Liberalization only at the margins? Analyzing the growth of contingent work in German core manufacturing sectors

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Abstract
Drawing on workers’ surveys and workplace interviews, this article investigates the growth of contingent work in German manufacturing sectors since the eighties. Findings partly confirm a “dualization” scenario as workers without industry-specific vocational training are more likely to be on a temporary contract than skilled workers, and the gap has widened over time. However, also skilled workers have become increasingly vulnerable to casualization due to job routine and the erosion of industrial relations. Findings confirm the crucial role of institutions in supporting the linkage between specific skills and employment stability, and suggest that the liberalization of the employment relationship has been advancing also in the core of the German economy.

1 Introduction

The German model has moved away from the coordinated model described in the Varieties of Capitalism literature (VoC), where workers benefitted of collective provision of skills, encompassing collective agreements and employment security (Hall and Soskice 2001). Recent research claims that coordinating institutions are in place only in core manufacturing sectors while the service periphery is characterized by low-skill and volatile jobs. The coordinated employment relations in core manufacturing sectors is mainly attributed to employers, supported by works councils, who want to retain their “specific”-skilled workers required by high-quality export production (Hassel 2014; Thelen 2012; Palier and Thelen 2010).

However, there is mounting evidence that employers in core manufacturing sectors have increasingly used subcontractors (Doellgast and Greer 2007; Jürgens 2004) and contingent work since the nineties (Marx 2011; Brenke and Eichhorst 2008; Eichhorst 2015). In 2014, for instance, more than 280,000 agency workers were employed in metal and electronic
occupations (Bundesagentur für Arbeit 2015). In contrast with the literature emphasizing employers’ commitment to job security, scholars have explained this phenomenon through the erosion of institutional constraints - such as collective bargaining erosion and labor market deregulation-, which allow work casualization even among core manufacturing workers (Benassi and Dorigatti 2014; Streeck 2009/2010).

These contradicting accounts about the liberalization of the employment relationship in German core manufacturing sectors feed into, first, a broader debate about the role of employers’ interests (Hall and Soskice 2001; Estevez-Abe et al. 2001) vs. industrial relations institutions for determining workers’ outcomes (Gallie 2007; Lloyd et al. 2013). Second, they reflect the opposing stances within the debate about the changing trajectory of coordinated economies, which expect respectively dualization between core manufacturing and services (Hassel 2014; Thelen 2014) and progressive liberalization (Baccaro and Howell 2011; Streeck 2009) until „the fringe will eat the core“ (Streeck 2010: 512).

This paper aims to contribute to both debates by investigating the relationship between skills, industrial relations institutions and contingent work in German core manufacturing sectors. The originality of the analysis consists in combining the quantitative analysis of the workers’ surveys of the Federal Institute of Vocational Training and Education (1986-2012) with interview findings in German automotive and machine tool building plants. The use of mixed methods allows to better investigate the extent of liberalization of the employment relationship and the underlying mechanisms. Indeed, the dualization literature focuses only on the national level either through qualitative studies (Hassel 2014; Thelen 2014) or cross-national quantitative studies showing that nonstandard work has spread differently across sectors, occupations and skill levels (Gebel and Giesecke 2011; Häusermann and Schwander
In contrast, the literature looking at the role of industrial relations mainly relies on qualitative case studies at workplace, which do not give a clear overall picture of changes over time in German core manufacturing sectors (Doellgast and Greer 2007; Holst et al. 2010).

The findings question the concept of “skill specificity” and its analytical usefulness for explaining workers’ outcomes, and suggest that the relationship between skills and employment stability is not as tightly coupled as described in the VoC and dualization literature. Industrial relations are fundamental for limiting the casualization of work as skills can only partly protect workers, especially because the work organization is routine. By bringing new evidence on the casualization of the employment relationship in the disputed “core” of the German national economy, this paper also contributes to the debate about the trajectory of the German model, suggesting that liberalization has the potential to progress beyond the service periphery.

The paper is organized as follows. The next section illustrates the evolution of “beneficial constraints” in German core manufacturing sectors. The third section derives the propositions regarding the influence of skills and work organization on the probability of being on a temporary contract. The fourth section presents the methodology. The fifth and sixth sections contain respectively the quantitative and the qualitative analysis. The seventh section discusses the findings and concludes.

2 The evolution of “beneficial constraints” in the German model
In his work on the traditional German model, Streeck (1991; 1992) claimed that the role of institutions as “beneficial constraints” is crucial for the tight linkage between industry-
specific skills, complex work organization and stable employment. He defined as “beneficial constraints” the collective bargaining agreements, the strict employment protection legislation and the presence of strong labor representation at workplace which characterized the German labor market from the seventies until the beginning of the nineties. As these institutions limited the ability of management to dismiss their workers or hire on precarious contracts, employers invested in training broad workforce segments in order to increase productivity and to compress labor costs. The dual vocational training provided workers with a “broad-based knowledge of materials, tools, machinery and products” (Roth 1997: 117). Furthermore, the Facharbeiter supported by strong works councils, pushed for the implementation of a “flexible, non-Taylorist organization of work” (Streeck 1991: 25), which required both workers’ “redundant” capacities and employment stability because it was characterized by teamwork and task rotation, information exchange within and across teams, and autonomy (Kern and Schumann 1984; Streeck 1991).

Streeck’s narrative illustrated the origins of the virtuous circle between industry-specific skills, complex work organization and negotiated and legislated employment protection. However, institutional constraints have eroded during the last twenty years. The use of temporary work has been progressively deregulated in Germany since the nineties, and culminated with the Hartz reforms. These lifted any limitation to the maximum duration and any obligation to motivate agency contracts, and allowed derogations by collective agreement to the principle of equal pay (Benassi and Dorigatti 2014).

