

Reference wages and turnover intentions: Evidence from linked employer-employee data

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Abstract

This research note analyzes the nexus between workers' turnover intentions and workers' own wages, internal and external reference wages. Worker and establishment surveys are linked with administrative social security data for all workers in surveyed establishments. Approximately half a million worker-year observations are used to predict conditional internal and external reference wages. Results show that higher external and internal reference wages are correlated with higher turnover intentions. Thus, external reference wages seem to serve as outside options and higher reference wages of co-workers seem rather to reduce own social status than to signal better future prospects at the current employer.

Keywords: income comparison, signal, status, turnover, linked employer-employee data

JEL codes: J31, J63, M52

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Notes: The used data is confidential and can be accessed via the Research Data Centre (FDZ) of the German Federal Employment Agency (BA) at the Institute for Employment Research (IAB): http://fdz.iab.de/en/Integrated_Establishment_and_Individual_Data/lpp.aspx. For help with the data, our statistical programs in Stata, and replication studies contact Jens Mohrenweiser.

1. Introduction

Turnover induced by workers is often inefficient for firms due to replacement costs and loss in human capital. But already turnover intentions of workers can be costly as they often translate into lower motivation to provide effort in the current employer's interest and might be followed by an actual quit. In this research note, we examine the influence of the wages of co-workers in the same firm and of the wages of workers in other firms on a worker's own intention to change the job. If workers compare their own wages at their current employer with potential wages in other firms, low own wages might induce discomfort in the current firm and higher external reference wages are related to better outside options. In a *ceteris paribus* perspective, i.e., holding the own wage constant, we can propose the hypothesis that workers' turnover intentions are positively correlated with external reference wages. Additionally, interpersonal wage comparisons within the workplace are likely to matter. First, higher internal reference wages of comparable co-workers might be seen as unfair from an equity perspective, if they are interpreted as better outcomes for peers. Second, higher internal reference wages might be associated with lower own social status (relative standing) within the peer group. Third, higher internal reference wages might signal better own future prospects (expected wage growth) at the current employer. In a *ceteris paribus* perspective, the first two arguments (equity and status) lead to the hypothesis that workers' turnover intentions are positively correlated with internal reference wages, whereas the third argument (signal) predicts a negative correlation between turnover intentions and wages of co-workers.

We link worker surveys with establishment surveys and administrative social security records for Germany, contributing to the still scarce evidence about the consequences of relative wages using linked employer-employee data. For example, Galizzi and Lang (1998) report for Italy and Pfeifer and Schneck (2012) for Germany that the average wage in an establishment as well as conditional internal reference wages are negatively correlated with workers' probability to quit the job. Godechot and Senik (2015) find for France no significant correlations between quit intentions and internal reference wage variables, whereas quit intentions are positively correlated with the regional reference wage. Card et al. (2012) find in a field experiment with an information treatment among employees of the University of California that workers, who know they earn lower relative wages, have significantly lower job and pay satisfaction and, in turn, a higher probability to search for a new job.

2. Data, variables, and method

The German Linked Personnel Panel (LPP) consists of questionnaires for employees and for employers (Kampkoetter et al., 2016). The employee questionnaire asks about job characteristics, attitudes, personality, and socio-demographic background. The employer questionnaire, answered by the owner or top managers of the establishment, entails questions about HRM practices and general firm policies. The LPP is a representative subsample of the IAB Establishment Panel that includes private sector establishments with 50 or more employees in manufacturing and service industries. We use the waves 2012 and 2014 consisting of 10,175 individuals nested in 869 establishments. Our analysis is based on the employee level, i.e., data from LPP employee surveys are augmented with establishment level characteristics (LPP/ IAB establishment surveys) and wage variables for each employee (social security records). We drop observations from our estimation sample with reported earnings below and above the social security thresholds, because we do not have precise wage information for them. As the social security records only include daily wage information, we only consider full-time employees. Moreover, we exclude observations with no comparable co-workers in the same occupation and establishment cell and with item non-responses, which leaves us with 8,505 worker-year observations nested in 867 establishments.

Our dependent variable is worker's turnover intention, which is based on the response to the question: "In the past twelve months, how many times have you thought about changing your job?" Respondents answered on a five-point ordinal scale ranging from 1 to 5 (1: "never", 2: "a few times a year", 3: "a few times a month", 4: "a few times a week", 5: "every day"). The majority of 62 percent of the surveyed workers has never thought about changing the job in the past twelve months and about 24 percent have thought about it only a few times per year. About 9 percent have thought about changing the job a few times per month and 4 percent have thought about it a few times per week. Less than 2 percent of the workers have thought about changing the job every day. We pool the answer categories and generate a binary variable for turnover intentions (*TI*) in the past twelve months, which takes the value one, if a worker thought at least a few times a year about a job change (38 percent), and zero, if a worker has never thought about a job change (62 percent).

