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**Career mobility of temporary workers within and across establishments:
A demand-side perspective**

Abstract

This paper addresses the career mobility of temporary workers from a demand-side perspective, focussing on promotions to managerial positions and wage growth. We use a large-scale revised administrative data source on employees entailing the entire population of promotions, which are considered a rare event. We provide evidence that compared to employees with a permanent contract, temporary workers are more likely to be promoted to a managerial position. Looking closer, this advantage is more pronounced across than within establishments, which we interpret as evidence for the greater importance of the flexibility over the screening function of temporary employment. However, because the qualification-related impact of fixed-term contracts on promotion is U-shaped, i.e. lowest for the medium-skilled IVET workers with long training periods in the establishments, we conclude that the screening function is still relevant in the German labour market. Moreover, the wage growth premium we find to be associated with fixed-term contracts can be explained by the fact that temporary workers benefit more from promotions to managerial positions. *[166 words]*

JEL codes: J31, J41, J62, M12, M51

Keywords: Fixed-term contracts, career mobility, promotion, wage growth, screening.

Introduction

Fixed-term contracts (FTCs) are a major tool to recruit new staff and to meet discontinuous labour demand in Germany. As they gained in importance over the last years, a large body of research focused on the employment and career effects of temporary contracts and the question whether FTCs are rather a “bridge” into permanent employment or a “trap” into a precarious employment career with alternating employment and unemployment spells. Contrary to previous studies that focus on the unemployment risk, on employment stability or transitions to permanent employment, we contribute to this literature by addressing the career mobility of temporary workers in terms of promotions to managerial positions and wage growth from the employer’s perspective.

By international standards, German employment protection legislation (EPL) is described as rather strict (Venn 2009). In this context, employers make use of FTCs to avoid potential dismissal costs as part of the German EPL. Being permanently employed is in most of the cases the better alternative for employees, because permanent workers can decide themselves when to leave a company. Therefore, we mainly take up a demand side perspective as it is primarily the employer who determines the type of contract (Grau 2010). The employer’s motives for applying FTCs are decisive for the career of the affected employees. The literature mainly distinguishes two functions of fixed-term contracts: adapting the volume of labour (flexibility function) and testing new workers (screening function) (Schmelzer et al. 2015). In the latter case, FTCs can speed up and improve the quality of allocation processes between employees and employers (Boockmann und Hagen 2008).

In Germany, fixed-term contracts are not equally distributed across qualifications and industries. First of all, the degree of uncertainty regarding an applicant’s suitability depends on his *qualification level* (Schmelzer et al. 2015). The combination of school-based and firm-based training as well as the strictly regulated setting of standards in the dual system of vocational training facilitates both the training-to-work transition and mobility between different firms for medium-skilled workers. The education for high-skilled workers, however, mainly takes place at universities and not at a workplace and is – with some exemptions¹ - not equally standardised (Schmelzer et al 2015). As a consequence, university graduates often lack work experience and employers lack information about the applicants’ occupational skills. This applies - even to a larger scale - to low-skilled workers (Bonoli/Hinrichs 2012). Without any vocational qualification or training certificate, employers’ information deficits can best be reduced by means of practical on-the-job experience. While careers of low- and high-skilled employees often start with a temporary contract, this risk is comparatively small in the case of medium-skilled workers with vocational qualifications (Gundert 2007; McGinnity et al. 2005; Schmelzer et al. 2015).

¹ Exceptions are medicine, law or teaching (cf. Stumpf et al. 2012).

Second, the employer's motives and therefore the frequency of use differ across *industries and professions* (Hohendanner/Gerner 2010; Hohendanner et al. 2015). While FTCs dominate recruitment in the science sector as well as social and public services, fixed-term contracts play a minor role in manufacturing. In this sector, the dual vocational training system is well established and flexibility needs are often met by temporary agency work, contracting out or internal measures like flexible working time arrangements or organizational flexibility. To sum up, the career prospects of individuals with FTCs mainly depend on the employers' motives, the qualification and the sectoral or occupational field. Across these differences, the likelihood of being employed at all in the first three years is lower for labour market entrants with FTCs than for permanent employees. Conversely, the risk of being un-employed is initially higher for individuals with FTCs (Gebel 2010; McGinnity et al. 2005). At later points in time, significant differences can no longer be identified with regard to employment likelihood and key indicators of employment quality, such as wages or occupational status (Gebel 2010; McGinnity et al. 2005).

However, there are no studies addressing the career mobility of temporary workers from a demand-side perspective. To close this research gap, we first investigate whether temporary contracts have an impact on the likelihood of promotion. We differentiate between promotions within the current establishment and external promotions that are achieved by changing employers to test the relative importance of the two functions of fixed-term contracts from the employer's viewpoint, namely flexibility vs. screening. Moreover, by addressing the potential heterogeneity of the impact of temporary employment on career mobility by qualification levels, we shed light on the absolute importance of the screening function for employers. Finally, we estimate the impact of fixed-term contracts on relative wage growth, hence providing an alternative measure of career mobility.