At the same time, in the last 15 years collective bargaining coverage has been declining also in the manufacturing sector (Addison et al. 2014) and works councils, despite their formal bargaining rights over recruiting, have decreasing influence on employers’ staffing strategies.
Union density has been declining after the re-unification membership boom and, while the automotive and steel industries are still well organized, union density greatly varies in the chemical and electronics industries (Bispinck and Dribusch 2011). Furthermore, the threat of outsourcing to cheap production sites has put works councils under increasing pressure of reducing labor costs (Rehder 2003), and they could not prevent the subcontracting of components and industrial services and the use of contingent work (Blöcker and Jürgens 2008; Doellgast and Greer 2007).

Reflecting the ambiguity of the expression “beneficial constraints”, the implications of declining legal and negotiated employment protection for stable employment in German core manufacturing sectors are controversial, as discussed in the following section.

3 The role of skills, industrial relations and work organization for the expansion of contingent work

This section formulates different propositions regarding how the effect of workers’ industry-specific skills and work organization on the incidence of contingent work has changed under the erosion of industrial relations described above. They are formulated at the individual level because the available dataset is a workers’ survey (see the methodology section).

The VoC literature emphasizes the beneficial role of institutions as opportunities, as they contribute to employers’ competitive advantage (Hall and Soskice 2001). Employment protection represents an incentive for workers to invest in skills which are transferable only to a limited extent because they have the guaranty of job security. In turn, employers are interested in retaining those workers who acquired skills specific to the company through vocational training because they want a return on their investment (Estevez-Abe et al. 2001;
Hall and Soskice 2001). As a stable skilled workforce is necessary to the German high-quality manufacturing production, employers are expected to maintain the “complementarity” between stable employment and workforce skills despite institutional erosion (Hancké et al. 2007: 11f.; Hassel 2014; Soskice 1999). Indeed, Palier and Thelen (2010) and Hassel (2014) suggest that this mechanism prevented the liberalization of the employment relationship to spread in the core. These considerations lead to the following proposition:

**Proposition 1:** In German core manufacturing sectors only workers without industry-specific skills have become more likely to be on a temporary contract over time.

In contrast with the VoC literature, industrial relations research points out the constraining role of institutions, and expects employers to make use of cheap and flexible workforce when negotiated and legal employment protection declines (Benassi and Dorigatti 2014; Doellgast and Greer 2007; Streeck 2009). Existing research indeed questioned the extent to which skill “specificity” is necessarily coupled with stable employment in German core manufacturing sectors. A group of scholars highlighted the cross-company mobility of workers (Marsden 1999; Streeck 2011; Thelen and Busemeyer 2012); among others, Marsden (1999) contended that German skills are occupational rather than firm-specific because they are, at least partly, provided off the job. Furthermore, Thelen and Busemeyer (2012) pointed out that the authorized certification system makes German occupational skills portable across employers.

This literature suggests that skill “specificity” does not force employers to hire permanently their trainees for the fear of losing unique skills. Therefore, employers could potentially benefit of declining labor market regulation by employing skilled workers on temporary contracts. In his study on the decline of British occupational labor markets Marsden (2010)
illustrates this phenomenon, which applies also to traditional sectors and occupations even though he focused on creative professions (p.1). He argues that high levels of competition among workers with comparable qualifications lead to “extended entry tournaments”: While hoping to be hired in a permanent position, workers accept low standards even for long periods, and some of them might even remain outside companies’internal labour markets. Employers benefit of this system not only through lower salaries but also because they have a long screening period for the candidates who have acquired experience also in other companies (Marsden 2010).

Research on the German labor market also found that employers do not always need to hire their trainees permanently. Negotiated and legal employment protection forces employers to offer a permanent position to most of their trainees (Scherer 2005) even though there are no skilled positions available. Therefore, young Facharbeiter are used to work in unskilled positions at the beginning of their career, while waiting for a skilled position to become vacant (Bosch 2014: 10). Furthermore, Franz and Zimmermann (1999) found that companies train above their needs and do not always hire their trainees, increasing labor market competition. These considerations suggest that employers might offer young workers temporary contracts once the employment protection is relaxed. These are convenient as temporary workers have no rights to company-level agreements, and can be easily dismissed if there is no demand for Facharbeiter or if their performance is not satisfactory. The risk for employers to lose their investment in training is at a minimum as young Facharbeiter might see temporary work as a necessary – and possibly short - transition period to a permanent position. These observations lead to an alternative proposition to Proposition 1:
Proposition 2: In German core manufacturing sectors, workers with industry-specific skills have become more likely to be on a temporary contract over time.

The industrial sociology literature on the German manufacturing sector suggests a further reason why skill specificity is not tightly coupled with stable employment. The comparative political economy literature often collapses the dimension of task complexity with the skill variable, see e.g. research on the linkage between skills and welfare/labor market outcomes by Emmenegger (2009) and Gebel and Gieshecke (2011). Therefore, as most of the workforce has a Facharbeiter qualification, the VoC literature assumes that core manufacturing sectors are characterized by non-Tayloristic work organization (see Jürgens 2004 for a similar point). The stable employment relationship is therefore dominant not only because employers want a return on their skill investment, but also because task autonomy and complexity require mutual trust and commitment (Marsden 1996).

However, industrial sociology research in German manufacturing reports that the work organization has moved away from the ideal type of “the end of the division of labor”\(^{\text{iii}}\), if that model ever existed at all. Indeed, the integrated work organization never spread across all production segments. It characterized only certain occupational profiles while work in direct production, especially on the assembly line, has mainly been organized along Fordist lines (Roth 1997; Schumann \textit{et al.} 1994). Furthermore, in his study of the German automotive industry Springer (1999) found that work became overall more standardised and routinised during the nineties. Similarly, Marsden (2015) shows in his recent analysis of the survey of the European Working Conditions Observatory that the work organization in many German firms” does not include teamwork, task autonomy and rotation (p.15).
These findings suggest that routine work organization might have an independent effect from formal qualifications on the incidence of temporary work. Temporary workers have been found more likely to occupy routine and repetitive job positions (Egger and Grossmann 2005; Letourneux 1998; Osterman 1987) as workers are more interchangeable if jobs are characterized by repetitive and low-discretion tasks (Lepak et al. 2003: 688) which can be easily learned and do not require great work experience (Brown and Lauder 2006). As employers can easily hire temporary workers in routine positions, industrial relations institutions are fundamental for preventing the casualization of those jobs. Indeed, cross-national research comparing low-end service jobs characterized by unskilled simple tasks identified institutions as crucial for regulating the use of temporary contracts (Gautié and Schmitt 2010; Shire et al. 2009). Given the weakening of industrial relations institutions in German core manufacturing sectors, the following propositions can be derived:

Proposition 3a: In German core manufacturing sectors, workers in highly routine job positions have become more likely to be on a temporary contract over time.

