Employee Identification and Wages – On the Economics of "Affective Commitment"*

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This version: May 21, 2021

Abstract

We study the role of employees' identification to the employer for wage growth. We first show in a formal model that identification implies countervailing effects: Employees with higher identification are more valuable as they exert higher efforts, but have weaker bargaining positions, and less outside options as they search less. Analyzing a novel representative panel dataset, we find that stronger identification is associated with less job search and turnover. Workers that have higher identification exhibit significantly lower wage growth. In line with the model, this pattern tends to be reversed conditional on having obtained an external offer.

Key Words: Wage, Affective commitment, Identity, Turnover, Job search
JEL Classification: J31, M50, M52

*We thank conference and seminar participants in Berlin, Mannheim, Düsseldorf, Rotterdam and the "Winter School on Applied Microeconomics: Theory and Empirics" for helpful comments and suggestions. We also thank the German Research Foundation (DFG) for financial support through priority program SPP 1764 (KA 4591/1-2 and SL 46/2-1).

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1 Introduction

In labor economics, it has often been stressed that an employee's decision on whether to stay or move to a different employer not only depends on wages, but also on non-monetary aspects of the job match (e.g., Sullivan and To, 2014). In most of the literature, however, this "match quality" is treated as an unobserved black box and is proxied by directly observable outcomes such as wages, tenure, firm size, worker skills, or productivity (Johnson, 1978; Jovanovic, 1979; Mortensen, 1988; Bowlus, 1995; Abowd et al., 1999; Gaure et al., 2012; Eeckhout, 2018; Eeckhout and Kircher, 2018). This paper opens part of this black box by studying one important component of match quality: employees' emotional identification with their employer. First, we analyze a formal model in which an employee works for an employer and is characterized by the degree to which he identifies with the incumbent employer. We assume that a higher identification increases the extent to which the employee internalizes the employer's payoff. In line with Akerlof and Kranton (2005) or Besley and Ghatak (2005), in such a framework, a higher identification naturally leads to higher work efforts. Moreover, the model predicts that an employee's well-being depends on his wage to a lesser extent when he identifies more strongly with his employer. In a next step, we consider wage negotiations and show that when the employer has sufficiently high bargaining power or when there is no moral hazard problem, wages are decreasing in affective commitment. This constitutes essentially a "compensating wage differential" effect (e.g., Rosen, 1986) as well known from the literature on public sector and non-profit motivation (Delfgaauw and Dur, 2007; Prendergast, 2007; Delfgaauw and Dur, 2008; Francois and Vlassopoulos, 2008; Prendergast, 2008): an employee who attaches some intrinsic value to staying with the employer has a weaker bargaining position and thus stays with the firm at a lower wage level. However, the picture changes when the employee has a higher threat point by having obtained an external offer and chooses an unobservable work effort. In this case, a higher identification with the firm has a value for the employer[1] as such an agent will exert higher efforts ex-post. In turn, a more "committed" employee will be able to negotiate a higher wage. Hence, the model does not make a clear prediction on the effect of employee identification on wage growth as there are two countervailing effects.

[1] In this respect, identification underlies similar mechanisms as firm-specific human capital, which is also only valuable for the incumbent employer but not for potential external employers, and thus has strong implications for counteroffers by the incumbent employer once an external offer is available(see, e.g., Yamaguchi, 2010; Lazear, 2012).

However, the model does predict that, *conditional on effort,* wage growth should be decreasing in affective commitment. Additionally, conditional on having an external offer, i.e. when more bargaining power lies with the employee, more committed employees should be able to negotiate higher wages, and thus wage growth should be upward sloping in affective commitment.

Second, to test the predictions generated by this model, we analyze a novel linked employer-employee dataset. In order to quantify employees' identification with their employer, we use a standard survey measure of emotional attachment from the literature in organizational psychology (*affective organizational commitment*, see e.g., Meyer and Allen, 1991) to predict future wage growth and search behavior in the labor market.[2] We find that (i) the predictive power of the wage level for job satisfaction is significantly weaker for employees with a higher affective commitment; (ii) a higher affective commitment is associated with higher work efforts, i.e., a lower number of absence days and more unpaid overtime; (iii) a higher affective commitment in period t predicts a lower wage growth in $t+1$; (iv) the relationship is more pronounced when we control for a measure of employee effort; (v) a higher affective commitment is associated with a lower likelihood that an employee searches for another job, receives an external outside offer or voluntarily quits his job with his incumbent employer; and (vi) employees that have obtained an outside offer can negotiate a significantly higher wage growth with their incumbent employer. In addition, we find evidence that this relationship tends to be even stronger for employees with higher affective commitment. This indicates, that employees with higher affective commitment are able to overcome the "compensating wage differential" effect by presenting a higher threat point in the form of an external offer. However, they do so less often.

We contribute to existing research in several ways. Even though the literature in labor economics has considered the quality of the job match as an important determinant of worker satisfaction and retention (Bowlus, 1995; Ferreira and Taylor, 2011; Barmby et al., 2012), only few studies have attempted to measure aspects of match quality explicitly (see Fredriksson et al., 2018, for an example of the latter). With our focus on employee identification as an important non-monetary aspect of job match quality[3], we add to the discussion

[2]Bömer et al. (2019) study supervisory support as a component of match quality, which determines employees' job search behavior using the same dataset.

[3]In contrast to rather stable cognitive skills and personality traits (or non-cognitive skills), i.e., "personal attributes not thought to be captured by measures of abstract reasoning power" (Heckman and Kautz, 2012, p. 452), which the previous literature has identified as important

in labor economics and relate to concepts discussed in the fields of behavioral economics, organizational psychology, and management. With the emergence of the behavioral economics literature and the consideration of social preferences in economic decision-making (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000; Charness and Rabin, 2002), also the concept of (group) identity has been introduced into the field of economics (Akerlof and Kranton, 2000, 2002, 2005). Recent experimental evidence has shown that social preferences are affected by group identity (Van Dijk et al., 2002; Goette et al., 2006; Chen and Li, 2009), i.e., the concern for the well-being of another individual is stronger when this person shares a common group identity. In the context of organizations, Akerlof and Kranton (2005) stress the importance of employees' identification for their work motivation. In line with this reasoning, Besley and Ghatak (2005) argue that organizations benefit when employees share their mission (see also Francois, 2000; Glazer, 2004; Delfgaauw and Dur, 2007; Francois, 2007; Delfgaauw and Dur, 2008; Brock et al., 2016; Besley and Ghatak, 2018). Several recent contributions provide (field) experimental evidence supporting this view (Tonin and Vlassopoulos, 2015; Burbano, 2016; Carpenter and Gong, 2016; Blasco et al., 2019; Cassar, 2019; Kajackaite and Sliwka, 2020).[4] While the mission match between employer and employees specifically refers to the channel of overlapping preferences towards a higher non-monetary goal, identification can be defined in a broader context. Cassar and Meier (2018) summarize ideas from the theory of psychological needs (see, e.g., Deci and Ryan (2000)) from an economics perspective and define "meaning of work" along the four dimensions mission, autonomy, competence, and relatedness. They describe relatedness as a feeling of connectedness to the organization and its members, thus this dimension of meaning of work closely relates to our understanding of employee identification.

To capture identification in the empirical part of this paper, we make use of a widely applied and validated survey measure to assess "affective organizational commitment". The notion of "affective commitment", which describes the strength of the emotional attachment of an employee to the employer, has first been considered in the field of organizational psychology.[5] A large body

factors for labor market success (e.g., Heckman et al., 2006), emotional attachment can be viewed as a match-specific component. This means that an individual's affective commitment is typically rather stable within an organization, but is likely to vary in a different job match at a different employer.

[4] A different strand of the literature studies the nexus between selection, incentives, and prosocial motivation in mission-oriented organizations or the provision of social services (see, e.g., Dal Bó et al. (2013), Dur and Zoutenbier (2015), and Ashraf et al. (2020).

[5] In a very influential contribution, Meyer and Allen (1991) argue that an employee's

of evidence (see e.g., Meyer and Allen, 1984; Tett and Meyer, 1993; Rhoades et al., 2001) has shown that employees differ in the extent to which they feel attached to the organization and that such "affective commitment" is generally considered to be predictive for individual turnover (intention), job performance, and absenteeism (see Meyer et al., 2002, for a meta-analysis).

We analyze the relationship between identification and job satisfaction, effort provision, wage growth, job search behavior, and employee mobility[6], both in a theoretical model and with field data. We provide empirical evidence from a representative linked employer-employee dataset that not only provides ample information on individual characteristics, attitudes, and labor market outcomes, but also detailed knowledge of specific job search behavior and outcomes, which previous datasets typically lack. This allows us to study the nexus between commitment to an employer and the job matching process in more detail. Additionally, we present evidence for the predictive power of a self-reported survey measure of identification for actual wage trajectories and turnover outcomes, and thereby contribute to the recently emerging literature which emphasizes the relevance of validated survey measures for economic behavior and decision-making (Blinder and Krueger, 2013; Bender et al., 2018; Falk and Hermle, 2018; Falk et al., 2018).

The paper proceeds as follows: In section 2, we analyze an illustrative formal model. Section 3 provides an overview of the dataset and descriptive statistics. In section 4, the results of our empirical analysis are presented. Finally, section 5 concludes.

2 The Model

Consider the following simple model to illustrate the key ideas. An employee works for two periods $t = 0, 1$. In each period, the employee chooses a work effort a at effort cost $c(a_t)$ which generates revenues $K(a_t)$ for the respective employer with $K_a, c_a, c_{aa} > 0$ and $K_{aa} \leq 0$.