FTCs and promotions to managerial positions from a theoretical perspective

Employers take recourse to FTCs in order to compensate for information deficits (Akerlof 1970; Spence 1973) and labour market rigidities (Nunziata and Staffolani 2007). On the one hand, FTCs are used to test new employees (screening), especially if certificates give only a rough indication of actual productivity (Stiglitz 1975). On the other hand, FTCs make it easier to adapt the size of the workforce (flexibility). The specific function of the FTCs has an impact on the workers' employment prospects in the respective firm (Schmelzer et al. 2015): If a FTC is used to meet flexibility needs, the employer is not primarily interested in a long-term employment relationship. The affected employee is more likely to switch employer or become unemployed afterwards. Conversely, FTCs as a screening instrument entail better prospects of subsequent permanent employment with the same employer. In this case, the transition probability mainly depends on the screened productivity of the employee. The argument can also be applied to the recruitment of managers. The promotion to management positions requires a thorough knowledge of the capabilities and suitability of the applicant. As in the standard recruitment case, fixed-term contracts might be used as a screening device. However, potential candidates with good prospects for management positions usually have professional and managerial experience and would not accept a temporary contract. Therefore, employers might rather offer permanent contracts for managerial positions. Consequently, employees with fixed-term contracts might rather find a managerial position by change of employer. This argument is supported by recent empirical findings after which job-to job mobility rewards job movers with wage increases (Schmelzer/Veira Ramos 2015). However, following statistical discrimination theory, FTCs can also be regarded as a bad "signal". In this case, promotions into managerial positions by employer change would be less likely for applicants with FTCs by contrast with applicants with permanent contracts. As FTCs are unequally distributed across qualifications and sectors, FTCs might only have a negative signalling function where they are not the standard hiring contract. To sum up, the effects of FTCs on the promotion chances to managerial positions are an empirically open question.

Data and estimation approach

For the estimations in this paper, we use the revised German employment register, a large-scale administrative dataset on employees liable to social security contributions. Due to its revision in 2012, it is now possible to identify fixed-term contracts. Additionally, the new occupational classification KldB 2010 allows directly observing career mobility in terms of promotions to managerial positions. The first three digits of the classification define the 144 occupational groups. The fourth digit further allows identifying managerial positions irrespective of this occupational group. All managerial positions require budgetary responsibility and supervisory competence.

The data at hand entail certain beneficial features. For instance, as the occupational classification codes are reported by the employer, we do not face the risk of over-reporting of promotions which has been shown to be present in surveys (Pergamit & Veum, 1999). Furthermore, promotions to managerial positions depict a rare event. As the data entail the entire population of employees, this allows us to draw a sample that entails all promotions during a certain time period. Moreover, because we can follow mobile workers to their new employers, we are able to distinguish between promotions within and across establishments, which is important to test for the relative importance of both the flexibility and the screening function of temporary contracts.

Furthermore, the data allow us to control for heterogeneities of both the initial and the destination establishment, which is important as we want to compare individuals from the same establishments, both at the initial and the end point of our observation period. Controlling for the heterogeneity of the initial establishment rules out sorting of certain individuals into establishments offering above-average promotion prospects. Additionally, establishments may cast their own quality signal that may affect the promotion decision of a potential destination establishment. Controlling for the heterogeneity of the destination establishment is crucial as this employer is the one ultimately deciding who is promoted and who is not². Furthermore, establishments may have a preference towards or internal policies requiring one of the promotion channels over the other. Presumably, in most of these cases there should be a preference towards internal over external promotion, as is the case in companies with pronounced internal labour markets. Such preferences can correlate with establishment-level characteristics (Bayo-Moriones and Ortín-Ángel, 2006; Agrawal, Knoeber, and Tsoulouhas, 2006).

Therefore, we want to estimate the following equation:

$$y_{ij}^* = x_i * \beta_j + \varphi_{k(i)j} + \theta_{l(i)j} + \varepsilon_{ij} \quad (1)$$

² If a worker stays with an employer during our observation period, initial and destination establishment are the same by construction.

with the latent outcome variable y_{ij}^* , the individual-specific covariates x_i , and the establishment-level components of both the initial establishment $\varphi_{k(i)j}$ and the destination establishment $\theta_{l(i)j}$.