Existing research found that lean management techniques made work processes increasingly standardized and routine also in qualified positions, putting an end to the “model of the poised and autonomous Facharbeiter” (Lacher 2006: 88; see also Buch 2006). Therefore, under the erosion of institutionalized employment protection it can be expected that work routinization has progressively increased the likelihood of Facharbeiter to be on a temporary contract. The following propositions can be derived:
Proposition 3b: In German core manufacturing sectors the effect of routine on the likelihood to be on a temporary contract has increased over time also among workers with industry-specific skills.

The next section illustrates the methods used for testing the above propositions against empirical evidence.

4 Methodology

This paper uses mixed methods, combining logistic regression analysis with qualitative research based on interview findings.

Quantitative analysis

The quantitative analysis is based on the Workers’ Survey from the German Federal Institute for Vocational Training and Education (BiBB). Five waves are taken into consideration: 1985/86, 1991/92, 1998/99, 2005/06 and 2011/12. Even though the surveys do not follow either the same individuals or the same companies over time, the sample is representative for the population in every survey year.

The population is restricted to the blue-collar workforce in core manufacturing sectors: chemicals, steel, forging, machine tool building, automotive, white goods, electronics, fine mechanics, ship and airplane building. The analysis considers only the active German population (at least 10 working hours a week) aged between 15 and 64, and trainees have been excluded.
A pooled logistic regression analysis was run with robust standard errors using the STATA software. The dependent variable, which is the probability of being on a temporary contract, is dichotomous (1=temporary contract; 0=permanent contract). The logistic regression analysis tests a simple model and three interactive logistic models, which aim at testing the conditional effect respectively of skill specificity and job routine on the probability of being on a temporary contract given increasing institutional erosion over time. Model II and III contain only one interaction term each for testing respectively the propositions 1, 2 and 3a. Model IV is the full interacted model, which includes all the interaction terms and the constituent terms, as prescribed by Brambor et al. (2006). This model furthers the analysis of the interaction effect between skills, work organization and time on the probability of being on a temporary contract (proposition 3b).

The simple model and the interactive models look as follows:

(I) \[ \text{Temporary contract} = \beta_0 + \sum \beta_1 \text{CONTROLS}_{it} + \beta_2 \text{routine}_{it} + \beta_3 \text{skill specificity}_{it} + \beta_4 \text{time}_{it} + \epsilon_{it} \]

(II) \[ \text{Temporary contract} = \beta_0 + \sum \beta_1 \text{CONTROLS}_{it} + \beta_2 \text{routine}_{it} + \beta_3 \text{skill specificity}_{it} + \beta_4 \text{time}_{it} + \beta_5 \text{time}_{it} \times \text{skill specificity}_{it} + \epsilon_{it} \]

(III) \[ \text{Temporary contract} = \beta_0 + \sum \beta_1 \text{CONTROLS}_{it} + \beta_2 \text{routine}_{it} + \beta_3 \text{skill specificity}_{it} + \beta_4 \text{time}_{it} + \beta_5 \text{time}_{it} \times \text{routine}_{it} + \epsilon_{it} \]
(IV) \( \text{Temporary contract} = \beta_0 + \sum \beta_i \text{CONTROLS}_{it} + \beta_2 \text{routine}_{it} + \beta_3 \text{skill specificity}_{it} + \beta_4 \text{time}_{it} + \beta_5 \text{time}_{it} \times \text{routine}_{it} + \beta_6 \text{time}_{it} \times \text{skill specificity}_{it} + \beta_7 \text{skill specificity}_{it} \times \text{routine}_{it} + \beta_8 \text{time}_{it} \times \text{skill specificity}_{it} \times \text{routine}_{it} + \epsilon_{it} \)

I operationalize my independent variables as follows. The dummy variable \textit{Skill specificity} refers to the workers who have their last vocational training degree in an occupation which traditionally belongs to core manufacturing sectors (ISCO 1985/86: from 1210 to 1541 and from 1910 to 3237/ ISCO88: from 10 to 15 and from 19 to 32).

The variable \textit{Job routine} was operationalized through the survey question “How often do you repeat the same work procedure?”. It takes value 1 if the answer is “always/often” and 0 for “rarely/never” (see Appendix). This measurement reflects the findings of Lacher (2006) and Springer (1999) as well as the interview findings in this paper (see section 6), which emphasize the routine of work tasks in German core manufacturing sectors. The choice of this variable can be argued to have some limitations: First, the survey unfortunately does not include the question of whether the workspace is dictated by a machine, which has also often been used as a measure of job routine in manufacturing (Bailey 1993; Baron and Bielby 1982); however, the measurement in this paper is rightly broader as workers in industrial services (such as logistics) are likely to have a repetitive job even though the pace is not dictated by a machine such as for assembly line workers. Second, the measure of job routine is a perception of workers, which could be argued to be endogenous to the type of contract. This linkage would however be counter-intuitive because temporary workers should find their work less repetitive as they can be reasonably assumed to work in the same job positions for shorter time periods. Following this reasoning, old workers should be more likely to find
their job routinized; indeed, across all waves 54% workers between 15 and 25 declared that their work was highly routinized against 60% among workers between 55 and 64.