"organizational commitment", i.e., the individual's psychological attachment to the organization, consists of three components. Besides affective commitment, the other components are "continuance commitment" as the awareness of the costs associated with leaving the organization and "normative commitment" as the feeling of obligation to continue the employment.

[6]Kampkötter and Sliwka (2014) show that incumbent employees with high levels of firm tenure have lower wages compared to newly hired employees in the same position arguing that the fact that these employees did not leave the firm in the past indicated higher mobility costs (which also capture some non-monetary elements such as affective commitment to the incumbent employer), which weakens their bargaining position.

In period 0, the employee is hired at a market wage $w_0 = w_M$. In period 1, the employee and the firm negotiate the wage w_1 and the bargaining outcome is determined by the generalized Nash bargaining solution[7], where the employee has bargaining power λ.

Let γ be a measure of the employee's identification with the employer or his "affective commitment" towards the employer: the higher γ, the stronger the extent to which the employee internalizes the employer's well-being. Employee and employer learn the realization of γ after the employee is hired in period 0. The employee's utility function in period t is thus

$$U_t(w_t, a_t) = w_t - c(a_t) + \gamma(K(a_t) - \zeta w_t), \tag{1}$$

where $\zeta \in [0, 1]$. Note that this formulation nests two approaches in modeling emotional attachment: When $\zeta = 0$ then emotional attachment γ captures "mission motivation" where the agent identifies with the objectives of the employer to some extent. When $\zeta = 1$ however, emotional attachment generates social preferences (simple altruism) towards the firm. In our theoretical analysis we take ζ as given and study the effect of changes in γ on wage increases. We then empirically explore the question whether the psychological concept affective commitment captures mere mission motivation or broader social preferences towards the employer.[8]

We note that, of course, the two-period model is a short-cut for a fully dynamic setting. However, the simple model captures essential features of the wage setting process in firms. The key idea of the approach is that the employee's emotional attachment is a match-specific state of an employee (which in the real world may also vary over time) and this state affects the bargaining position at the respective point in time.

2.1 Analysis

Given equation (1), the employee chooses an effort such that

$$\gamma K'(a_t) - c'(a_t) = 0 \tag{2}$$

[7]The Nash bargaining solution is commonly used in labor economics to model wage negotiations (see e.g. Mortensen and Pissarides (1999) for a respective survey or Gertler and Trigari (2009) for a more recent discussion on the role of "staggered" bargaining.

[8]As will become clear below, the key differences between both approaches is that they make differential assumptions on the impact of wages on utility: the marginal utility of a wage increase is unaffected by emotional attachment in the former case, but lower in the latter case where well-being becomes less sensitive in wages.

which implicitly defines his effort $a(\gamma)$ such that

$$\frac{\partial a(\gamma)}{\partial \gamma} = -\frac{K'(a)}{\gamma K''(a) - c''(a)} > 0$$

and this implies the following simple first result:

Proposition 1 *When the employee exhibits a stronger identification with the employer, (i) his work effort is higher and (ii) his marginal utility from wages is lower iff* $\zeta > 0$.

Note that claim (i) corresponds to typical results in the literature on employee identification (Akerlof and Kranton, 2005), mission motivation (Besley and Ghatak, 2005; Cassar, 2019), or public sector and non-profit motivation (Delfgaauw and Dur, 2007, 2008): As a more emotionally attached worker internalizes the employer's output to a greater extent, such an employee will work harder.

Claim (ii) directly follows from the above assumption on the structure of the utility function: When $\zeta > 0$ such that emotional attachment generates social preferences towards the employer, the well-being of an employee with a higher identification with the employer is less sensitive to changes in the wage.

2.2 Wage Bargaining

In a next step, we analyze the wage bargaining outcome in period 1 and the resulting change in wages between periods 0 and 1. It is important to note that the model aims at capturing a typical annual wage increase decision. In most firms, supervisors once a year have to decide on the wage increases assigned to incumbent employees and explain (and potentially discuss) their decision with the respective employees. Our model uses the generalized Nash bargaining solution to model this process in a stylized manner.

In the negotiations, the employee's utility when staying with the firm is

$$(1 - \zeta\gamma) w_1 + \gamma K(a(\gamma)) - c(a(\gamma))$$

and his threat point utility is equal to u_M.[9] The employer's utility when the

[9] If the worker does not know the level of identification realized in a different job and has some beliefs about the realization of emotional attachment at the new employer, u_M is, for instance, equal to $E_\gamma[(1-\gamma) w_M + \gamma K(a(\gamma)) - c(a(\gamma))]$.

employee stays is

$$K\left(a\left(\gamma\right)\right)-w_1$$

and we normalize the employer's threat point utility to 0.[10] Note that the agent stays with the firm if there are gains from trade, i.e., a wage level exists in which both the firm and the agent are better off when the agent stays,[11] which will be the case if

$$\left(1-\zeta\gamma+\gamma\right)K\left(a\left(\gamma\right)\right)-c\left(a\left(\gamma\right)\right) \quad \geq \quad u_M. \tag{3}$$

In this case, we apply the generalized Nash bargaining solution to determine the bargaining outcome. The following result characterizes the corresponding relative wage increase. Note that we focus on characterizing relative wage increases as this will be our key variable of interest in the empirical analysis and it also typically is the choice variable in the wage setting process for incumbent employees in firms.

Proposition 2 *When* $\left(1-\zeta\gamma+\gamma\right)K\left(a\left(\gamma\right)\right)-c\left(a\left(\gamma\right)\right)>u_M$ *the employee stays with the firm and his wage increases by*

$$\Delta\left(\gamma,a\right)=\frac{w_1}{w_0}=\frac{\lambda K\left(a\right)+\left(1-\lambda\right)\frac{u_M-\left(\gamma K(a)-c(a)\right)}{\left(1-\zeta\gamma\right)}}{w_M}. \tag{4}$$

Conditional on effort a*, wage growth is decreasing in* γ*, i.e.,*

$$\frac{\partial\Delta\left(\gamma,a\right)}{\partial\gamma}<0.$$

When efforts are endogenous, then

$$\frac{\partial\Delta\left(\gamma,a\left(\gamma\right)\right)}{\partial\gamma}=\frac{\lambda}{w_M}\underbrace{K'\left(a\left(\gamma\right)\right)a'\left(\gamma\right)}_{>0}+\left(1-\lambda\right)\underbrace{\frac{\zeta\left(u_M+c\left(a\left(\gamma\right)\right)\right)-K\left(a\left(\gamma\right)\right)}{\left(1-\zeta\gamma\right)^2w_M}}_{<0}.$$

When the employer has some bargaining power $\left(0<\lambda<1\right)$*, there is a trade-off between a "compensating wage differential" effect and a "motivation" effect.*

[10] This is, for instance, the case in a competitive labor market where $w_M=E_\gamma\left[K\left(a\left(\gamma\right)\right)\right]$.

[11] To see this note that there are gains from trade if and only if there exists a wage level w_1 which makes the firm and the worker better off. The firm is better off iff $K\left(a\left(\gamma\right)\right)\geq w_1$. The worker is better off if $w_1\geq\frac{u_M-\gamma K(a(\gamma))+c(a(\gamma))}{(1-\zeta\gamma)}$. Hence, the set of Pareto improving wage levels is non-empty iff $K\left(a\left(\gamma\right)\right)\geq\frac{u_M-\gamma K(a(\gamma))+c(a(\gamma))}{(1-\zeta\gamma)}$ which is equivalent to (3).

Wage increases are decreasing in the employee's degree of identification with the employer if, and only if, the employee's bargaining power is sufficiently small.

Proof: See appendix.

Hence, there are two effects: On the one hand, there is a "compensating wage differential" effect: The employer can push committed employees to a lower wage as they enjoy working for the firm – and this joy will be lost when the employee leaves his incumbent employer. But there is also a countervailing "motivation effect": When efforts are endogenous, committed employees work harder and are therefore more valuable for their incumbent employer, allowing them to reap part of this value in negotiations. Conditional on efforts, wage growth is thus decreasing in γ. However, the net effect of affective commitment on wage growth is ambiguous when efforts are endogenous. When the employee has a strong bargaining power, the motivation effect dominates and wage growth is upward sloping in affective commitment. If, however, the employee's bargaining power is sufficiently small, the compensating wage differential effect is stronger and wage growth is decreasing in affective commitment.

2.3 Job Search and External Offers

Now we consider an employee's effort to search for a new job. Assume now that before period 1, the worker can choose a search effort p at cost $k(p)$ with $k_p, k_{pp} > 0$. This search effort determines the likelihood of receiving an outside offer generating utility u_O that may improve his outside option. The worker's search is successful ($d = 1$) with probability p. In this case, the new outside option is drawn from a probability distribution with pdf $f(u_O)$ on the support $]u_M, \infty[$. If the search is not successful ($d = 0$), the outside option remains u_M.