Aside from including establishment-level information we consider relevant for promotion processes, like the number of employees, the share of managers and promotions, the churning rate, the industry and region, we follow the approach of Mundlak (1978) and Chamberlain (1984) and model the establishment-specific effects as linear functions of the establishment-level means of all individual variables x_i :

$$\varphi_{k(i)j} = \bar{x}_k * \rho_j + \mu_{kj} \quad (2)$$

and

$$\theta_{l(i)j} = \bar{x}_l * \gamma_j + \mu_{lj}, \quad (3)$$

thus resulting in

$$y_{ij}^* = x_i * \beta_j + \bar{x}_k * \rho_j + \bar{x}_l * \gamma_j + \mu_{kj} + \mu_{lj} + \varepsilon_{ij}, \quad (4)$$

which then can be estimated consistently using pooled maximum likelihood applied to a multinomial logit specification (Wooldridge, 2010):

$$\Pr(y_i = j | x_i, \bar{x}_k, \bar{x}_l) = \frac{\exp(x_i \beta_j + \bar{x}_k * \rho_j + \bar{x}_l * \gamma_j)}{1 + \left[\sum_{h=1}^J \exp(x_i \beta_h + \bar{x}_k * \rho_h + \bar{x}_l * \gamma_h) \right]} \quad (5)$$

Because the estimation of (5) requires a base outcome for which the coefficients are fixed to zero, we choose those who are still employed in a non-managerial position and who stay with their employer. Analysing the relative importance of the two functions of fixed-term contracts requires us to compare the likelihoods of promotion within and across establishments. Therefore, since marginal effects are not comparable in size across outcome categories when its constants differ, we compute and report relative risk ratios (henceforth: RRR) for each covariate. Comparison of RRR across outcome categories can be achieved by means of a chi-square test, because any unsystematic overrepresentation of an outcome category is supposed to be purged.

In contrast to the aforementioned establishment-specific covariates which we include for both the initial and the destination establishment, all individual-specific characteristics are either measured at the initial point in time (15 April 2012) or relate to the period ending with this date, hence they are determined prior to the promotion. Aside from a dummy variable indicating temporary employment,

we also include dummy variables for sex and foreign citizenship, age (45 categories)³, tenure and tenure squared, actual daily working hours, highest attained educational degree (6 categories), job mobility and regional mobility within the last 10 years, gross daily wage (log) observed at 15 April 2012, as well as occupational main groups (37 categories). We additionally account for the employment biography by including the days of employment (log) and days of employment squared (log), the share of time in employment that has been spent in part-time work, the days of unemployment benefit receipt, as well as the first observed gross daily wage (since 1975). For a summary of the aforementioned variables, confer Table A1 in the appendix.

Our final regression sample entails the entire population (101.148) of full-time workers who have been promoted to a managerial position during April 2012 and December 2013, plus a random draw of 95.473 non-promoted full-time workers who have been employed at the same establishments as the promoted individuals. Within our sample, about 42 per cent of workers change establishments during the observation period. Moreover, 71 per cent of the promoted workers achieve this promotion externally, i.e. by changing employers. This share of external promotions may be overstated, as promotions require a reclassification of the reported occupational classification code, which is more likely with establishment changes, because the employer has to set up a new code instead of having the opportunity to simply retain the previous code. However, as long as the choice whether to reclassify a code is not systematically correlated with our variables of interest, this should not pose a problem for our analyses as the estimates stay unbiased.

We analyse the effects of temporary employment on career mobility considering two different operationalisations. First, we address the impact of fixed-term contracts on promotions to managerial positions applying a multinomial logistic model. The four possible outcomes are: (1) staying non-promoted and at the same establishment, (2) non-promoted but employed at a different establishment, (3) promoted within the establishment, and (4) promoted by changing employers. Second, we estimate the impact of temporary employment on wage growth using linear regression (OLS). Unfortunately, wages in the German employment register are top-coded, as employers only have to report the true wages up to the contribution limit of the social security. Wages that exceed this threshold are reported as the current threshold's value (Bender et. al 2000). Therefore, we apply the approach by Gartner (2005) for this data source to impute the top-coded wages using a Tobit model.

³ By including dummies for each available age, we lift the restriction of linearity and allow for any non-linear effect shape. In doing so, we argue that not only control for age itself, but for cohort effects as well.

Results

Flexibility versus screening

Before turning to the more detailed outcome structure, we first look at promotions to managerial positions as a binary outcome. The corresponding coefficients from Table 1 reveal that temporary workers are more likely to be promoted to a managerial position than those employees with a permanent contract. However, for the pursuit of our research question addressing the relative importance of the flexibility and the screening function of FTCs, it is crucial to differentiate between external and internal promotions. In case establishments provide fixed-term contracts mainly in order to guarantee flexibility and avoid dismissal costs, we should observe career mobility to be more likely when changing establishments. However, if focus is on reducing uncertainty about a worker's true productivity and suitability for the job, prospects for promotion should be higher within establishments. First, the relative risk ratios (henceforth: RRR) presented in Table 2 confirm the finding from Table 1 that, compared to employees with a permanent contract, temporary workers are more likely to be promoted when changing employers. The prospects for an internal promotion are even the same with both types of contracts. However, as judging from the chi-square test on the difference of the coefficients between internal and external promotions, we observe the outside option of career mobility to be more likely, our results may still be compatible with the seemingly contradicting results of Booth et al. (2002) who report that temporary workers are less satisfied with the promotion prospects associated with their current job.