The erosion of negotiated and legal employment protection was operationalized through the time variable because the dataset does not provide information on the presence and strength of industrial relations at workplace. However, the effect of the weakening of industrial relations and of the relaxation of labor market regulation on workers’ outcomes in Germany was widely studied in the literature (Alber and Heisig 2011 Brenke and Eichhorst 2008; Eichhorst and Marx 2011; Promberger 2006). Furthermore, the case study findings illustrate in detail how national labor market reforms and workplace concession bargaining influence the use of contingent work, tracing the causal mechanism linking the weakening legislative and negotiated employment protection to the probability of being on a temporary contract.

*Time* was coded as a continuous variable taking the values from 1 to 5 in order to facilitate the interpretation of the interaction terms and to save degrees of freedom, as the use of dummy waves would have required the inclusion of eight interaction terms between job routine and skill specificity and four wave dummies (excluding the wave dummy used as reference category). In order to make sure that the effect of time follows a positive trend, the logistic regression was first run with the wave dummies instead of the continuous variable *Time*, confirming that the direction of the time effect does not change the direction between the waves, and showing a positive trend since 1992 (see Appendix).

All models include control variables such as age, gender, local unemployment rate, the location of the workplace in Eastern Germany, the firm size and sectoral dummies (see Appendix for the operationalization). Table 1 presents a correlation table with descriptive
statistics for all variables included in the model. It confirms that there is no multicollinearity as the correlation values are below 0.8 (Franke 2010).

TABLE 1

The descriptive analysis includes the variables overqualification and overskilling, which are not in the regression analysis because they are not directly relevant to the propositions and not comparable across years. The dummy variable Overqualification is present only in the first three waves and takes value 1 if workers feel that their job could be done by someone with lower qualifications and value 0 if their job could be done by someone with different or lower qualifications; the dummy variable Overskilling is present only in the last three waves and takes value 1 if workers feel that their skills are appropriate for their job and value 0 if the skills are not.

Qualitative analysis

The case study findings complement the quantitative analysis because the case studies help to map out the effect of labor market reforms and collective bargaining on the relationship between skills, work organization and contingent work. The case study findings rely on semi-structured qualitative interviews conducted either by phone or in person between January 2011 and April 2013. The interview partners were human resource managers, union representatives and works councillors in five automotive plants and two machine tool building plants. The interview partners also included officials of the German metal union IG Metall who had extensively worked on the issue of contingent work either in the headquarters or in local union offices. The interviews have been conducted in German and the quotes in the paper have been translated by the author.
5 From words to numbers: An analysis of skills, job routine and temporary work

Descriptive statistics. Table 2 shows that temporary work has been increasing overall from almost 5% in 1986 to 11% in 2012 within the whole workforce. Temporary work among workers with industry-specific skills has also been increasing over time, and particularly among young workers - it increased by 24% between 1986 and 2012.

TABLE 2

Table 3 shows that temporary workers are more likely to work in routine job positions across all waves, and that their rates increased more rapidly in routine job positions.

TABLE 3

However, the employment of temporary workers in routine job positions does not necessarily reflect their skills. Table 4 shows that temporary workers are more likely to feel overqualified and overskilled than permanent workers. Furthermore, it reports that both perceptions of overqualification and overskilling levels among permanent workers have been increasing. This trend suggests that the high skill levels reported above might not be necessary and some tasks could be performed by workers with lower qualifications and experience.

TABLE 4
Regression results. Table 5 shows the results of the logistic regression analysis. The logistic regressions with robust standard errors have been run using the STATA commands *logit* and *robust*. The log odds are reported.

The results of Model I are the following: The variables “firm size” and “Eastern Germany” are positively correlated with the probability of being on a temporary contract. Male and old workers are less likely to be on a temporary contract than female and young workers. The time variable shows that workers have become more likely to be on a temporary contract over time. Having an industry-specific vocational training degree is negatively correlated with the probability of being on a temporary contract while job routine is positively correlated.

Models II and III contain respectively the interaction terms “time*skill specificity” and “time*job routine”. Neither the interaction terms nor the constituent terms – which are non-significant - can be interpreted from the table because the analytical interest lies “in the marginal effect of X on Y for substantively meaningful values of the conditioning variable Z” (Ai and Norton 2003; Brambor et al. 2006). Following the command routine recommended by Brambor et al. (2006) and Williams (2012), the command *margins* is used to estimate the marginal effects of skill specificity and routine given each value of the time variable. The plot graphs are reported, which give a clear representation of the interaction term, but the tables with the values of the marginal effects, the standard errors and the confidence intervals are reported in the Appendix (tables A1-A5). Figure 1 reports the plot for the marginal effect of skill specificity on the probability of being on a temporary contract over time (1=1985…5=2012). The line shows that the marginal effect is significant since 1992 and negative, which means that the negative effect of skill specificity on the probability of being on a temporary contract has been increasing over time. Figure 2 represents the interaction
term through predicted probabilities: The probability of being on a temporary contract has become higher for workers without industry-specific skills than for workers with those skills. However, it also shows that both categories of workers have become more likely to be on a temporary contract.

Figure 1 and 2

Figure 3 reports the plot for the marginal effect of job routine on the probability of being on a temporary contract, showing that the positive marginal effect of job routine has been increasing over time. Figure 4 reports that the probability of being on a temporary contract for workers in routine job positions has increased over time and to a greater extent than the probability for workers who are not employed in routine job positions.