When the worker receives the external offer, he thus either negotiates a higher wage or leaves the firm obtaining a utility u_O. He will stay with the firm if there are gains from trade, i.e., $(1 - \zeta\gamma + \gamma) K(a(\gamma)) - c(a(\gamma)) > u_O$. The negotiated wage increase when he stays is again determined by Nash bargaining analogously to Proposition 2 and thus will be equal to

$$\Delta(u_O) = \frac{\lambda K(a) + (1-\lambda)\frac{u_O - (\gamma K(a) - c(a))}{(1-\zeta\gamma)}}{w_M}.$$

The outside offer will thus increase the agent's wage by $\frac{(1-\lambda)}{(1-\zeta\gamma)}(u_O - u_M)$ and utility by $(1-\lambda)(u_O - u_M)$ when staying. But if u_O is sufficiently large, the

employee leaves the firm and his utility then increases by

$$u_O - (1-\gamma\zeta)\left(\lambda K(a) + (1-\lambda)\frac{u_M - (\gamma K(a) - c(a))}{(1-\zeta\gamma)}\right) + c(a_t) - \gamma K(a_t)$$

$$= u_O - \left[(1-\lambda)u_M + \lambda\left((1-\gamma\zeta+\gamma)K(a(\gamma)) - c(a(\gamma))\right)\right].$$

Hence, the expected utility gain from obtaining an external offer is

$$E[\Delta u] = \int_{u_M}^{(1-\zeta\gamma+\gamma)K(a(\gamma))-c(a(\gamma))} (1-\lambda)(u_O - u_M) f(u_O)\, du_O$$
$$+ \int_{(1-\zeta\gamma+\gamma)K(a(\gamma))-c(a(\gamma))}^{\infty} (u_O - (1-\lambda)u_M - \lambda\left((1-\gamma\zeta+\gamma)K(a(\gamma)) - c(a(\gamma))\right)) f(u_O)\, du_O.$$

which determines the worker's optimal search effort. We can show:

Proposition 3 *If the employee obtains an external offer d providing utility $u_O > u_M$, he will stay with the firm if $(1-\zeta\gamma+\gamma)K(a(\gamma)) - c(a(\gamma)) > u_O$. In this case the worker's expected wage increase conditional on the offer d is*

$$E[\triangle | d] = \frac{\lambda K(a(\gamma)) + (1-\lambda)\frac{u_M - (\gamma K(a(\gamma)) - c(a(\gamma)))}{(1-\zeta\gamma)}}{w_M}$$
$$+ d \cdot \frac{(1-\lambda)}{(1-\zeta\gamma)}\left(\frac{E[u_O | u_O \leq K(a(\gamma)) - c(a(\gamma))] - u_M}{w_M}\right) \quad (5)$$

The stronger the employee's identification with the firm γ, the larger is the wage growth the agent achieves when having obtained an external offer. A stronger employee identification, however, reduces the employee's search effort and thus the likelihood that he leaves the firm.

Proof: See appendix.

As we have seen before, without an external offer, wages may increase to a lesser extent for more emotionally attached workers (when either their bargaining power λ is small or when efforts are held constant). However, as the result shows, once the worker has obtained an external offer but stays with the employer, there is always a countervailing effect. To see this, note that

$$E[\triangle | d=1] - E[\triangle | d=0] = \frac{(1-\lambda)}{(1-\gamma)}\left(\frac{E[u_O | u_O \leq K(a(\gamma)) - c(a(\gamma))] - u_M}{w_M}\right)$$

is strictly *increasing* in γ. Hence, an external wage offer comes along with higher wage increases for more emotionally attached workers. The reason is twofold: First, the firm matches higher wage offers when a worker is more emotionally attached as such workers are more productive (that is, $E\left[u_O \middle| u_O \leq K\left(a\left(\gamma\right)\right) - c\left(a\left(\gamma\right)\right)\right]$ is increasing in γ). But moreover, as such a worker's utility is less sensitive to money, the firm has to raise the worker's wage by a greater extent to match the higher threat point resulting from the external offer.[12]

The question naturally arises why an employee with a higher γ exerts lower search efforts. The reason is that with positive probability, the utility provided by the external offer u_O is so large that the worker leaves the firm. But for more attached workers this is less likely, as such workers have a higher productivity, i.e., $K\left(a\left(\gamma\right)\right) - c\left(a\left(\gamma\right)\right)$ is larger. Moreover, if such workers leave, their utility gain from moving is smaller as they loose the psychological benefit of the larger emotional attachment. Thus, it may be that an employee with a higher emotional attachment to the firm will have a lower wage growth without an external offer, but achieves a higher wage growth once having obtained an external offer.

2.4 Predicted Patterns

Our model takes the strength of the employees' emotional attachment to the employer as given and derives predictions for the future employer-employee relationship and behavior. Note that we do not aim at identifying causal effects of employee identification with the employer, but rather use our formal model to describe qualitative characteristics of the conditional expectation function of future wage growth, work efforts, and search activities, conditional on the degree of employee identification. The following stylized expected patterns sum up our theoretical results: A stronger identification of an employee with the employer predicts

- *higher work effort:*
$$\frac{\partial E\left[a\left|\gamma\right.\right]}{\partial \gamma} > 0,$$
- *a lower wage growth (conditional on work effort):*
$$\frac{\partial E\left[\triangle\left|\gamma, a\right.\right]}{\partial \gamma} < 0,$$

[12] Note that the *utility increase* obtained through an external offer does not depend on γ when the worker stays.

- *lower search efforts and a lower likelihood of obtaining an external wage offer:*

$$\frac{\partial E\left[p\left|\gamma\right.\right]}{\partial \gamma} < 0.$$

- *a higher wage growth when having obtained an external offer*

$$\frac{\partial \left(E\left[\triangle\left|\gamma,\ d=1\right.\right]-E\left[\triangle\left|\gamma,\ d=0\right.\right]\right)}{\partial \gamma} > 0.$$

We will now test these patterns empirically using a representative matched employer-employee panel dataset.

3 Data and Descriptive Statistics

The empirical analysis is based on the first three waves of the Linked Personnel Panel (LPP), an employer-employee panel dataset that has been developed by the authors jointly with the Centre for European Economic Research (ZEW) Mannheim and the Institute for Employment Research (IAB) Nuremberg on behalf of the German Federal Ministry of Labor and Social Affairs (BMAS). The LPP is a linked employer-employee dataset that is representative for German private sector establishments (except sectors of agriculture, forestry, and fishery) with more than 50 employees subject to social security contributions (see Kampkötter et al., 2016, for details on the construction and design of the dataset).[13] The employer survey is based on a subsample of the IAB Establishment Panel and is stratified according to four employment classes (50-99; 100-249; 250-499; 500 and more employees), five industries (metalworking and electronic industries; further manufacturing industries; retail and transport; services for firms; information and communication services) and four regions of Germany (North; East; South; West). The sample comprises 1,219 establishments in the first wave (2012/13), 771 in the second wave (2014/15) and 846 in the third wave (2016/17) and is representative for the above-mentioned establishment characteristics. A random sample of employees was drawn from participating establishments in each wave to take part in at home telephone interviews (CATI). The employee survey was carried out in 2012/13 (first wave) comprising 7,508 employees, in

[13] This study uses the Linked Personnel Panel (LPP), wave 1617, http://dx.doi.org/10.5164/IAB.LPP1617.de.en.v1. For more details, see Haylock and Kampkötter, 2019a.

2014/15 (second wave) comprising 7,109 employees and in 2016/17 (third wave) comprising 6,428 employees.

Besides information on the workforce structure and composition, employee representation, ownership, legal structure and establishment-level performance measures originating from the IAB establishment panel, the LPP employer survey focuses on human resource management practices in firms in more detail. The employee survey includes a rich set of items on socio-demographic characteristics and detailed survey scales to assess job characteristics, personal characteristics, attitudes, and behavioral outcome variables.

Our main independent variable is *affective commitment* to the organization. This is a psychological construct that is widely used in organizational psychology and management research which captures an employee's emotional attachment to or identification with his employer. The dataset includes a six-item short scale by Meyer et al. (1993). This construct is a reduced but embedded scale of the original version introduced by Allen and Meyer (1990). Items were measured on a five-point Likert scale and show a high level of scale reliability with a value of Cronbach's alpha of 0.83. The six items read as follows: *"I would be very happy to spend the rest of my career with this organization", "This organization has a great deal of personal meaning for me", "I really feel as if this organization's problems are my own", "I do not feel a strong sense of 'belonging' to my organization", "I do not feel 'emotionally attached' to this organization", "I do not feel like 'part of the family' at my organization".*[14] The mean and median for this construct (unstandardized) range around 3.7 and 3.8 in both the first and the second wave.

Our underlying approach builds on the idea that affective commitment measures a "state" of an employee at a given point in time and has a match-specific component. That is, it is neither fully determined by characteristics of the employee (such as general altruism which would lead to a similar level of identification also with the objectives of other firms), nor of the employer (such as, for instance, social traits of the boss, or CSR activities of the firm). As a first descriptive piece of evidence supporting this claim we have computed the correlation coefficient of affective commitment of employees between two consecutive waves both for those who stayed with their employer and for those who switched employers. Indeed, this correlation is substantially higher for stayers (*0.67*) than for movers (*0.20*) indicating that affective commitment has a substantial match-specific component and is not a purely employee-specific

[14] The latter three items are reverse coded.

trait.

As a second piece of evidence, Haylock and Kampkötter (2019b) have investigated the importance of firm-specific effects for predicting different psychological measures also using the LPP data set. They, for instance, have found that the share of the explanatory power of firm fixed effects is larger for altruism than for affective commitment although the affective commitment items explicitly refer to the employees' attitude towards the specific employer, whereas altruism assesses a general personality trait. This indicates that affective commitment is also not too strongly determined by characteristics of the firm and thus seems to have a strong match-specific component. Finally, we will explore the robustness of our results below also using firm (establishment) and employee fixed effects, thus using either only the within-firm or within-employee variation in affective commitment as a determinant of wage growth.