We interpret this differential between internal and external promotion for promotions as evidence for the greater importance of the flexibility over the screening function of fixed-term contracts. Establishments seem to use temporary employment to be able to adapt the volume of labour while avoiding dismissal costs rather than as an extended probationary period to remove uncertainties regarding their workers' suitability for the job. Furthermore, these results imply that temporary employment can be seen as both a dead-end and a stepping stone: Although employers tend to hire for fixed-term jobs without providing considerable promotion prospects (*dead-end*), compared to employees with a permanent contract their temporary employees have a relative advantage of promotion to managerial positions when changing to another establishment (*stepping stone*).

To test whether the screening function is valid at all in the German labour market, we scrutinize the potential effect heterogeneity with respect to qualification levels. First, the RRR in Table 3 reveal that the promotion prospects to a managerial position clearly depend on the educational level, with those holding a degree of higher tertiary education having the best prospects and those with no vocational education having the poorest prospects. Moreover, judging from the interaction effects, fixed-term

contracts are associated with higher promotion prospects for both low-skilled and high-skilled employees, compared to vocationally trained workers. This pattern holds true for both internal and external promotions. This points to the validity of the screening function of fixed-term employment, as the demand for screening to reveal true individual productivity is lowest for the medium-skilled workers because the employer can learn about their value to the establishment during the up to 3 years training period. We argue that the issue concerning the interpretation of interactions terms in non-linear estimation, as discussed by Ai and Norton (2003), does not apply in our case, as we are interpreting RRR, which represent multiplicative effects (Buis 2010). However, as a robustness check, we exploit wage growth as alternative operationalisation of career mobility, hence regressing (linear) wage growth instead of (non-linear) promotions using OLS. Our results presented in Table 4 confirm the findings based on promotions to managerial positions from Table 3.

Robustness checks

In our paper, we interpret the difference between the RRR on internal and external promotion as indicator for the relative importance of the flexibility and the screening function of FTCs. In order to test the validity of this interpretation, we re-estimate our regression on promotions to managerial positions on two distinct subsamples of establishments which are distinguished by their reported importance of screening as the main motive for the usage of FTCs. We use the IAB Establishment Panel, an annual representative survey on establishments in Germany that employ at least one employee liable to social security contributions.⁴ In its wave from 2009, establishments which stated to use FTCs have been asked for their main motive to do so. Based on the industry-level share of establishments reporting screening as their dominant motive, we divide our sample into two groups depending on this share and re-run the estimation. The corresponding RRR presented in Table 5 show the expected pattern. On the one hand, in industries with a below-average importance of screening (Panel B), the likelihood for promotion is higher for external promotions, which is the pattern we also observe when estimating on our entire sample. Moreover, the difference between the two outcomes is even larger, thus the flexibility function appears to be even more important when restricting the analysis sample to this group of observations. On the other hand, when restricting the estimation to industries with an above-average reported importance of screening over flexibility, the pattern is reversed, with larger RRR for internal than for external promotion. Although this difference turns out insignificant, this still clearly shows that our interpretation of the differences between the internal and the external promotion prospects as the relative importance between the two main functions of FTCs appears to be valid.

⁴ For more details on the IAB Establishment Panel, confer Fischer et al., 2009, and Ellguth et al., 2014.

So far, we let the outcomes vary by whether workers get promoted and by whether they change establishments. However, we restrict the set of possible outcomes to individuals staying (full-time) employed. We choose this approach because we only observe establishment-level information for those who remain employed. However, as a robustness check, we re-estimate our analysis using an extended specification that additionally entails those leaving (full-time) employment as a fifth outcome category. The corresponding RRR in Table 6 show that our conclusions do not change substantially. Although the positive coefficient for internal promotion now turns out significant, this is supposedly caused by the excluded control for the heterogeneity of the destination establishment. We can also see that temporary workers tend to leave (full-time) employment more often than those with a permanent contract. Furthermore, this alternative estimation serves as a robustness check pointing to the validity of the independence of irrelevant alternatives (IIA) assumption which is important in a multinomial logit framework.

Our paper is based on promotions to managerial positions as a new measure of career mobility. However, promotions to a permanent contract may be taken as an alternative operationalisation. Although it is obvious that the likelihood to have a permanent contract in $t+1$ should be higher for those who already have a permanent contract in t , we may still interpret the difference between internal and external career mobility. First, the RRR presented in Table 7 confirm that temporary workers are far less likely to receive a permanent contract than those who already have one. However, more importantly, we also observe the same pattern as in our main analysis on promotions: Career mobility is higher when changing employers, hence pointing to the greater relative importance of the flexibility over the screening function of fixed-term contracts.

Finally, as our main analysis sample is restricted to promoting establishments to improve identification within establishments, this can still be regarded as a special case scenario. Therefore, we re-estimate our regression on promotion with an alternative control group sample, entailing a random sample of non-promoted full-time workers from the entirety of establishments in Germany. The results as displayed in Table 8, however, do not change substantially.