Figure 3 and 4

Model IV includes two additional interaction terms: the term job routine*specific skills allows the analysis of the marginal effect of job routine on the probability of being on a temporary contract conditional on workers’ skills. The term job routine*specific skills*time is used for the analysis of how the marginal effect of job routine on the probability of being on a temporary contract changes over time for workers with industry-specific skills. Figure 5 shows that the marginal effect of job routine on the probability of being on a temporary contract is lower for workers with a dual vocational training degree than for workers without those skills. Figure 6 shows that the marginal effect of job routine on the probability of being on a temporary contract has increased over time among workers with industry-specific skills even though it is not significant for the last wave.
Further logistic regressions have been run as robustness checks (see Appendix). First, the regression has been run with standard errors clustered by sector and by Federal State as the observations might be correlated e.g. through common technology, or labor market regulation at regional level. The significance level and the coefficients of skill specificity and job routine do not change. Second, the regression has been run without Eastern Germany, as the exclusion of Eastern Germany from the sample was recommended by BiBB researchers (Rohrbach-Schmidt and Tiemann 2013) but the model does not show any relevant change.

Third, the logistic regression has been run only on companies with more than 500 employees, which have almost 100% coverage of works councils and a sectoral bargaining coverage going from 93.9% in 1995 to 76.9% in 2010 (Benassi 2014: 69). In this way, the analysis checks whether the results have been biased by missing the control variable “industrial relations”, which has been found significant in studies on temporary work at company level (Davis-Blake and Uzzi 1993; Lepak and Snell 1999). It could be argued that the probability of being on a temporary contract has not increased in establishments covered by sectoral agreements and with strong workplace representation; or that skills and job routine do not have independent effects in companies with strong internal labor markets rules because works councils ensure a correspondence between workers’ qualifications and complex job positions. However, both the simple model and the interactive model show that both coefficients for “job routine” and “time” are positive and significant. The analysis of the interactions terms “job routine*time” and “job routine*time*specific skills” gives similar results as the analysis conducted on the whole sample. In contrast, the variable “specific skills” is non-significant.
even when the logistic regression is run without the variable “job routine”. The interaction term “specific skills*time” might be non-significant because big companies have the ability to recruit workers with industry-specific skills even on temporary contracts. These results strengthen rather than undermine the argument of the paper that skill “specificity” does not necessarily lead to stable employment.

This section has shown that, first, workers with a dual vocational training degree are less likely to be on temporary contracts compared to workers without those qualifications – and the gap has widened over time. Furthermore, workers in routine jobs are more likely to be on a temporary contract, and the likelihood has increased over time. These findings confirm a “dualization” scenario. However, also workers with a dual vocational training degree have become more likely to be on a temporary contracts over time, showing that skill “specificity” does not fully protect workers from casualization. In addition, the analysis has shown that the marginal effect of job routine on the probability of being on a temporary contract has been increasing over time even among specific skilled workers. These findings suggest that there is scope to casualize work also among workers with industry-specific skills, also thanks to the routine nature of job.

The qualitative analysis in the following section investigates the reasons for the diffusion of temporary contracts also among workers with industry-specific skills and for the continuing association between specific skills and permanent contract, which cannot be fully explained by the complex work organization.

**Case study findings**
Is stable employment necessary?

The interviews both with employers and employees suggested that the literature has overestimated the relevance of skills for manufacturing production in Germany. They report that there are broad segments in core manufacturing sectors where temporary and permanent workers do not need either firm-specific or sector-specific skills and the training time is very short, especially in direct production. A works councillor in an automotive plant in Bavaria, who worked in the body shop of a big automotive plant for thirty years, suggested that for complex tasks such as welding “even” one day is necessary but two or three hours of training are sufficient for working on the assembly line. Indeed, works councillors and union representatives pointed out that standardization and job routine reduce the necessity for complex knowledge, facilitating the employment of temporary workers in certain production areas. The following quotes respectively from a works councillor and an IG Metall official in Berlin-Brandenburg illustrate this:

“Nowadays the work processes are so standardized that anyone with a vocational training degree as electrician could repair the circuits either for Ford or for BMW, it is the same. Today everyone is available and disposable at any time” (Works councillor A 19.04.2012)

“We used to have group work […] but now we have again the assembly line, because every job position was fragmented to such an extent that you only perform one work task, you only need one activity. [However,] you will have production areas where complex knowledge through experience [Erfahrungswissen] is present and needs to be present and you will not be able to employ agency workers” (IG Metall official 06.07.2011)

An IG Metall official in Lower Saxony even suggested that the expansion of temporary work is an unofficial way to “break out” from the traditional vocational training system as employers cannot do it officially for political reasons, at least at the automotive plant he was closely working with. Instead of training (and then retaining) Facharbeiter who do a “very
silly job at the assembly line” and “some pro forma teamwork”, they would hire semi-skilled workers on temporary contracts. Employers have, indeed, reduced their commitment to dual vocational training in metal professions, which has become more selective and does not provide anymore “abundant skills” to the workforce (IG Metall 2013; Thelen and Busemeyer 2012).

Both employers and works councillors reported that the temporary workforce is often as skilled as the standard workforce; especially in the case of agency workers, employers can just “order” workers with the required qualifications. Similarly, a works councillor in an automotive plant suggested that Facharbeiter qualifications are no longer exclusive to the “core” workforce and that temporary workers with appropriate qualifications can be employed everywhere:

“it [the phenomenon of temporary work] has become a real labor market, where workers have all the qualifications you need. It might be that it [the use of temporary workers] does not work in some job positions. Still, today it is not a problem after a certain training time to employ them [temporary workers], it’s no big deal. Regarding toolmaking, the toolmakers used to say: ‘We are not replaceable’. But now you can get it [the work done] everywhere in the world. You can do it everywhere” (Works councillor A 19.04.2012)

Furthermore, temporary workers are sometimes employed in the same positions for months and even for years. In those cases, they accept working on temporary contracts but the wish to be hired permanently “is always in their minds” – as one works councillor in Wolfsburg said. A similar mechanism applies to the case of trainees, who have been increasingly offered temporary contracts at the end of their dual vocational training in the last few years. In this way, employers enjoy the benefits of a young and qualified workforce but can decide to
dismiss them when there is a crisis and when there are no vacancies in skilled positions (DGB Bundesvorstand 2009; IG Metall 23.07.2012; IG Metall Jugend 13.08.2010).