Further survey variables we use are *job* and *pay satisfaction*, which are measured on an 11-point Likert scale adapted from the German Socio-Economic Panel (SOEP) from zero to ten with a mean of 7.5 and 7.6 (median 8) and 6.7 and 6.8 (median 7) in the first and second wave, respectively. Both commitment and job satisfaction are standardized with zero mean and unit variance before entering the regressions. Furthermore, we use the number of sick days within a year and the hours of unpaid overtime per week reported by the employees as proxies for effort within our analyses. Additional individual-level control variables include job status (blue collar vs. white collar), supervisory position, part time, gender, secondary and tertiary education, age, gross hourly wage, limited work contract, marital status, and household size. The set of establishment-level controls comprises industry, region, establishment size, ownership structure, and independent establishment. In table 6 in the appendix, we provide an overview of the descriptive statistics of all the relevant variables on the employee and establishment level we use in our regressions.

Hourly wage growth is measured as annual change in hourly wages from the first to the second wave and the second to the third wave respectively (measured in percent).[15] In order to discard data outliers, we winsorize this variable at the 1% level in each tail. Average hourly wage growth equals 8.2% and 5.6%

[15]Most of the predicted patterns from our theory section, which we will analyze empirically in the following, refer to changes between period t and $t+1$ or outcomes in $t+1$ based on variables in t. Therefore, given the structure of our data, t either refers to the first wave in 2012/13 or the second wave in 2014/15 and $t+1$ to the second wave in 2014/15 or the third wave in 2016/17 respectively and thus the difference between t and $t+1$ always relates to a two-year window. This also implies that the data from the third wave, in most of our analyses, will only be used to construct our dependent variables, but not as predictor variables.

respectively within the time span of two years, the median hourly wage growth ranges comparably lower at 6.7% and 3.9%. *Active job search* is defined as dummy variable with value 1 if an employee has actively searched for a job in the 12 months prior to being surveyed. *Job offer* is a dummy variable coded 1 if an employee has been approached by another employer within the 12 months prior to the interview and has, as a consequence of the poaching behavior, received a specific job offer, and 0 otherwise (no job offer received and not being approached by an employer). *Realized voluntary turnover* is coded as 1 if the reason for the realized job change is voluntary, i.e., a termination by the employee itself and 0 if the employee is still with his incumbent employer.

4 Results

4.1 Job Satisfaction, Wages, and Affective Commitment

In order to test our first stylized prediction, we regress job satisfaction in period *t+1* on hourly wage in *t+1*, commitment in *t* and the interaction of both. The key idea of our first analysis is that we take job satisfaction as a measure of employee well-being and explore whether for employees with high affective commitment, the conditional expectation of their well-being is less dependent on their wages.

In the first specification of table 1, we analyze pooled cross-sectional data from all three waves without any additional controls. In the second specification, we add employee and establishment characteristics. In specification (3), we include establishment fixed effects and in specification (4) employee fixed effects. The results show that total hourly wage is positively associated with job satisfaction but that the economic magnitude is small. The average hourly wage in this regression sample amounts to 23 Euros. Hence, table 1 shows that an increase in the hourly wage by 1 Euro (i.e., approximately 5%) is associated with an increase in job satisfaction of only around 0.01 to 0.02 standard deviations. This shows that absolute wages indeed are not an important predictor for job satisfaction. This result mirrors findings from previous work (see e.g., Clark and Oswald, 1996), where the absolute wage level also played a minor role for the prediction of job satisfaction.

Recall that in the formal model, we nested two alternative ways to think about the role of affective commitment ("mission motivation" ($\zeta = 0$) or social preferences ($\zeta = 1$)). As illustrated in the model, in the former case affective commitment would not affect the marginal effect of wages on well-being. But

in the latter (i.e. when affective commitment changes social preferences), the marginal effect of wages on well-being would be lower for more emotionally attached workers. Note that this is what we find in the first three specifications as the coefficient for the interaction term between affective commitment and hourly wage has a negative sign. In other words, the conditional expectation function of job satisfaction has a weaker slope with respect to wages for employees who exhibit a stronger emotional attachment towards their employer. The size of the interaction term roughly corresponds to about 40 to 60% of the size of the wage coefficient in all three specifications, i.e., for a person with an affective commitment that is about 1.5 standard deviations above the mean, wages are not predictive for job satisfaction while the predictive power of wages for satisfaction is much higher for less emotionally attached workers. The interaction term remains statistically significant when we include establishment fixed effects. When we include worker fixed effects, the point estimate remains similar in magnitude but is no longer statistically significant.

Table 1: Job Satisfaction and commitment

Dependent variable	Job satisfaction$_{t+1}$(std.)			
	(1)	(2)	(3)	(4)
Hourly wage$_{t+1}$(wins.)	0.008***	0.010***	0.011***	0.021**
	(0.002)	(0.003)	(0.004)	(0.009)
Commitment$_t$(std.)	0.433***	0.488***	0.438***	0.112
	(0.046)	(0.047)	(0.060)	(0.132)
Commitment$_t$(std.) *	-0.005***	-0.006***	-0.005**	-0.008
Hourly wage$_{t+1}$(wins.)	(0.002)	(0.002)	(0.002)	(0.005)
Constant	-0.202***	-0.176	-0.293	-1.039**
	(0.046)	(0.110)	(0.242)	(0.510)
Observations	3,450	3,237	3,237	3,237
Number of clusters	613	583	583	583
R-squared (within)	0.128	0.168	0.362	0.057
Employee & establ. controls	No	Yes	Yes	Yes
Establishment fixed effects	No	No	Yes	No
Employee fixed effects	No	No	No	Yes

Notes: Robust standard errors clustered on establishments in parentheses. Control variables on employee level include: blue collar, supervisory position, part time, female, secondary and tertiary education, age, limited work contract, marital status, household size, and year dummies. Control variables on establishment level include: industry, region, establishment size, ownership structure, and independent establishment. *** p<0.01, ** p<0.05, * p<0.1.

4.2 A Proxy for Work Effort

The second stylized prediction refers to the relationship between affective commitment and work effort in the same year. Since work effort is hard to measure across a broad number of firms, we use the number of sick days within a year and the amount of unpaid overtime hours per week, which essentially constitutes a gift to the employer, as two alternative proxies for work effort (see e.g., Engellandt and Riphahn, 2011). In table 2, we first analyze the pooled cross-section and then gradually include employee and establishment controls as well as establishment and employee fixed effects. Again, all specifications show the expected sign, i.e., more committed employees take fewer sick days (specifications (1) to (4)) and work, on average, more overtime (specifications (5) to (8)). We find that employees with a one standard deviation higher affective commitment are, on average, two days less absent. This result is robust to the inclusion of establishment fixed effects, however, it becomes smaller and statistically insignificant when we apply employee fixed effects.[16] With respect to unpaid overtime, the analyses show that employees with a higher commitment of one standard deviation work between 0.07 and 0.2 hours per week more overtime compared to their counterparts with lower affective commitment. For both effort proxies, the coefficients correspond to about a 10% higher effort provision for a one standard deviation higher affective commitment compared to the respective mean values (see table 6 in the appendix).

[16] This may be due to the fact that affective commitment is rather stable over time such that there is little within-person variation: The Pearson correlation coefficient is 0.65 (p-value < 0.0001) for affective commitment in t and $t+1$ and 0.60 (p-value < 0.0001) for affective commitment in t and $t+2$. Moreover, measurement error may cause an attenuation bias leading to smaller coefficients.

Table 2: Sick days and unpaid overtime

Dependent variable	Sick days$_t$				Unpaid overtime$_t$			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Commitment$_t$ (std.)	-2.011***	-1.897***	-1.793***	-0.998	0.192***	0.065**	0.105***	0.014
	(0.234)	(0.252)	(0.267)	(0.697)	(0.031)	(0.029)	(0.031)	(0.041)
Constant	11.974***	18.257***	18.364***	7.088	0.618***	-0.381*	-0.961**	0.657
	(0.342)	(1.496)	(4.449)	(5.000)	(0.045)	(0.198)	(0.442)	(0.535)
Observations	14,930	14,340	14,340	14,340	14,898	14,302	14,302	14,302
Number of clusters	1,166	1,150	1,150	1,150	1,166	1,149	1,149	1,149
R-squared	0.007	0.046	0.143	0.016	0.005	0.082	0.207	0.010
Employee & establ. controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Establishment fixed effects	No	No	Yes	No	No	No	Yes	No
Employee fixed effects	No	No	No	Yes	No	No	No	Yes

Notes: Robust standard errors clustered on establishment level in parentheses. Control variables on employee level include: blue collar, supervisory position, part time, female, secondary and tertiary education, age, limited work contract, marital status, household size, and year dummies. Control variables on establishment level include: industry, region, establishment size, ownership structure, and independent establishment.
*** p<0.01, ** p<0.05, * p<0.1.

