participation rate low-skilled workers* *M9b (2013)*
Institutional company context (2011)		
Cluster A: Low Embeddedness ($n = 1{,}702$)	Ref.	Ref.
Cluster B: Employee-Oriented HRM ($n = 933$)	1.25 (0.43)	–0.04 (0.04)
Cluster C: Regulation ($n = 1{,}374$)	1.20 (0.37)	–0.02 (0.04)
Control variables	Same control variables as in Table 1	Same control variables as in Table 1
Pseudo R^2/adjusted R^2	0.28	0.32
n (establishments)	500	500

(*) significant on 10% level; * significant on 5% level; ** significant on 1% level.
Note: Models M7a, M8a, M9a: Logistic regression; AME; standard errors in parentheses. Models M7b, M8b, M9b: OLS regression; standardized coefficients, standard errors in parentheses.
Source: IAB Establishment Panel, waves 2011 and 2013; own calculations (only companies with low-skilled workers).