Wage growth

Addressing the relative wage growth in Panels A and B of Table 9, we find a positive coefficient for temporary contracts, as well as for promotions and establishment changes. At first sight, the positive coefficient for temporary employment when controlling for promotions and employer changes seems to imply that temporary workers experience a higher wage growth in general. When applying a threefold interaction between these three covariates, however, the picture sharpens considerably (Panel C of Table 9). The now both statistically and economically insignificant coefficient on tempo-

rary employment suggests that those temporary workers that are neither promoted to a managerial position nor change employers experience the same relative wage growth as comparable employees with a permanent contract. However, temporary workers seem to benefit more from a promotion to a managerial position, no matter whether it is achieved within the current establishment or by changing employers. Thus, this finding can explain the positive wage growth effect from temporary contracts when controlling for promotions and establishment changes without allowing for interactions. Moreover, it supports our suggestion of a *stepping stone* effect, as temporary workers are not only more likely to get promoted by changing establishments, but to benefit from this external promotion even more than those with a permanent contract.

Conclusions

In this paper, we address the career mobility of temporary workers from a demand-side perspective. We investigate the two functions of temporary employment – the flexibility and the screening function – and look at promotions to managerial positions to analyse their relative and absolute relevance in the German labour market. Additionally, we scrutinize the relative wage growth of fixed-term contracts and its dependence from internal and external promotions. Our study contributes to the “bridge or trap” literature on FTCs by focusing on hierarchical promotions and wage growth using a unique dataset that combines administrative information on promotions and survey information. The data and method applied allow us to control for observed and unobserved heterogeneity of both the initial and the destination establishment as we want to compare individuals from the same establishments, both at the initial and the end point of our observation period. However, although we control for observed individual characteristics, we cannot completely rule out unobserved individual heterogeneity that may influence selection into FTCs.

First, we show that temporary workers are more likely to be promoted to a managerial position than those employees with a permanent contract. Differentiating the outcome by applying a multinomial response framework, we can further show that this difference in promotion prospects is greater across than within establishments. We take this as evidence for the greater importance of flexibility over screening in the German labour market. Moreover, the career mobility associated with fixed-term contracts is highest for both low-skilled and high-skilled workers, compared to those medium-skilled employees holding a vocational degree, who already have been screened for their suitability for the job during their training period of up to three years. Therefore, even though the flexibility function is even more important, the screening function also seems to be relevant in the German labour market.

Concerning wages, we can show that temporary workers experience a wage growth premium for promotion, no matter whether it is achieved within or across establishments. This explains the general positive effect of fixed-term contracts on wage growth that we find even when controlling for promotions and establishment changes without applying interaction terms. Therefore, those temporary workers who do experience neither an internal nor an external promotion to a managerial position have the same wage growth than those otherwise comparable employees that have a permanent contract. This implies that considering both promotions to managerial positions and wage growth as operationalisations of career mobility, temporary workers appear to be better off in certain scenarios, but never worse.

Our results shed a different light on FTCs as we find positive effects on external promotions and no differences between employees with permanent and temporary contracts as regards internal promotions. Employer's motives to use FTCs are not only relevant for transitions to permanent employment (Schmelzer et al. 2015) but also for promotions. Internal promotions are more likely in sectors where the screening motive dominates. In sectors where the flexibility motive prevails, employees rather find a higher position elsewhere. But the employers' motive is not necessarily harmful for career prospects. Even if FTCs are used for flexibility reasons they might have a positive effect on the subsequent career of temporarily employed individuals. Our results indicate that employees gain work experience in a temporary job that helps to get promoted in a subsequent job with a new employer.

Our study is the first to analyse the relationship between FTCs and promotions to managerial positions. However, the analysis is limited to one country. In international comparison, Germany is a special case with relatively low shares of temporary employment, relatively strict employment protection legislation and the specific dual educational system. Insofar, a comparative study on the effects of FTCs on promotions taking into account different institutional contexts could shed more light on the relationship between fixed-term contracts and promotions.

Table 1: Impact of fixed-term contracts on promotion

	Promotion to managerial position	
	Coeff.	SE
Temporary contract	.017***	(.004)
Pseudo R ²	0.513	
Observations	196,621	

Notes: Reported coefficients are marginal effects. Standard errors are presented in parentheses. Asterisks indicate significance levels: *** p<0.01, ** p<0.05, * p<0.1. Apart from the variables presented within the table, the underlying estimation specification also contains individual controls including sex, age (45 categories), actual working hours, an indicator for foreign citizenship, highest attained educational degree (6 categories), tenure, tenure squared, work experience, work experience squared, time spent in part-time work, time spent in unemployment benefit receipt, gross daily wage at the beginning of the analysis period, first observed gross daily wage, past regional mobility, past job mobility, and the initial occupational field (37 dummies). We additionally control for establishment heterogeneity by adding establishment-level means of each covariate, plus some basic establishment variables, including log firm size, share of managers, share of promotions, industry (18 categories), region (16 *Bundesländer*), and churning rate; all establishment variables are included for both the initial and the destination establishment.