4.3 Predicting Wage Growth

In the following section, we study the extent to which affective commitment as measured in period t predicts actual wage growth between t and *t+1*. Again, note that t either refers to the first wave in 2012/13 or the second wave in 2014/15 and *t+1* to the second wave in 2014/15 or the third wave in 2016/17 respectively. Hence, wage growth is always calculated over a period of two years. Recall that without information on the employee's bargaining power, our model makes no prediction on the sign of the slope of the conditional expectation function of wage growth between t and *t+1* as a function of affective commitment γ as measured in *t*. However, it predicts that the slope should be negative when we condition on work effort a

$$\frac{\partial E\left[\Delta \,|\gamma, a\right]}{\partial \gamma} < 0.$$

As a first step, we descriptively explore the connection between affective commitment in period t and wage growth between t and *t+1*. Figure 1 shows mean wage growth when using a median split of all workers in the sample by their level of affective commitment, both pooled across all waves as well as separately for wage growth from 2012/13 to 2014/15 and 2014/15 to 2016/17. The figure already indicates a sizable compensating wage differential effect: Employees with above median levels of affective commitment exhibit a substantially lower wage growth.

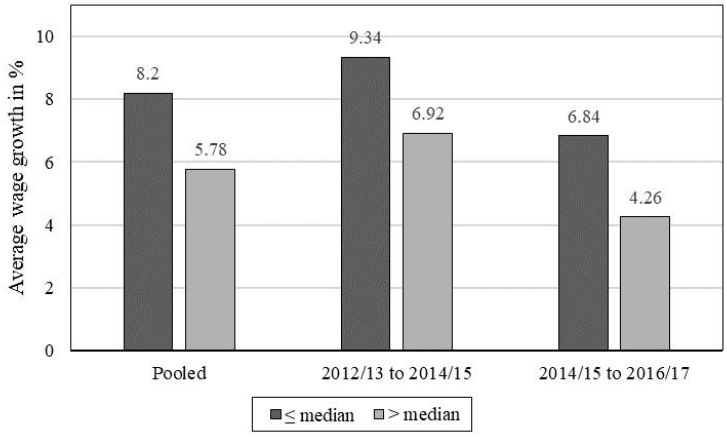

Figure 1: Wage growth for employees by level of affective commitment

The corresponding regression results are reported in table 3. As before, we

first include employee and establishment controls, before we show the results with establishment and employee fixed effects. In the specifications reported in columns (5) to (8), we additionally control for our two proxies for work effort (sick days and unpaid overtime).

First, note that the coefficient of affective commitment is negative in all specifications, indicating that employees with higher levels of affective commitment experience lower wage growth. Hence, the compensating wage differential effect seems to dominate the motivation effect. Second, the coefficients are still negative and now also statistically significant throughout all specifications when we control for effort proxies (columns 5 to 8), which is in line with the idea that the conditional expectation function is decreasing in affective commitment conditional on effort.[17] The point estimates indicate that a person with a one standard deviation higher affective commitment faces a 1 to almost 3 percentage points lower wage growth. As average wage growth between two waves in the sample is about 7 percent, this constitutes a sizable effect of about 12 to 40% lower wage growth for such employees.[18]

[17] The coefficients in columns 1 and 5 and in columns 2 and 6 are not significantly different from each other. But the coefficients in columns 3 and 7 and 4 and 8 are significantly different from each other at the 10%-level.

[18] Work engagement is often used as an alternative measure of effort in the literature. As a robustness check, table 7 in the appendix uses work engagement as an additional control variable when regressing wage growth on commitment. In the LPP, we operationalize work engagement with the nine-item short scale of the Utrecht Work Engagement Scale (Schaufeli et al., 2002), measured on a five-point Likert scale. The results remain robust and become even slightly more significant, but we caution that some of this may be due to correlated measurement error in the two constructs. As an additional falsification check, table 8 in the appendix regresses wage growth on work engagement instead of commitment. Even though these two measures are highly correlated (Pearson correlation coefficient: 0.49, p-value $<$ 0.0001), all regression coefficients for engagement are statistically insignificant showing that affective commitment rather than work engagement is driving our results.

Table 3: Wage growth and commitment

Dependent variable	Hourly wage growth $\triangle$ in % between t and $t+1$ (wins.)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Commitment_t (std.)	-1.231***	-0.897**	-0.757	-2.330	-1.284***	-0.940***	-0.871*	-2.786*
	(0.366)	(0.359)	(0.494)	(1.623)	(0.361)	(0.356)	(0.491)	(1.633)
Sick days_t					0.008	0.008	0.019	0.033
					(0.019)	(0.018)	(0.022)	(0.036)
Unpaid overtime_t					0.144	0.189*	0.202	-0.218
					(0.103)	(0.107)	(0.139)	(0.392)
Constant	8.112***	7.953***	5.597	8.875	7.850***	7.932***	5.690	9.180
	(0.489)	(1.857)	(9.703)	(14.166)	(0.506)	(1.907)	(9.814)	(14.733)
Observations	3,013	2,983	2,983	2,983	2,982	2,953	2,953	2,953
Number of clusters	574	571	571	571	574	571	571	571
R-squared (within)	0.009	0.040	0.208	0.057	0.009	0.041	0.208	0.059
Empl. & establ. contr.	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Establ. fixed effects	No	No	Yes	No	No	No	Yes	No
Empl. fixed effects	No	No	No	Yes	No	No	No	Yes

Notes: Robust standard errors clustered on establishment level in parentheses. Control variables on employee level include: blue collar, supervisory position, part time, female, secondary and tertiary education, age, limited work contract, marital status, household size, and year dummies. Control variables on establishment level include: industry, region, establishment size, ownership structure, and independent establishment.
*** p<0.01, ** p<0.05, * p<0.1.

As a further robustness check we also replicate this analysis excluding all employees who receive performance-based pay as our model did not incorporate performance-contingent bonuses. The results remain very similar when restricting the sample to employees on pure fixed wage contracts (see table 11 in the appendix).

4.4 Job Search and Turnover

In this section, we present empirical evidence for our prediction with respect to job search behavior and outcomes of the search process. We estimate probit regressions to study the relationship between commitment, our effort proxies, satisfaction with pay in period *t,* and the propensity to engage in active job search, receipts of external offers, and realized voluntary turnover in *t+1.* Table 4 reports marginal effects for the three different dependent variables. Specifications (1) and (2) show that more committed employees indeed exhibit a lower probability to actively engage in search for alternative employment opportunities in the future. The coefficient is robust to the inclusion of additional explanatory variables and indicates that employees with a one standard deviation higher commitment have, on average, a 5 to 7 percentage points lower propensity to actively search for alternative employment offers. Again, this is a sizable difference: As the baseline likelihood that somebody actively looks for a new job is 25% in the sample, this likelihood is, thus, nearly 30% lower for employees with an affective commitment that is one standard deviation above the mean.

As a potential consequence, we also find that employees with higher commitment have a lower likelihood to receive external job offers. Both specifications (3) and (4) show that employees with affective commitment that is one standard deviation above the mean, have an around 2 percentage points lower propensity to receive an external offer. Given that the average likelihood to receive an external offer within our dataset is around 9%, this corresponds to a reduction of around 20%.

Table 4: Job search, turnover and commitment

Dependent variable	Active job search$_{t+1}$		External offer$_{t+1}$		Voluntary turnover$_{t+1}$	
	(1)	(2)	(3)	(4)	(5)	(6)
Commitment$_t$ (std.)	-0.067***	-0.053***	-0.018***	-0.015***	-0.010***	-0.008***
	(0.013)	(0.013)	(0.004)	(0.005)	(0.001)	(0.001)
Sick days$_t$		0.001		0.000		0.000
		(0.001)		(0.000)		(0.000)
Unpaid overtime$_t$		-0.006		0.002**		0.001**
		(0.004)		(0.001)		(0.000)
Satisfaction with pay$_t$ (std.)		-0.037***		-0.010*		-0.005***
		(0.014)		(0.005)		(0.002)
Observations	1,292	1,255	3,908	3,358	3,701	3,612
Number of clusters	481	478	623	606	601	598
Pseudo R-squared	0.081	0.089	0.099	0.100	0.174	0.194

Notes: Robust standard errors clustered on establishment level in parentheses. Marginal effects reported. All specifications include employee and establishment controls. Control variables on employee level include: blue collar, supervisory position, part time, female, secondary and tertiary education, age, limited work contract, marital status, household size, and year dummies. Control variables on establishment level include: industry, region, establishment size, ownership structure, and independent establishment. *** p<0.01, ** p<0.05, * p<0.1.

Furthermore, with respect to realized voluntary turnover, we consistently find that employees with higher levels of commitment exhibit a significantly lower probability to quit their current job voluntarily. The average turnover rate in our sample is 2%, which is reduced by around 1 percentage point, i.e., by 40 to 50%, for employees with an affective commitment that is one standard deviation above the mean.[19]

4.5 Wage Growth with External Offer

Finally, we study the relationship between affective commitment in t and hourly wage growth between t and *t+1,* conditional on having obtained an external offer in *t+1*. In other words, we investigate to what extent the wage increase that an employee has obtained after an external offer depends on the employee's affective commitment. Recall that our formal model predicts that external offers should be associated with higher wage increases for more emotionally attached workers.

We regress the hourly wage growth between t and *t+1* on commitment in t, a dummy variable indicating whether an employee received an outside offer in *t+1*, and the interaction of the two. In specifications (1) to (3), we stepwise include employee and establishment controls, as well as establishment fixed effects. In specifications (4) to (6), we additionally control for our effort proxies. First of all, we find that when an employee received an external offer, the associated wage growth with his incumbent employer is around four percentage points higher compared to employees without an external offer. As average wage growth within our dataset is around 7 percent, this corresponds to between 55 and 63% higher wage growth for employees that have received an external offer. The coefficient of the interaction term with affective commitment has the expected sign, indicating that highly committed employees are able to reap some of the value they generate for the employer in wage negotiations when they have an external offer. However, the interaction term is significant in only one specification.[20]

[19] As previous research in psychology has shown that personality traits are predictive of turnover decisions (see e.g., Zimmerman, 2008) and may be correlated with affective commitment, we also include the Big Five personality traits as additional control variables (see table 10 in the appendix). All of our results remain robust.