The role of (weakening) constraints for employers’ strategies

Works councils and union representatives identified the main cause for the growth of contingent work in labor market deregulation – in particular, the liberalization of the use of fixed-term and agency work which started in the mid-nineties and culminated with the Hartz reforms. A works councillor in an automotive plant in Eastern Germany claimed that “thanks to the legislation employers can take decisions on their own on certain issues [temporary work]”, despite the presence of works councils in the workplace. Another works councillor reported that:

“Until the last ten years the Facharbeiter thought that they were irreplaceable. Since the labor market has been deregulated, this has dramatically changed” (Works councillor B 19.04.2012)

The casualization of work took place also in companies with strong industrial relations because works councils were under pressure of cost-cutting and the threat of outsourcing, and therefore implicitly accepted the cost reduction through temporary work. However, works councils resisted the employment of temporary workers among Facharbeiter and tried to enforce internal labor market rules. A works councillor in Bavaria reported that the management wanted to start employing temporary workers to a large extent in direct and indirect production units:

“The management wants to do it [use temp work] also in the production segments of Facharbeiter. But we say both as works council and as union that these are key competences – if we cannot handle that our equipment
works, it does not matter whether we have agency workers in the direct production or not \([\text{in the sense: cost reduction will not save us from failing as a company}]\) ” (Works councillor 17.07.2012)

The role of works councils was pointed out also in the interviews with the management. For instance, a human resource manager of an automotive company explained that temporary workers could be employed as skilled workers but they are employed in unskilled positions because permanent skilled employees, who are employed in unskilled positions, are advanced in the career ladder as soon as there is a vacancy for a Facharbeiter. Indeed, at the BMW plant in Leipzig, where the works council’s power was limited by the high unemployment rate and the threat of locating the plant in Eastern Europe, one third of the employees are on agency contracts at all skill levels (Holst et al. 2010).

Works councillors and union representatives stressed the role of labor for enforcing internal labor market rules also in regard to the permanent hiring of trainees. An IG Metall union official who worked very closely with a large automotive company, illustrated this mechanism:

“If a company such as X could break out of the vocational training system, they would probably do it and would hire only semi-skilled…But obviously there is an obligation for X to train people, to hire Facharbeiter and to pay their qualification in an appropriate way. IG Metall provides that X does not break out” (IG Metall official 24.09.2012)

However, as also mentioned above, this does not happen in all companies, and trainees are more and more frequently hired on a temporary contract first. As a result, IG Metall conducted a campaign between 2009 and 2012 aimed at (re)regulating the hiring of trainees.
In May 2012 IG Metall signed a collective agreement which guarantees at least a one-year contract to all trainees (IG Metall 23.05.2012).

The interview findings show that there is a broad scope for employers to casualize work. They show, first, that many job positions, even though they might be occupied by skilled workers, do not require specific qualifications. Second, temporary workers can be easily employed because of the routine nature of work; furthermore, they can even be employed in more complex skilled positions because they are qualified and willing to stay. Third, labor market deregulation and the increasing pressure of works councils for concession bargaining have weakened the institutional constraints supporting the traditional German production model. As a consequence, contingent work spread and young skilled workers are increasingly affected by casualization even though workers with a dual vocational training degree are still given priority to their career ladder.

**Discussion**

Section 3 formulated different propositions regarding the extent to and the mechanisms through which contingent work spread in German core manufacturing sectors. This section discusses to what extent the findings confirm those propositions and draws broader implications for existing literature.

The first two propositions regard the relationship between skills and stable employment when the negotiated and legal employment protection declines. While the first proposition expected workers with a dual vocational training degree to be protected from the casualization of work (Hassel 2014; Thelen 2012), the second proposition argued that those workers will become more likely to be on a temporary contract if the legislative and negotiated employment protections erode (Marsden 2010). The empirical analysis found evidence compatible with
both propositions. On the one hand, workers without a dual vocational training degree are more likely to be on a temporary contract than Facharbeiter, and the divide between the two groups increases over time. This finding supports a “dualization” scenario. On the other hand, workers with industry-specific skills have also become more likely to be on a temporary contract since the eighties. The descriptive statistics and case study findings have shown that temporary contracts are increasingly used among young workers in the transition between vocational training and permanent employment. Furthermore, the case study findings suggest that the “specificity” of skills has been overestimated in the VoC literature, as agency workers can easily be employed in different positions with a short on-the-job training, especially those with a dual vocational training degree.

The qualitative case studies explain these mixed findings through the resilience and the erosion of industrial relations institutions. They suggest that employers’ interest does not fully explain why sector-relevant vocational training still protects, at least partly, Facharbeiter from work casualization. The union IG Metall actively intervened to negotiate provisions regarding the permanent hiring of young Facharbeiter, and works councils in the case studies still managed to ensure the permanent hiring of trainees. At the same time, case study findings have shown that labor market reforms weakening the employment protection for temporary workers, even though often defined as “reforms at the margins” (Boeri and Garibaldi 2007), have consequences – even though milder- for the core skilled workforce too.

The quantitative analysis provided evidence in support of proposition 3a and 3b, which expected that workers in routine job positions would become more likely to be on a temporary contract over time, and that this effect would be present also among skilled workers. However, it is important to note that the concentration of temporary workers in
routine positions is not only due to the lower qualifications levels of temporary workers, as suggested by the higher overqualification and overskilling rates among temporary workers than permanent workers. Indeed, it is also the outcome of companies’ internal labor market rules, which give permanent workers priority for advancement if there are vacancies in *Facharbeiter* segments.