Table 2: Relative probabilities of promotions for temporary employees within and across establishments, multinomial logit

	Non-promoted mover	Internal promotion	External promotion	Difference
<i>Reference category: non-promoted stayer</i>	(1)	(2)	(3)	(3)-(2)
Temp. contract	1.603*** (0.080)	1.045 (0.055)	1.359*** (0.059)	-0.314***
Pseudo R ²	0.392			
Observations	196,621			

Notes: Reported coefficients are relative risk ratios of (1) staying non-promoted but changing the establishment or transitions in (2) a managerial position within establishments and (3) a managerial position across establishments. The reference category comprises individuals who are not promoted and who stay with the current employer. Standard errors are presented in parentheses. Asterisks indicate significance levels: *** p<0.01, ** p<0.05, * p<0.1. Omitted coefficients as in Table 1.

Table 3: Heterogeneity of FTC effect promotion by level of qualification, multinomial logit

	Non-promoted mover	Internal promotion	External promotion
<i>Reference category: non-promoted stayer</i>	(1)	(2)	(3)
Temporary contract (TC)	1.607*** (0.090)	0.935 (0.058)	1.243*** (0.063)
No tertiary degree	1.256*** (0.095)	0.357*** (0.023)	0.433*** (0.028)
<i>Ref: Vocational degree</i>	-	-	-
Degree of higher education	1.199*** (0.064)	1.503*** (0.056)	1.617*** (0.056)
TC * No tertiary degree	1.053 (0.107)	1.432** (0.214)	1.301** (0.152)
TC * Degree of higher educ.	0.924 (0.077)	1.164* (0.099)	1.270*** (0.083)
Pseudo R ²	0.391		
Observations	196,621		

Notes: Reported coefficients are relative risk ratios of (1) staying non-promoted but changing the establishment or transitions in (2) a managerial position within establishments and (3) a managerial position across establishments. The reference category comprises individuals who are not promoted and who stay with the current employer. Standard errors are presented in parentheses. Asterisks indicate significance levels: *** p<0.01, ** p<0.05, * p<0.1. Omitted coefficients as in Table 1.

Table 4: Heterogeneity of FTC effect on wage growth by level of qualification, OLS

Dependent variable: Wage growth	
Temporary contract (TC)	0.002 (0.004)
No tertiary degree	-0.045*** (0.004)
<i>Ref: Vocational degree</i>	-
Degree of higher education	0.009 (0.007)
TC * No tertiary degree	0.016** (0.007)
TC * Degree of higher educ.	0.055*** (0.005)
Pseudo R ²	0.113
Observations	178,106

Notes: Reported coefficients are relative risk ratios of (1) staying non-promoted but changing the establishment or transitions in (2) a managerial position within establishments and (3) a managerial position across establishments. The reference category comprises individuals who are not promoted and who stay with the current employer. Standard errors are presented in parentheses. Asterisks indicate significance levels: *** p<0.01, ** p<0.05, * p<0.1. Omitted coefficients as in Table 1.

Table 5: Relative probabilities of promotions for temporary workers within and across establishments, by reported level of focus on screening within industries, multinomial logit

Reference category: non-promoted stayer	Panel A Only industries with a relatively high share of establishments reporting screening to be the dominant motive				Panel B Only industries with a rather low share of establishments reporting screening to be the dominant motive			
	Non-promoted mover	Internal promotion	External promotion	Difference	Non-promoted mover	Internal promotion	External promotion	Difference
	(1)	(2)	(3)	(3)-(2)	(4)	(5)	(6)	(6)-(5)
Temporary contract	1.340*** (0.142)	1.337*** (0.121)	1.243*** (0.101)	0.094	1.654*** (0.100)	0.931 (0.061)	1.422*** (0.076)	-0.491***
Pseudo R ²	0.436				0.413			
Observations	69,180				127,441			

Notes: Reported coefficients are relative risk ratios of (1) staying non-promoted but changing the establishment or transitions in (2) a managerial position within establishments and (3) a managerial position across establishments. The reference category comprises individuals who are not promoted and who stay with the current employer. To distinguish between industries with a high and low share, we draw on results from IAB Establishment Panel 2009, where the establishments that stated to use fixed-term contracts have been asked for their main motive for the usage. Standard errors are presented in parentheses. Asterisks indicate significance levels: *** p<0.01, ** p<0.05, * p<0.1. Omitted coefficients as in Table 1.