[20] Table 9 in the appendix shows the relationship between affective commitment and the wages offered by an external employer. While we only have very few observations (around 100) to study this question, the point estimates indicate that conditional on having obtained an external offer, employees with higher commitment get offered significantly higher wages on the market compared to candidates with lower affective commitment.

Table 5: Wage growth and commitment with external offer

Dependent variable	Hourly wage growth △ in % between *t* and *t+1* (wins.)					
	(1)	(2)	(3)	(4)	(5)	(6)
Commitment_t (std.)	-1.310***	-1.000***	-1.006**	-1.285***	-0.974***	-1.062**
	(0.374)	(0.365)	(0.501)	(0.374)	(0.367)	(0.501)
$\text{External offer}_{t+1}$	4.316***	3.884***	3.873**	4.456***	3.960***	3.775**
	(1.240)	(1.239)	(1.641)	(1.245)	(1.245)	(1.681)
Commitment_t (std.) * $\text{External offer}_{t+1}$	1.579	1.638	2.727*	1.008	1.079	2.254
	(1.218)	(1.193)	(1.568)	(1.210)	(1.189)	(1.584)
Sick days_t				0.009	0.008	0.019
				(0.019)	(0.018)	(0.022)
Unpaid overtime_t				0.109	0.169	0.179
				(0.101)	(0.104)	(0.134)
Constant	7.841***	7.813***	6.073	7.560***	7.745***	6.106
	(0.502)	(1.865)	(9.590)	(0.514)	(1.914)	(9.711)
Observations	3,013	2,983	2,983	2,982	2,953	2,953
Number of clusters	574	571	571	574	571	571
R-squared (within)	0.014	0.044	0.212	0.014	0.044	0.211
Employee & establ. controls	No	Yes	Yes	No	Yes	Yes
Establishment fixed effects	No	No	Yes	No	No	Yes

Notes: Robust standard errors clustered on establishment level in parentheses. Control variables on employee level include: blue collar, supervisory position, part time, female, secondary and tertiary education, age, limited work contract, marital status, household size, and year dummies. Control variables on establishment level include: industry, region, establishment size, ownership structure, and independent establishment. *** p<0.01, ** p<0.05, * p<0.1.

5 Conclusion

In this paper, we studied a stylized theoretical model to analyze the effect of emotional attachment of an employee to the employer on wage bargaining and search behavior. The model predicted several patterns that we investigated empirically using a novel, representative matched employer-employee panel dataset. In particular, the model predicts that higher affective commitment has two countervailing effects. On the one hand, the employer can exploit the emotional attachment by offering a lower wage. On the other hand, an agent with a higher emotional attachment exerts higher efforts and is thus more valuable for the employer. The employee's bargaining position in the wage negotiations determines which of the two effects dominates.

Previous literature has identified on-the-job search and subsequent wage bargaining (including external offers) with the incumbent employer as the main source for rapid wage growth (Greenwald, 1986; Golan, 2005; Barron et al., 2006; Yamaguchi, 2010; Bagger et al., 2014). Our model integrates identification with the incumbent employer as a non-monetary determinant of employee's utility. We predict that the employee's emotional attachment to the employer, thus, affects effort choice and that highly committed employees will, on average, experience lower wage growth. Furthermore, a more committed employee will be less willing to invest in costly search for alternative employment opportunities, therefore the employee will be less likely to receive external offers, and finally have a lower tendency to switch employers. However, when highly committed employees have obtained an external offer from an outside employer, they tend to be able to negotiate higher wages with their incumbent employer as they are more valuable to them.

In our empirical analysis, we found that a widely applied, short survey scale measuring an employee's "affective commitment" towards the employer has substantial predictive power for on-the-job search and future wage growth. Our empirical results show that more committed workers experience sizeably lower wage growth in subsequent years compared to less committed workers. We additionally find evidence for lower investments into on-the-job search by high commitment workers, and a lower likelihood of receiving an external offer and leaving the incumbent employer. In line with our model, our data indicate that conditional on having obtained an external offer, employees who reported a higher commitment with their incumbent employer, can overcome this negative "compensating wage differential" effect.

Of course, we have to caution that affective commitment is not exogenously assigned in our dataset. It will be an important endeavor for future work to study the dynamic interplay between wages and affective commitment in more detail.

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Appendices

Appendix A: Proofs

Proof of Proposition 2:

The generalized Nash bargaining solution is obtained by maximizing the Nash product

$$\max_{w_1} \left((1-\zeta\gamma) w_1 + \gamma K(a) - c(a) - u_M \right)^{\lambda} \left(K(a) - w_1 \right)^{1-\lambda}$$

with first order condition

$$\begin{aligned} 0 &= \lambda (1-\zeta\gamma) \left((1-\zeta\gamma) w_1 + \gamma K(a) - c(a) - u_M \right)^{\lambda-1} \left(K(a) - w_1 \right)^{1-\lambda} \\ &\quad - \left((1-\zeta\gamma) w_1 + \gamma K(a) - c(a) - u_M \right)^{\lambda} (1-\lambda) \left(K(a) - w_1 \right)^{-\lambda} \end{aligned}$$

$$\Leftrightarrow 0 = \lambda (1-\zeta\gamma) \left(K(a) - w_1 \right) - (1-\lambda) \left((1-\zeta\gamma) w_1 + \gamma K(a) - c(a) - u_M \right)$$

$$\Leftrightarrow w_1 = \lambda K(a) + (1-\lambda) \frac{u_M - (\gamma K(a) - c(a))}{(1-\zeta\gamma)}$$

such that

$$\Delta(\gamma, a) = \frac{w_1}{w_0} = \frac{\lambda K(a) + (1-\lambda) \frac{u_M - (\gamma K(a) - c(a))}{(1-\zeta\gamma)}}{w_M}$$

When keeping efforts fixed,

$$\frac{\partial \Delta(\gamma, a)}{\partial \gamma} = (1-\lambda) \frac{-K(a)(1-\zeta\gamma) + \zeta (u_M - (\gamma K(a) - c(a)))}{w_M (1-\zeta\gamma)^2}$$

$$= (1-\lambda) \frac{\zeta (u_M + c(a)) - K(a)}{w_M (1-\zeta\gamma)^2}.$$

Note that when there are strictly positive gains from trade we have that

$$K(a(\gamma)) > \frac{u_M + c(a(\gamma))}{1-\zeta\gamma+\gamma} \geq \zeta (u_M + c(a)).$$

where the latter follows from the fact that $\frac{1}{1-\zeta\gamma+\gamma} > \zeta$ always holds as it is equivalent to $1-\zeta\gamma > \zeta(1-\zeta\gamma)$. Hence, $\frac{\partial \Delta(\gamma,a)}{\partial \gamma} < 0$.

When efforts are endogenous, then

$$\frac{\partial \Delta(\gamma, a(\gamma))}{\partial \gamma} = \frac{\lambda K'(a)\, a'(\gamma) + (1-\lambda)\, \frac{\left(-K(a(\gamma)) - \gamma K'(a(\gamma)) a'(\gamma) + c'(a(\gamma)) a'(\gamma)\right)(1-\zeta\gamma) + \zeta(u_M - (\gamma K(a(\gamma)) - c(a(\gamma))))}{(1-\zeta\gamma)^2}}{w_M}$$

and using that $\gamma K'(a) - c'(a) = 0$ thus

$$\frac{\partial \Delta(\gamma, a(\gamma))}{\partial \gamma} = \frac{\lambda K'(a(\gamma))\, a'(\gamma) + (1-\lambda)\, \frac{\zeta u_M - (K(a(\gamma)) - \zeta c(a(\gamma)))}{(1-\zeta\gamma)^2}}{w_M}$$

$$= \frac{\lambda}{w_M} \underbrace{K'(a(\gamma))\, a'(\gamma)}_{>0} + (1-\lambda) \underbrace{\frac{\zeta u_M - (K(a(\gamma)) - \zeta c(a(\gamma)))}{(1-\zeta\gamma)^2 w_M}}_{<0}.$$

■

Proof of Proposition 3:

To see that the wage increase due to an external offer is increasing in γ consider

$$\begin{aligned}
&E\left[\Delta\middle|\, d=1\right]-E\left[\Delta\middle|\, d=0\right]\\
&=\frac{(1-\lambda)}{(1-\zeta\gamma)}\left(\frac{E\left[u_O\middle|\, u_O\leq(1-\zeta\gamma+\gamma)K\left(a\left(\gamma\right)\right)-c\left(a\left(\gamma\right)\right)\right]-u_M}{w_M}\right)
\end{aligned}$$

and note that the first derivative w.r.t. γ is

$$\begin{aligned}
&\frac{\zeta\left(1-\lambda\right)}{\left(1-\zeta\gamma\right)^2}\left(\frac{E\left[u_O\middle|\, u_O\leq(1-\zeta\gamma+\gamma)K\left(a\left(\gamma\right)\right)-c\left(a\left(\gamma\right)\right)\right]-u_M}{w_M}\right)\\
&+\frac{(1-\lambda)}{(1-\zeta\gamma)w_M}\left(\frac{\partial E\left[u_O\middle|\, u_O\leq(1-\zeta\gamma+\gamma)K\left(a\left(\gamma\right)\right)-c\left(a\left(\gamma\right)\right)\right]}{\partial\gamma}\right).
\end{aligned}$$