We regress workers' turnover intentions on three wage variables, which are constructed from social security records of all (not only the surveyed) full-time employees working in LPP establishments on June 30th in 2012 and 2014: the worker's own wage (*WOWN*), the worker's conditional internal reference wage within the firm (*WREFINT*), and the worker's conditional

external reference wage across firms (*WREFEXT*). *WOWN* is simply the log of individual nominal earnings per day. As the average wage in a complete establishment is a very broad comparison income for workers with different characteristics and productivity levels, we predict *WREFINT* based on Mincer type earnings regressions estimated separately for each establishment and year. The regressions explain log daily earnings of full-time employees with individual schooling level (three categories), quadratic age function, and dummies for one-digit occupation codes. *WREFINT* is consequently the average wage in each cell of the considered explanatory variables. We use the same approach to generate *WREFEXT* by predictions from a Mincer type earnings regression for all workers across all firms in the sample instead of separate regressions for each establishment. We estimate Tobit models for all earnings regressions, because the earnings in the social security data are bottom and top coded at the social security thresholds. In total, we use approximately half a million worker-year observations from administrative social security data for the regressions to predict *WREFINT* and *WREFEXT*. Table 1 presents means, standard deviations, and correlations for our wage variables. *WOWN* is on average 4.708 log points, *WREFINT* is on average 4.695 log points, and *WREFEXT* is on average 4.775 log points. Not surprisingly, *WOWN*, *WREFINT*, and *WREFEXT* are positively correlated with each other. Their partial correlations with turnover intentions are negative, which might be misleading due to the interrelation of the wage variables and confounding factors. Thus, a more elaborated regression analysis is necessary that takes a *ceteris paribus* perspective by holding the own wage constant.

Table 1: Variables of interest

	Definition	Mean	SD	<i>TI</i>	<i>WOWN</i>	<i>WREFINT</i>
<i>TI</i>	Binary turnover intentions in past 12 months (0: none; 1: thought at least a few times a year about job change)	0.380	0.485	1		
<i>WOWN</i>	Log own daily wage	4.708	0.411	-0.137	1	
<i>WREFINT</i>	Predicted log daily reference wage inside firm	4.695	0.370	-0.144	0.904	1
<i>WREFEXT</i>	Predicted log daily reference wage outside firm	4.775	0.279	-0.047	0.634	0.702

Notes: 8505 worker-year observations in 867 establishments. All correlation coefficients are statistically significant different from zero at $p < 0.01$.

The binary character of our dependent variable “workers’ turnover intentions (*TI*)” would usually call for a binary probit model. But as we are interested in wage comparisons between workers within the same workplace, we focus on linear regressions with the inclusion of firm fixed-effects, i.e., 867 establishment dummies, which also reduce a potential omitted variable bias stemming from unobserved time-invariant firm heterogeneity. For this approach and given our data properties, we prefer to estimate a linear probability model using OLS, which coefficients can be interpreted as marginal effects, i.e., the change in the probability that a worker thought at least a few times a year about a job change. In a sensitivity check without the inclusion of firm fixed-effects, the size of the marginal effects from probit and OLS regressions are approximately similar in size. Although we use data for the years 2012 and 2014, worker random-effects or fixed-effects models are not a feasible estimation strategy in our application, because most workers are only observed once. But we control for a wide range of differences in socio-demographic characteristics (age, education, gender, having a partner, having kids), personality (Big Five, trust), employment characteristics (permanent contract, working hours, shift work, flexible working time, managerial responsibilities), job characteristics (out-of-hours demand, decision autonomy, task autonomy, interdependence with co-workers, physical loading), time-varying establishment characteristics (works council, collective agreement, workforce composition, limited company, foreign-owned company, state-of-the-art technology, firm-size categories), and a dummy for the year 2014 to capture confounding factors that are correlated with the wage variables and turnover intentions. Descriptive statistics for all variables are in the Online Appendix. As we use aggregated and predicted wage variables at the establishment level as regressors, we report robust standard errors clustered at the establishment level, which are rather conservative, i.e., we might produce too low statistical significance levels.

3. Results and discussion

The regression results for workers’ turnover intentions in Table 2 show that own wages are not significantly correlated with turnover intentions, though the coefficient has the expected negative sign. But internal and external reference wages are on average significantly positively correlated with turnover intentions in a *ceteris paribus* perspective, i.e., holding the own wage

constant.¹ A 0.1 log point (approximately 10 percent) higher internal reference wage is associated with a 1.36 percentage point higher probability to have thought about a job change. Thus, lower social status and equity considerations when making interpersonal comparisons with peers in the same workplace seem to dominate on average the counteracting signal effect of potentially better own future prospects in the current workplace. A 0.1 log point (approximately 10 percent) higher external reference wage is associated with a 2.42 percentage point higher probability to have thought about a job change. This result is consistent with the hypothesis that workers compare their wages with potential wages in other firms and that higher external reference wages indicate better outside options.