Table 6: Relative probabilities of promotions for temporary workers within and across establishments, leaving full-time employment as additional outcome; multinomial logit

Reference category: non-promoted	Specification within initial establishments				Difference (3)-(2)
	Non-promoted mover (1)	Internal promotion (2)	External promotion (3)	Leaving full-time employment (4)	
Temporary contract	1.895 (0.081)	1.129*** (0.052)	1.651*** (0.059)	2.103*** (0.109)	-0.522***
Pseudo R ²	0.311				
Observations	207,641				

Notes: Reported coefficients are relative risk ratios of (1) staying non-promoted but changing the establishment or transitions in (2) a managerial position within establishments and (3) a managerial position across establishments. The reference category comprises individuals who are not promoted and who stay with the current employer. Standard errors are presented in parentheses. Asterisks indicate significance levels: *** p<0.01, ** p<0.05, * p<0.1. Omitted coefficients as in Table 1, except that in Panel B, establishment-level control variables are only included for the initial establishments, as there is no destination information for those leaving full-time employment.

Table 7: Relative probabilities of permanent employment for temporary employees within and across establishments, multinomial logit

Reference category: non-promoted stayer	Non-promoted mover (1)	Internal promotion (2)	External promotion (3)	Difference (3)-(2)
Temp. contract	0.013*** (0.001)	0.002*** (0.0002)	0.009*** (0.001)	-0.007***
Pseudo R ²	0.336			
Observations	196,621			

Notes: Reported coefficients are relative risk ratios of (1) staying non-promoted but changing the establishment or transitions in (2) a managerial position within establishments and (3) a managerial position across establishments. The reference category comprises individuals who are not promoted and who stay with the current employer. Standard errors are presented in parentheses. Asterisks indicate significance levels: *** p<0.01, ** p<0.05, * p<0.1. Omitted coefficients as in Table 1.

Table 8: Relative probabilities of promotions for temporary employees within and across establishments, using an alternative sample; multinomial logit

Reference category: non-promoted stayer	Non-promoted mover (1)	Internal promotion (2)	External promotion (3)	Difference (3)-(2)
Temp. contract	1.595*** (0.068)	0.952 (0.052)	1.298*** (0.060)	-0.346***
Pseudo R ²	0.445			
Observations	223,806			

Notes: Reported coefficients are relative risk ratios of (1) staying non-promoted but changing the establishment or transitions in (2) a managerial position within establishments and (3) a managerial position across establishments. The reference category comprises individuals who are not promoted and who stay with the current employer. Standard errors are presented in parentheses. Asterisks indicate significance levels: *** p<0.01, ** p<0.05, * p<0.1. Omitted coefficients as in Table 1.

Table 9: Wage growth of temporary employees

Dependent variable: <i>Wage growth</i>	Panel A Baseline specification		Panel B Extended specification		Panel C Fully interacted specification	
	<i>Coeff.</i>	<i>SE</i>	<i>Coeff.</i>	<i>SE</i>	<i>Coeff.</i>	<i>SE</i>
Temporary contract	.023***	(.004)	.023***	(.004)	-.001	(.004)
Promotion			.066***	(.002)	.055***	(.002)
Establishment change			.013***	(.002)	.004	(.003)
Promotion * Establ. change					.014***	(.004)
Temp. contract * Promotion					.062***	(.008)
Temp. contract * Establ. change					-.002	(.008)
Temp. contract * Promotion * Establ. change					.002	(.011)
	Adjusted R ²	0.083	0.095	0.096		
	Observations	196,479	196,479	196,479		

Notes: Reported coefficients are basic OLS coefficients for wage growth, where wage growth is defined as $\ln(\text{wage}_{i,t} - \text{wage}_{i,t-1})$. Top-coded wages are imputed. Standard errors are presented in parentheses. Asterisks indicate significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Omitted coefficients as in Table 1.

References

- Ai, C. and Norton, E.C. (2003). Interaction terms in logit and probit models. *Economics Letters*, 80, 123-129.
- Akerlof, G. A. (1970). The Market for Lemons: Quality Uncertainty and the Market Mechanism. *Quarterly Journal of Economics*, 84, 488-500.
- Arrow, K. J. (1973). Higher education as a filter. *Journal of Public Economics*, 2, 193-216.
- Bonoli, G.; Hinrichs, K. (2012). Statistical discrimination and employers' recruitment practices for low-skilled workers. *European Societies*, 14, 338-361.
- Boockmann, B., & Hagen, T. (2008). Fixed-term contracts as sorting mechanisms: Evidence from job durations in West Germany. *Labour Economics*, 15, 984-1005.
- Booth, A.L., Francesconi, M., & Frank, J. (2002). Temporary jobs: Stepping stones or dead ends? *The Economic Journal*, 112, F189-F213.
- Buis, M.L. (2010). Stata tip 87: Interpretation of interactions in non-linear models. *The Stata Journal*, 10(2), 305-308.
- Burgess, S., Propper, C., Rees, H., & Shearer, A. (2003). The class of 1981: the effects of early career unemployment on subsequent unemployment experiences. *Labour Economics*, 10, 291–309.
- DeVaro, J.; Waldman, M. (2012). The Signaling Role of Promotions: Further Theory and Empirical Evidence. *Journal of Labor Economics*, 30, 91-147.
- Ellguth, P., Kohaut, S., and Moeller, I. (2014). The IAB Establishment Panel – methodological essentials and data quality. *Journal for Labour Market Research*, 47(1-2), 27-41.
- Fischer, G., Janik, F., Mueller, D., and Schmucker, A. (2009). The IAB Establishment Panel – things users should know. *Schmollers Jahrbuch*, 129(1), 133-148.
- Gash, V. (2008). Bridge or Trap? Temporary Workers' Transitions to Unemployment and to the Standard Employment Contract. *European Sociological Review*, 24, 651-668.
- Gebel, M. (2010). Early career consequences of temporary employment in Germany and the UK. *Work, Employment and Society*, 24, 641-660.
- Gundert, S. (2007). *Befristete Beschäftigung bei Berufsanfängern und älteren Arbeitnehmern*. Berlin: Logos.