This expression is strictly larger than 0 as

$$\begin{aligned}
&\frac{\partial\left(\left(1-\zeta\gamma+\gamma\right)K\left(a\left(\gamma\right)\right)-c\left(a\left(\gamma\right)\right)\right)}{\partial\gamma} \qquad (6)\\
&=\left(1-\zeta\right)K\left(a\left(\gamma\right)\right)+\left(\left(1-\zeta\gamma+\gamma\right)K'\left(a\left(\gamma\right)\right)-c'\left(a\left(\gamma\right)\right)\right)a'\left(\gamma\right)\\
&>\left(\gamma K'\left(a\left(\gamma\right)\right)-c'\left(a\left(\gamma\right)\right)\right)a'\left(\gamma\right)=0
\end{aligned}$$

by equation (2). To determine the employee's search efforts, consider his choice problem

$$\max_p p\cdot E\left[\Delta u\right]-k\left(p\right)$$

with first order condition $E\left[\Delta u\right]-k'\left(p\right)=0$ such that p is strictly increasing in $E\left[\Delta u\right]$ by the implicit function theorem. Recall that

$$\begin{aligned}
E\left[\Delta u\right]=&\int_{u_M}^{(1-\zeta\gamma+\gamma)K(a(\gamma))-c(a(\gamma))}\left(1-\lambda\right)\left(u_O-u_M\right)f\left(u_O\right)du_O\\
&+\int_{(1-\zeta\gamma+\gamma)K(a(\gamma))-c(a(\gamma))}^{\infty}\left(u_O-\left(1-\lambda\right)u_M-\lambda\left(\left(1-\gamma\zeta+\gamma\right)K\left(a\left(\gamma\right)\right)-c\left(a\left(\gamma\right)\right)\right)\right)f\left(u_O\right)du_O.
\end{aligned}$$

Now note that by Leibniz' integral rule we have that

$$\begin{aligned}\frac{\partial E\left[\Delta u\right]}{\partial\gamma} &= \left[\left(1-\lambda\right)\left(\left(1-\zeta\gamma+\gamma\right)K\left(a\left(\gamma\right)\right)-c\left(a\left(\gamma\right)\right)-u_M\right)\right.\\ &\quad\left.-\left(\left(1-\zeta\gamma+\gamma\right)K\left(a\left(\gamma\right)\right)-c\left(a\left(\gamma\right)\right)-\left(1-\lambda\right)u_M-\lambda\left(\left(1-\zeta\gamma+\gamma\right)K\left(a\left(\gamma\right)\right)-c\left(a\left(\gamma\right)\right)\right)\right)\right]\\ &\quad\cdot f\left(\left(1-\zeta\gamma+\gamma\right)K\left(a\left(\gamma\right)\right)-c\left(a\left(\gamma\right)\right)\right)\frac{\partial\left(\left(1-\zeta\gamma+\gamma\right)K\left(a\left(\gamma\right)\right)-c\left(a\left(\gamma\right)\right)\right)}{\partial\gamma}\\ &\quad+\int_{\left(1-\zeta\gamma+\gamma\right)K\left(a\left(\gamma\right)\right)-c\left(a\left(\gamma\right)\right)}^{\infty}\left(-\lambda\frac{\partial\left(\left(1-\zeta\gamma+\gamma\right)K\left(a\left(\gamma\right)\right)-c\left(a\left(\gamma\right)\right)\right)}{\partial\gamma}f\left(u_O\right)\right)du_O\\ &= \int_{\left(1-\zeta\gamma+\gamma\right)K\left(a\left(\gamma\right)\right)-c\left(a\left(\gamma\right)\right)}^{\infty}\left(-\lambda\frac{\partial\left(\left(1-\zeta\gamma+\gamma\right)K\left(a\left(\gamma\right)\right)-c\left(a\left(\gamma\right)\right)\right)}{\partial\gamma}f\left(u_O\right)\right)du_O\end{aligned}$$

which is strictly negative by equation (6).

Finally, the likelihood that the employee leaves the firm is

$$\Pr\left(u_O>\left(1-\zeta\gamma+\gamma\right)K\left(a\left(\gamma\right)\right)-c\left(a\left(\gamma\right)\right)\right)=1-F\left(\left(1-\zeta\gamma+\gamma\right)K\left(a\left(\gamma\right)\right)-c\left(a\left(\gamma\right)\right)\right)$$

such that

$$\begin{aligned}&\frac{\partial\Pr\left(u_O>\left(1-\zeta\gamma+\gamma\right)K\left(a\left(\gamma\right)\right)-c\left(a\left(\gamma\right)\right)\right)}{\partial\gamma}\\ =&-f\left(\left(1-\zeta\gamma+\gamma\right)K\left(a\left(\gamma\right)\right)-c\left(a\left(\gamma\right)\right)\right)\frac{\partial\left(\left(1-\zeta\gamma+\gamma\right)K\left(a\left(\gamma\right)\right)-c\left(a\left(\gamma\right)\right)\right)}{\partial\gamma}<0.\end{aligned}$$

■

Table 6: Summary statistics

	2012/13				2014/15			
	Obs.	Mean	Median	SD	Obs.	Mean	Median	SD
Affective commitment	5,825	3.75	3.83	.892	5,187	3.69	3.83	.886
Work engagement	5,715	3.79	3.89	.797	5,118	3.71	3.83	.82
Job satisfaction	5,917	7.59	8	1.74	5,246	7.49	8	1.7
Pay satisfaction	5,914	6.68	7	2.16	5,245	6.83	7	2.05
Sick days	5,856	11.9	4	24.7	5,185	12.8	5	25.4
Unpaid overtime	5,848	.616	0	2.8	5,172	.85	0	3.32
Hourly wage growth $\triangle$ in % btw. t and $t+1$ (wins.)	1,782	8.20	6.67	19.8	1,404	5.61	3.93	18.2
Hourly wage	4,944	20.2	18.4	9.45	4,518	21.7	20.1	9.91
Active job search	754	.241	0	.428	587	.256	0	.437
Voluntary turnover	2,215	.0185	0	.135	1,716	.0332	0	.179
External offer	2,246	.0712	0	.257	1,765	.11	0	.313
External offer wage	0	.	.	.	333	5339	3800	7640
Control variables:								
Blue collar (1/0)	5,920	.586	1	.493	5,247	.614	1	.487
Supervisory position (1/0)	5,917	.305	0	.461	5,241	.299	0	.458
Part time (1/0)	5,920	.116	0	.321	5,247	.134	0	.34
Female (1/0)	5,920	.273	0	.446	5,247	.284	0	.451
Secondary education:								
None (1/0)	5,907	.00593	0	.0768	5,235	.00439	0	.0661
Certificate of secondary education (1/0)	5,907	.263	0	.44	5,235	.228	0	.42
General cert. of secondary education (1/0)	5,907	.433	0	.495	5,235	.442	0	.497
Adv. technical college entrance qual. (1/0)	5,907	.101	0	.301	5,235	.105	0	.307
University-entrance diploma (1/0)	5,907	.19	0	.392	5,235	.212	0	.409
Other (1/0)	5,907	.00796	0	.0889	5,235	.00821	0	.0903

continued on next page

	2012/13				2014/15			
	Obs.	Mean	Median	SD	Obs.	Mean	Median	SD
Tertiary education:								
None (1/0)	5,915	.025	0	.156	5,242	.0223	0	.148
Apprenticeship (1/0)	5,915	.497	0	.5	5,242	.477	0	.5
Vocational training (1/0)	5,915	.104	0	.306	5,242	.0981	0	.297
Master craftsman (1/0)	5,915	.202	0	.402	5,242	.209	0	.406
University of applied sciences (1/0)	5,915	.083	0	.276	5,242	.0881	0	.284
University (1/0)	5,915	.0849	0	.279	5,242	.102	0	.303
Other (1/0)	5,915	.00406	0	.0636	5,242	.00305	0	.0552
Age class:								
<25 years (1/0)	5,920	.051	0	.22	5,247	.0305	0	.172
25-39 years (1/0)	5,920	.231	0	.421	5,247	.212	0	.409
40-54 years (1/0)	5,920	.544	1	.498	5,247	.522	1	.5
>55 years (1/0)	5,920	.173	0	.378	5,247	.234	0	.423
Limited work contract (1/0)	5,911	.0641	0	.245	5,240	.0429	0	.203
Marital status (1/0)	5,910	.84	1	.366	5,241	.847	1	.36
Household size	5,911	2.81	3	1.23	5,243	2.77	3	1.2
Industry:								
Metalworking and electronic industries (1/0)	5,920	.315	0	.464	5,144	.316	0	.465
Further manufacturing industries (1/0)	5,920	.37	0	.483	5,144	.372	0	.483
Retail and transport (1/0)	5,920	.111	0	.314	5,144	.111	0	.315
Services for firms (1/0)	5,920	.138	0	.345	5,144	.128	0	.334
Information and communications services (1/0)	5,920	.0667	0	.25	5,144	.0737	0	.261
Establishment size:								
50-99 employees (1/0)	5,920	.155	0	.362	5,144	.115	0	.32
100-249 employees (1/0)	5,920	.237	0	.425	5,144	.261	0	.439
250-499 employees (1/0)	5,920	.263	0	.44	5,144	.254	0	.435
500 and more employees (1/0)	5,920	.344	0	.475	5,144	.37	0	.483
Ownership structure:								
Family/Founder (1/0)	5,905	.48	0	.5	5,125	.431	0	.495
Management (1/0)	5,905	.138	0	.345	5,125	.179	0	.384
Investor (1/0)	5,905	.0757	0	.265	5,125	.073	0	.26
Shareholders (1/0)	5,905	.0882	0	.284	5,125	.122	0	.327
Public (1/0)	5,905	.0171	0	.13	5,125	.022	0	.147
Other (1/0)	5,905	.20	0	.4	5,125	.172	0	.378
Independent establishment (1/0)	5,863	.698	1	.459	5,139	.689	1	.463
Region:								
North (1/0)	5,920	.172	0	.378	5,144	.16	0	.367
East (1/0)	5,920	.256	0	.436	5,144	.27	0	.444
South (1/0)	5,920	.253	0	.435	5,144	.257	0	.437
West (1/0)	5,920	.318	0	.466	5,144	.313	0	.464