Based on these findings, the theoretical contribution of this paper is twofold. First, the paper contributes to the existing debate about the role of employers’ interest in skills (Hall and Soskice 2001; Hassel 2014; Thelen 2012) vs. industrial relations (Lloyd et al. 2013; Streeck 1991) for determining workers’ outcomes and, in particular, the diffusion patterns of contingent work. By providing new evidence based on longitudinal micro-level data and on case-study findings in the German manufacturing sector, the paper conciliates different expectations derived from existing literature. The paper confirms the expectations of the VoC and dualization literature that skilled workers are less likely to be on a temporary contract than workers without dual vocational training, and that the gap has widened over time. However, the findings suggest that employers’ interests in a stable workforce have been overestimated, corroborating existing criticism of the VoC concept of “specific skills” and its usefulness in the analysis of labor market outcomes (Streeck, 2011; Tählín, 2008).

The paper finds indeed that the role of industrial relations, rather than employers’ interests, is crucial for ensuring stable employment, strengthening existing arguments about the centrality of industrial relations in determining workers’ outcomes (Doellgast 2010; Lloyd et al. 2013). The paper shows that both the resilience and the erosion of industrial relations can explain the pattern of diffusion of contingent work: While works councils still manage to advance skilled workers along the career ladder, labor market deregulation has eroded their ability to control
external hiring and the transition of trainees to permanent employment. In relation to Streeck’s argument on “beneficial constraints” (1991; 1992), the findings suggest that, even in the traditional German model, the constraining role of institutions was probably more important than the complexity of work organization to ensure stable employment, as large segments of (even skilled) job positions were routine even then, although to a lower extent. This observation is compatible with past research criticizing the image of the work organization in German core manufacturing sectors as homogenously complex and generally requiring skilled work (Jürgens 2004; Roth 1997).

Second, this paper contributes with new micro-level evidence to the broad macro-level debate about the changing trajectory of coordinated economies. While some scholars have argued that coordinated economies such as Germany have maintained a stable coordinated manufacturing core (Hassel 2014; Thelen 2012), other scholars contend instead that they have been going down a common path towards liberalization, which will not spare the core in the long run even though it proceeds at a slower pace (Baccaro and Benassi 2014; Baccaro and Howell 2011; Streeck 2009). By using individual level data, the present paper has shown that liberalization has exposed all workers to the casualization of work even though its effect depends on their skills and on the extent to which they are (still) protected by industrial relations institutions.

The paper hints at different directions for further research. High overqualification and overskilling levels and the interview findings suggest that formal qualifications do not reflect job requirements, raising the question to what extent employers have an interest in providing training. Furthermore, some interview findings suggested that employers could casualize employment to a greater extent than the literature expected without incurring in any costs.
Therefore, more research would be needed to assess the extent to which employers need a skilled and stable workforce, and whether they face costs when they depart from the traditional production model, as suggested by arguments on “beneficial constraints”. Finally, job routine is likely to be only one of the factors favoring the expansion of contingent work. The standardization of technologies across the industry and changes in the required knowledge - such as narrowing from broad to more specific competencies - are likely to have taken place and to have contributed to further facilitating the employment of temporary workers.
References


Table 1: Correlation table

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<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temporary contract</td>
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<td>0.00</td>
<td>1.00</td>
</tr>
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<td>Unemployment</td>
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<td>3.70</td>
<td>20.40</td>
</tr>
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<td>0.73</td>
<td>0.45</td>
<td>0.00</td>
<td>-0.07</td>
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<td>Job routine</td>
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<td>0.50</td>
<td>0.00</td>
<td>1.00</td>
</tr>
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<td>1.15</td>
<td>1.00</td>
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<tr>
<td>Male respondent</td>
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<td>3.00</td>
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</tr>
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<td>1.22</td>
<td>1.00</td>
<td>5.00</td>
</tr>
<tr>
<td>Chemical</td>
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<td>0.00</td>
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<tr>
<td>Glass</td>
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<td>0.23</td>
<td>0.00</td>
<td>1.00</td>
</tr>
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<td>1.00</td>
</tr>
<tr>
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<td>1.00</td>
</tr>
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<td>0.44</td>
<td>0.00</td>
<td>1.00</td>
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<tr>
<td>Ship and airplane building</td>
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<td>0.00</td>
<td>1.00</td>
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<tr>
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<td>1.00</td>
</tr>
<tr>
<td>Fine mechanics</td>
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<td>0.18</td>
<td>0.00</td>
<td>1.00</td>
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Table 2: The diffusion of temporary work (1986 - 2012)

<table>
<thead>
<tr>
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<th></th>
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<td>Within the total workforce (%)</td>
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<td></td>
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<tr>
<td></td>
<td>4.45</td>
<td>6.26</td>
<td>8.26</td>
<td>8.25</td>
<td>10.37</td>
<td>+6.23</td>
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<tr>
<td>Among specific skilled workers (%)</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.56</td>
<td>4.74</td>
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<td>8.06</td>
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<td>+2.49</td>
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<td>Among specific-skilled workers by age (%)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-25</td>
<td>9.32</td>
<td>6.83</td>
<td>18.29</td>
<td>37.7</td>
<td>33.33</td>
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<td>45-65</td>
<td>6.63</td>
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<td>9.55</td>
<td>15.32</td>
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<td>+7.81</td>
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n. observations=10,420

Table 3: Routine job positions by type of contract (1986-2012)

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<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
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<td></td>
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</tr>
<tr>
<td></td>
<td>3.54</td>
<td>4.9</td>
<td>5.39</td>
<td>5.85</td>
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<tr>
<td>Temp (%)</td>
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<td></td>
<td>5.39</td>
<td>7.8</td>
<td>10.34</td>
<td>9.99</td>
<td>13.03</td>
<td>+7.64</td>
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</table>

n. observations=10,233

Table 4: Overqualification and overskilling by type of contract (1986-2012)

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<tr>
<th>Year</th>
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<th>temporary workers</th>
</tr>
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<td>Overqualification (%)</td>
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<td></td>
</tr>
<tr>
<td>1986</td>
<td>24.9</td>
<td>35.2</td>
</tr>
<tr>
<td>1992</td>
<td>26</td>
<td>32</td>
</tr>
<tr>
<td>1998</td>
<td>43</td>
<td>62.5</td>
</tr>
<tr>
<td>Overskilling (%)</td>
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<td></td>
</tr>
<tr>
<td>1998</td>
<td>5.9</td>
<td>13.3</td>
</tr>
<tr>
<td>2006</td>
<td>15</td>
<td>23</td>
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<tr>
<td>2012</td>
<td>11.2</td>
<td>21.3</td>
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\[a\text{ n. observations=8,492 }\]
\[b\text{ n. observations=6,031}\]
Table 5: Logistic regression table