Table 2: Regression results (linear probability model with OLS) for turnover intentions

	Coef. (SE)
<i>WOWN</i>	-0.041 (0.035)
<i>WREFINT</i>	0.136** (0.061)
<i>WREFEXT</i>	0.242*** (0.053)
Control variables	Yes
Firm fixed-effects	Yes
Mean binary dependent variable: turnover intentions	38%
R squared	0.311
Adjusted R squared	0.229

Notes: 8505 worker-year observations in 867 establishments. Linear probability model with OLS and inclusion of firm fixed-effects (establishment dummies). Dependent variable is binary turnover intentions in past 12 months (0: none; 1: thought at least a few times a year about job change). Robust standard errors clustered at establishment level. * p<0.10, ** p<0.05, *** p<0.01. Complete results for all variables can be requested from the authors.

¹ Note that it does not matter for the estimated coefficients and standard errors of the reference wage variables, if we regress turnover intentions on the internal and external reference wages or on their gaps to the own wage. Because we control for the absolute own wage in the regressions, the absolute reference wages reflect the gaps to the absolute own wage in a ceteris paribus perspective. For example, a one unit increase of the absolute reference wage increases the gap by one unit, holding the absolute own wage constant. Formally, we estimate equation (1) and equation (2) would be the specification with gaps, which result in the same coefficients b and c for the reference wage variables. Note that workers' own wages serve rather as a control variable in our setting and that we are interested in the reference wage variables.

$$(1) \quad TI = a \cdot WOWN + b \cdot WREFINT + c \cdot WREFEXT$$

$$(2) \quad TI = a \cdot WOWN + b \cdot (WREFINT - WOWN) + c \cdot (WREFEXT - WOWN) \\ = (a - b - c) \cdot WOWN + b \cdot WREFINT + c \cdot WREFEXT$$

Our findings are in line with previous results of Godechot and Senik (2015), who report that quit intentions are significantly positively correlated with the external regional reference wage. But they contradict Godechot and Senik (2015), who find no significant correlations with internal reference wage variables, and Galizzi and Lang (1998) as well as Pfeifer and Schneck (2012), who report that unconditional and conditional internal reference wages are negatively correlated with actual quits. We find, however, that conditional internal reference wages are positively correlated with turnover intentions so that a potential status effect seems to dominate a potential signal effect, which is consistent with findings in a field experiment by Card et al. (2012) among employees of a single employer. Part of the differing results can be attributed to the importance of taking explicitly a within-firm perspective – either by the inclusion of firm fixed-effects or by looking at single firms – when analyzing comparisons at the workplace.

Our findings have implications for wage policies. Even if unequal pay structures and wage comparisons at the workplace might be beneficial from an incentive point of view, they might increase intentions to change the job among relatively lower paid workers and, consequently, increase turnover related costs for firms. Moreover, our findings might explain why many firms insist on pay secrecy rules and one might question policies of pay transparency within and across firms.

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Supplementary material: Online Appendix (263 words)

Table A.1: Variable list and complete descriptive statistics

	Mean	SD
Binary turnover intentions (<i>TI</i>) in past 12 months (0: none; 1: thought at least a few times a year about job change)	0.380	
<i>WOWN</i>	4.708	0.411
<i>WREFINT</i>	4.695	0.370
<i>WREFEXT</i>	4.775	0.279
<i>Individual level variables</i>		
Age in years	45.133	10.523
Male	0.816	
Partner	0.841	
Kids	0.370	0.736
University degree	0.319	
<i>Job level variables</i>		
Permanent contract	0.954	
Working hours	42.380	7.081
Shiftwork	0.323	
Flexible working hours	0.149	
Manager	0.339	
Available outside work	2.058	1.143
Decision autonomy	4.019	0.994
Task variety	4.256	0.921
Dependent on co-worker	3.868	1.195
Co-worker depend on me	3.374	1.301
Physical work environment.	2.371	1.457
<i>Firm level variables</i>		
Works council	0.808	
Collective agreement	0.706	
Share females	0.255	0.198
Share university graduates	0.129	0.146
Share apprenticeship degree	0.645	0.221
Firm managed by owner	0.191	
Limited company	0.908	
Foreign majority owner	0.202	
Modern technique	0.772	
<i>Personality</i>		
Agreeableness	4.047	0.577
Consciousness	4.368	0.476
Neuroticism	2.689	0.755
Openness	3.660	0.627
Extraversion	3.704	0.725
Trust	3.472	0.782
<i>Firm size (ref. 50-99)</i>		
100 - 249 employees	0.257	
250 - 499 employees	0.254	
500 und more employees	0.349	
<i>Industry (ref. other manufacturing)</i>		
Metal, electro, vehicles	0.412	
Retail, logistics, communication	0.098	
Service for firms	0.111	
IT and other services	0.050	
<i>Region (ref. west)</i>		
North	0.158	
East	0.270	
South	0.260	
Year 2014	0.453	

Notes: 8505 worker-year observations in 867 establishments. Standard deviations for dummy variables are omitted. Industry and region are time-invariant firm characteristics and not included in our regressions with firm fixed-effects. Their means are nevertheless presented for completeness, because industry and region are stratification variables of the surveys.