Table 7: Wage growth and commitment with control for engagement

Dependent variable	Hourly wage growth △ in % between *t* and *t+1* (wins.)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Commitment_t (std.)	-1.736***	-1.319***	-1.167*	-2.461	-1.800***	-1.373***	-1.296**	-2.837
	(0.442)	(0.429)	(0.594)	(1.738)	(0.441)	(0.427)	(0.594)	(1.750)
Engagement_t (std.)	0.800**	0.736*	0.701	1.696	0.854**	0.784**	0.783	1.231
	(0.393)	(0.386)	(0.479)	(1.525)	(0.393)	(0.386)	(0.479)	(1.539)
Sick days_t					0.011	0.011	0.022	0.022
					(0.019)	(0.019)	(0.023)	(0.035)
Unpaid overtime_t					0.125	0.173	0.211	0.015
					(0.108)	(0.110)	(0.144)	(0.439)
Constant	8.074***	8.231***	5.484	8.519	7.809***	8.140***	5.521	8.458
	(0.492)	(1.857)	(9.751)	(14.402)	(0.509)	(1.911)	(9.856)	(15.064)
Observations	2,957	2,928	2,928	2,928	2,930	2,902	2,902	2,902
Number of clusters	572	569	569	569	572	569	569	569
R-squared (within)	0.011	0.043	0.210	0.057	0.011	0.043	0.211	0.057
Employee & establ. controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Establishment fixed Effects	No	No	Yes	Yes	No	No	Yes	Yes
Employee fixed Effects	No	No	No	Yes	No	No	No	Yes

Notes: Robust standard errors clustered on establishments in parentheses. Control variables on employee level include: blue collar, supervisory position, part time, female, secondary and tertiary education, age, limited work contract, marital status, household size, and year dummies. Control variables on establishment level include: industry, region, establishment size, ownership structure, and independent establishment. *** p<0.01, ** p<0.05, * p<0.1.

Appendix D:

Table 8: Wage growth and engagement

Dependent variable	Hourly wage growth △ in % between *t* and *t+1* (wins.)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Engagement_t (std.)	-0.093	0.099	0.166	0.870	-0.057	0.127	0.201	0.331
	(0.326)	(0.325)	(0.400)	(1.448)	(0.324)	(0.323)	(0.397)	(1.471)
Sick days_t					0.014	0.013	0.024	0.017
					(0.019)	(0.019)	(0.023)	(0.034)
Unpaid overtime_t					0.091	0.158	0.199	0.018
					(0.108)	(0.111)	(0.142)	(0.444)
Constant	7.946***	8.690***	5.615	8.643	7.652***	8.570***	5.702	8.895
	(0.484)	(1.839)	(9.757)	(14.507)	(0.503)	(1.896)	(9.859)	(15.162)
Observations	2,977	2,947	2,947	2,947	2,949	2,920	2,920	2,920
Number of clusters	573	570	570	570	573	570	570	570
R-squared (within)	0.005	0.041	0.209	0.053	0.005	0.041	0.209	0.052
Employee & establ. controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Establishment fixed effects	No	No	Yes	Yes	No	No	Yes	Yes
Employee fixed effects	No	No	No	Yes	No	No	No	Yes

Notes: Robust standard errors clustered on establishments in parentheses. Control variables on employee level include: blue collar, supervisory position, part time, female, secondary and tertiary education, age, limited work contract, marital status, household size, and year dummies. Control variables on establishment level include: industry, region, establishment size, ownership structure, and independent establishment. *** p<0.01, ** p<0.05, * p<0.1.

Appendix E:

Table 9: External offer wages and commitment

Dependent variable	External offer wage$_{t+1}$		
	(1)	(2)	(3)
Commitment$_t$ (std.)	1,005.516***	548.740*	523.558*
	(247.084)	(293.610)	(309.955)
Sick days$_t$			-10.119
			(7.512)
Unpaid overtime$_t$			28.508
			(56.422)
Constant	5,713.998***	1,409.745	1,621.968
	(444.321)	(941.325)	(998.849)
Observations	716	701	682
Number of clusters	431	425	416
R-squared (within)	0.019	0.198	0.195
Employee & establ. controls	No	Yes	Yes

Notes: Robust standard errors clustered on establishments in parentheses. Control variables on employee level include: blue collar, supervisory position, part time, female, secondary and tertiary education, age, limited work contract, marital status, household size, and year dummies. Control variables on establishment level include: industry, region, establishment size, ownership structure, and independent establishment. *** p<0.01, ** p<0.05, * p<0.1.

Table 10: Job search, turnover and commitment with control for Big Five personality traits

Dependent variable	Active job search$_{t+1}$		External offer$_{t+1}$		Voluntary turnover$_{t+1}$	
	(1)	(2)	(3)	(4)	(5)	(6)
Commitment$_t$ (std.)	-0.072***	-0.057***	-0.020***	-0.017***	-0.010***	-0.008***
	(0.013)	(0.013)	(0.004)	(0.005)	(0.001)	(0.001)
Sick days$_t$		0.001		0.000		0.000
		(0.001)		(0.000)		(0.000)
Unpaid overtime$_t$		-0.007*		0.002*		0.001
		(0.004)		(0.001)		(0.000)
Satisfaction with pay$_t$ (std.)		-0.038***		-0.008		-0.005***
		(0.015)		(0.005)		(0.002)
Extraversion$_t$ (std.)	0.010	0.009	0.010**	0.012**	0.003**	0.003*
	(0.014)	(0.014)	(0.004)	(0.005)	(0.002)	(0.001)
Conscientiousness$_t$ (std.)	-0.000	-0.002	0.001	0.000	0.000	0.001
	(0.015)	(0.015)	(0.004)	(0.005)	(0.002)	(0.002)
Neuroticism$_t$ (std.)	-0.010	-0.014	-0.003	-0.003	-0.000	0.000
	(0.013)	(0.013)	(0.004)	(0.005)	(0.001)	(0.001)
Openness$_t$ (std.)	0.042***	0.039***	0.013***	0.012**	0.003	0.002
	(0.014)	(0.014)	(0.005)	(0.005)	(0.002)	(0.002)
Agreeableness$_t$ (std.)	-0.017	-0.019	-0.003	-0.002	0.003*	0.003**
	(0.013)	(0.013)	(0.004)	(0.005)	(0.002)	(0.002)
Observations	1,248	1,214	3,767	3,250	3,584	3,500
Number of clusters	475	471	617	600	597	594
Pseudo R-squared	0.091	0.099	0.108	0.109	0.190	0.208

Notes: Robust standard errors clustered on establishments in parentheses. All specifications include employee and establishment controls. Control variables on employee level include: blue collar, supervisory position, part time, female, secondary and tertiary education, age, limited work contract, marital status, household size, and year dummies. Control variables on establishment level include: industry, region, establishment size, ownership structure, and independent establishment. *** p<0.01, ** p<0.05, * p<0.1.

Appendix G:

Table 11: Wage growth and commitment - Employees with pure fixed wages only

Dependent variable	Hourly wage growth △ in % between *t* and *t+1* (wins.)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Commitment_t (std.)	-1.646***	-1.602***	-1.922**	-1.038	-1.676***	-1.614***	-2.028**	-2.338
	(0.560)	(0.550)	(0.886)	(2.600)	(0.562)	(0.552)	(0.897)	(2.557)
Sick days_t					-0.016	-0.007	-0.003	0.112*
					(0.016)	(0.017)	(0.029)	(0.062)
Unpaid overtime_t					-0.138	-0.118	-0.065	0.804
					(0.167)	(0.167)	(0.199)	(0.800)
Constant	7.213***	5.859*	6.000	-13.354	7.396***	6.433*	6.145	-17.457
	(0.685)	(3.268)	(18.104)	(25.089)	(0.724)	(3.347)	(18.106)	(25.317)
Observations	1,183	1,163	1,163	1,163	1,172	1,153	1,153	1,153
Number of clusters	574	571	571	571	574	571	571	571
R-squared (within)	0.012	0.043	0.351	0.095	0.012	0.042	0.351	0.120
Employee & establ. controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Establishment fixed effects	No	No	Yes	Yes	No	No	Yes	Yes
Employee fixed effects	No	No	No	Yes	No	No	No	Yes

Notes: Robust standard errors clustered on establishment level in parentheses. Control variables on employee level include: blue collar, supervisory position, part time, female, secondary and tertiary education, age, limited work contract, marital status, household size, and year dummies. Control variables on establishment level include: industry, region, establishment size, ownership structure, and independent establishment.
*** p<0.01, ** p<0.05, * p<0.1.