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<tr>
<th>VARIABLES</th>
<th>(I) No interaction</th>
<th>(II) Interaction specific skills*time</th>
<th>(III) Interaction routine*time</th>
<th>(IV) Fully interacted model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific skills</td>
<td>-0.509**</td>
<td>-0.0985</td>
<td>-0.509**</td>
<td>-0.383</td>
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<tr>
<td></td>
<td>(0.0990)</td>
<td>(0.228)</td>
<td>(0.0990)</td>
<td>(0.405)</td>
</tr>
<tr>
<td>Job routine</td>
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<td>0.411***</td>
<td>0.243</td>
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<td></td>
<td>(0.0890)</td>
<td>(0.0891)</td>
<td>(0.215)</td>
<td>(0.418)</td>
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<td>Time trend</td>
<td>0.268***</td>
<td>0.361***</td>
<td>0.231***</td>
<td>0.235*</td>
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<tr>
<td></td>
<td>(0.0377)</td>
<td>(0.0585)</td>
<td>(0.0573)</td>
<td>(0.121)</td>
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<tr>
<td>Specific skills*time</td>
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<tr>
<td></td>
<td>(0.0712)</td>
<td></td>
<td></td>
<td>(0.135)</td>
</tr>
<tr>
<td>Job routine*time</td>
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<td></td>
<td>0.0612</td>
<td>0.166</td>
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<tr>
<td></td>
<td></td>
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<td>(0.0703)</td>
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<tr>
<td>Job routine*specific skills</td>
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<td></td>
<td>0.379</td>
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<tr>
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<td>(0.488)</td>
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<tr>
<td>Job routine<em>specific skills</em>time</td>
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<td>-0.187</td>
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<tr>
<td></td>
<td></td>
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<td>(0.160)</td>
</tr>
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<td>Local unemployment rate</td>
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<td>(0.0152)</td>
<td>(0.0152)</td>
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<tr>
<td>Male respondent</td>
<td>-0.215*</td>
<td>-0.206</td>
<td>-0.213*</td>
<td>-0.198</td>
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<tr>
<td></td>
<td>(0.125)</td>
<td>(0.125)</td>
<td>(0.125)</td>
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<tr>
<td>Reference category: age 15-25</td>
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<tr>
<td>26-35</td>
<td>-1.037***</td>
<td>-1.037***</td>
<td>-1.037***</td>
<td>-1.037***</td>
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<tr>
<td></td>
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<td>(0.119)</td>
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<tr>
<td>36-45</td>
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<td>-1.504***</td>
<td>-1.506***</td>
<td>-1.505***</td>
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<td>(0.130)</td>
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<tr>
<td>46-55</td>
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<td>-1.568***</td>
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<tr>
<td>56-65</td>
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<td>-1.624***</td>
<td>-1.630***</td>
<td>-1.627***</td>
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<td>(0.186)</td>
<td>(0.186)</td>
<td>(0.187)</td>
</tr>
<tr>
<td>Reference category for firm size:&lt;10 employees</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10≤ employees ≤500</td>
<td>0.406***</td>
<td>0.409***</td>
<td>0.407***</td>
<td>0.409***</td>
</tr>
<tr>
<td></td>
<td>(0.115)</td>
<td>(0.116)</td>
<td>(0.115)</td>
<td>(0.116)</td>
</tr>
<tr>
<td>&gt;500 employees</td>
<td>0.153</td>
<td>0.165</td>
<td>0.156</td>
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</tr>
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<td>(0.119)</td>
<td>(0.118)</td>
<td>(0.119)</td>
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<td>0.823***</td>
<td>0.833***</td>
<td>0.826***</td>
<td>0.836***</td>
</tr>
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<td>(0.131)</td>
<td>(0.132)</td>
<td>(0.131)</td>
<td>(0.132)</td>
</tr>
<tr>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
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<td>-2.694***</td>
<td>-2.820***</td>
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<tr>
<td></td>
<td>(0.322)</td>
<td>(0.361)</td>
<td>(0.341)</td>
<td>(0.468)</td>
</tr>
</tbody>
</table>

| Wald chi2                        | 426.42              | 431.93                                 | 429.06                       | 437.93                      |
| Prob>chi2                        | 0.000               | 0.000                                  | 0.000                        | 0.000                       |
| Pseudo R2                        | 0.0838              | 0.0846                                 | 0.0839                       | 0.0851                      |
| Observations                     | 9,922               | 9,922                                  | 9,922                        | 9,922                       |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Figure 1: Average Marginal Effects of skill specificity with 95% confidence intervals

Figure 2: Predicted probabilities of skill specificity with 95% confidence interval

upper curve: specific skills =0
lower curve: specific skills =1

Figure 3: Average Marginal Effects of job routine with 95% confidence intervals

Figure 4: Predicted probabilities of job routine with 95% confidence interval

upper curve: job routine=1
lower curve: job routine=0
Figure 5: Average Marginal Effects of job routine at different values of skill specificity with 95% confidence intervals

Figure 6: Average Marginal Effects of job routine among specific skilled workers at different time points with 95% confidence intervals
The term “Facharbeiter” is the German word indicating workers who completed a dual vocational training degree and is typically used for professional figures in the manufacturing sector.

There is a lively debate on the extent to which temporary contracts represent a bridge to permanent employment, see e.g. Gash (2008); Jahn and Rosholm (2010); Reichelt (2015).


iv The works councillor used to be a tool maker and he often referred to this profession as the paramount example of the core Facharbeiter during the interview.