- Hohendanner, C.; Gerner, H.-D. (2010). Die Übernahme befristet Beschäftigter im Kontext betrieblicher Personalpolitik. *Soziale Welt*, 61, 27-50.
- Hohendanner, C.; Ostmeier, E.; Ramos Lobato, P. (2015). Befristete Beschäftigung im öffentlichen Dienst. Entwicklung, Motive und rechtliche Umsetzung. IAB-Forschungsbericht 12/2015.
- McGinnity, F., Mertens A., & Gundert, S. (2005). A Bad Start? Fixed-Term Contracts and the Transition from Education to Work in West Germany. *European Sociological Review*, 21, 359-374.
- Spence, M. (1973). Job Market Signaling. *The Quarterly Journal of Economics*, 87, 355-374.
- Stiglitz, J. E. (1975). The Theory of "Screening", Education, and the Distribution of Income. *The American Economic Review*, 65, 283-300.
- Stumpf, F., Damelang A., & Schulz, F. (2012). Die berufliche Strukturierung der frühen Erwerbsphase. Ereignisanalysen zur Beschäftigungsstabilität. IAB-Forschungsbericht 12/2012. Nuremberg.
- Venn, D. (2009). Legislation, collective bargaining and enforcement: Updating the OECD employment protection indicators. *OECD Social, Employment and Migration Working Papers* 89.

Appendix

Table A1: Summary table of individual- and establishment-specific covariates

Variable	Mean	Std. Dev.	Min	Max
Outcome				
Not promoted, same establishment (D)	0,431	0,495	0	1
Not promoted, different establishment (D)	0,055	0,228	0	1
Promoted, same establishment (D)	0,147	0,354	0	1
Promoted, different establishment (D)	0,367	0,482	0	1
Establishment-specific information				
Churning rate (initial establishment)	0,322	0,292	0	3
Churning rate (destination establishment)	0,296	0,263	0	2,034
Share of promotions (initial)	0,04	0,08	0	1
Share of promotions (destination)	0,046	0,091	0	1
Share of managers (destination)	0,086	0,09	0	1
Managers? (initial) (D)	0,15	0,357	0	1
Share of managers (initial)	11,39	12,671	0	100
Number of employees (log) (initial)	5,389	2,11	0,693	10,811
Number of employees (log) (destination)	5,397	2,151	0,693	10,888
Individual-specific information				
Temporary contract? (D)	0,093	0,29	0	1
Regional mobility in the past	0,109	0,188	0	1
Job mobility in the past	0,194	0,241	0	1
Initial wage (log)	3,192	0,527	-2,803	11,028
Censored wage? (D)	0,186	0,389	0	1
First observed wage (log)	3,708	0,673	-4,605	8,911
Gender (D; 1=female)	0,26	0,439	0	1
Nationality (D; 1=foreign)	0,066	0,248	0	1
Age	39,799	10,167	18,156	62,995
Age squared	1.687,33	825,97	329,646	3.968,31
Tenure	1,17	1,533	-5,9	3,619
Tenure squared	3,718	3,497	0	34,81
Days spent in employment (log)	14,281	9,47	0,003	37,287
Days spent in employment squared (log)	293,622	324,792	0	1390,305
Days of unemployment benefit receipt	183,142	362,657	0	7.568,00
Share of employment spent in part-time work	0,04	0,111	0	0,952
Actual daily working hours	6,579	1,488	0,004	74,2
<i>Highest attained vocational education</i>				
No vocational degree (D)	0,055	0,228	0	1
Apprenticeship training cert. (D)	0,547	0,498	0	1
Meister/Technician (D)	0,082	0,275	0	1
University/College degree (D)	0,209	0,406	0	1
Doctoral degree (D)	0,013	0,115	0	1
Vocational education unknown (D)	0,094	0,291	0	1

Notes: Aside from the establishment-level means of the individual-specific variables, the 37 dummy variables indicating the occupational main group, the 18 dummy variables indicating the industry, and the 16 regional dummy variables are omitted from this table. N=196,621.