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ABSTRACT

Social Comparisons of Wage Increases and Job Satisfaction[*]

We combine status quo and social comparison considerations and investigate whether relative wage increases in the sense of differences between individual wage increases and wage increases of comparable employees are related to managers' job satisfaction. Using a panel data set of managers in the German chemical industry, we indeed find first evidence. The relation between relative wage increases and job satisfaction is relevant for managers with lower absolute wage levels in particular.

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1.   Introduction

It is now more and more established that individuals take certain reference points into account when evaluating their income. Two of the most prominent concepts of reference points include the own status quo (e.g. Kahneman & Tversky 1979) and social comparisons with peers (e.g. Adams 1963, Fehr & Schmidt 1999). Considering employment relationships, individuals take own wages of previous periods into account so that wage increases are related to job satisfaction (e.g. Clark 1999) and they also compare their absolute wage with that of other employees (e.g. Clark & Senik 2010, Card et al. 2012).

We combine these two reference point concepts. We argue that individuals may compare their individual wage *increases* with those of other employees. Based on data of middle managers in Germany, we indeed find first evidence that relative wage increases are positively related to job satisfaction. This relation holds for employees with lower absolute wage levels in particular.

Hence, there are good reasons to combine these two reference point concepts and to focus on the relevance of *relative wage increases*. We therefore refer to differences between individual wage increases and wage increases of similar employees in a market. We want to explore whether the comparison of own wage increases with those of other employees is related to job satisfaction.

This paper proceeds as follows. In section 2, we refer to the relevant theoretical approaches and previous empirical findings before describing our data, variables, and methodology in section 3. The empirical results are presented in section 4. Section 5 concludes.

2.   Theoretical approaches and previous empirical findings

In the context of status quo preferences, prospect theory by Kahneman und Tversky (1979) states that human decision-making is largely based on relative utility considerations. Thus, employees usually evaluate their income or other goods with respect to a certain reference point and evaluate deviations from that point as gains and losses, respectively. In employment relationships, employees may take their wages of previous periods as reference points. Wage increases can then be interpreted as deviations from these reference points.

Clark (1999) finds evidence that both wages and wage increases have a positive effect on job satisfaction but no significant effect of the absolute wage alone. He uses a cross section built from the first two waves of the British Household Panel Survey (BHPS) for his study. Grund and Sliwka (2007) state for the German case that job satisfaction is positively related to wage increases for white collar workers in particular.

In terms of social comparisons, social comparison theory (Festinger 1954) and equity theory (Adams 1963) argue that individuals compare themselves with similar persons, which has an impact on utility and on behavior. By comparing themselves with others, employees want to reduce uncertainty in specific domains and to estimate unfairness in terms of compensation structures. Especially disadvantageous inequality (i.e. individual wage level is lower than reference wage level) is assumed to have a negative effect on a subject`s utility (Fehr & Schmidt 1999). In contrast to these negative comparison effects, Hirschman and Rothschild (1973)

suggest the information effect or tunnel effect. Such an effect comprises higher wages of others potentially operating as a signal for own future wage opportunities.

There are some empirical studies which address the identification of relevant reference groups for social comparisons with respect to the absolute wage. Ferrer-i-Carbonell (2005) finds that individuals compare themselves with employees who have a similar education level, who are inside the same age bracket, and who live in the same region as themselves. In line with these findings, Godechot and Senik (2015) show that social comparisons in terms of the wage level prevail both on the firm level as well as on the market level.

In most cases certain differences in wage levels may be accepted among employees because of differences in human capital and the level of task responsibilities, for instance. There are both theoretical and empirical hints that these social comparisons may rather be attached to wage increases than only to absolute wages, though. According to tournament theory (Lazear & Rosen 1981), individuals are incentivized by extraordinary wage increases in situations where employees compete for winner prizes, such as promotions or extra bonuses. In an empirical investigation, Grund and Westergaard-Nielsen (2008) show that the dispersion of wage increases (rather than the dispersion of absolute wages) among the workforce of firms is related to firm performance.

Hence, there are good reasons to combine these two reference point concepts and to focus on the relevance of *relative wage increases*. We therefore refer to differences between individual wage increases and wage increases of either employees in other firms. We want to elaborate the role of the comparison of own wage increases with those of other employees. Our conjecture is that relative wage increases are positively related to utility and, therefore, to job satisfaction.

3.   Data, variables and methodology

We use panel data on middle managers in the German chemical industry. These individuals have an impression of their relative position within the market, as the corresponding employee association provides detailed information on the wage structure and wage increases of the relevant market each year.

We use data from the years 2009 to 2015, which are collected in retrospect, so that we have compensation information for the years 2008 to 2014. The dataset has been generated from an annual salary survey which we have conducted in collaboration with the Association of Employed Academics and Executives in the Chemical Industry (Verband angestellter Akademiker und leitender Angestellter der chemischen Industrie (VAA)). There are around 440,000 individuals employed in the German chemical sector, of which around 10 % have some kind of management position (VCI, 2016). Every year, the questionnaire is sent out to all of the 18,000 members of the Association. We receive a response rate of around 0.3 per year. Since we focus on wage increases, we restrict our analysis to fulltime employees, for whom we have information from two consecutive years. In order to get a homogeneous sample of employees, we restrict our data to individuals who work in firms in western Germany and hold a university degree in either natural science or engineering. Furthermore, we do not consider managers of the highest top level (level 1), as their employment contracts and compensation packages differ fundamentally from those of middle managers. Besides we have excluded about 200 observations of managers who changed their employer within the previous year. This leads to a sample of n=12,056 observations with 4,772 different individuals.

Job satisfaction is considered to be a suitable proxy for the well-being of employees with respect to their work. It represents our dependent variable and is assessed by the question "How satisfied are you with your job?" on an 11-digit scale ranging from 0 (totally unhappy) to 10 (totally happy). Managers report an average level of job satisfaction of about 7.

The yearly total compensation (in € 1,000) of manager i in a certain year t is represented by $wage_{i,t}$ (the previous year value is described by $wage_{i,t-1}$). The *relative wage increase* is calculated by $[(wage_{i,t} - wage_{i,t-1})/wage_{i,t-1}] - [(\overline{wage}_{others,t} - \overline{wage}_{others,t-1})/ \overline{wage}_{others,t-1}]$. It describes the difference between the wage increase of manager *i* in a certain year *t* and the average wage increase of other similar managers. It is supposed that wage profiles are concave and increase over time. As managers are assumed to be aware of this phenomenon, they should tend to compare their own wage increases with those of employees with similar years of professional experience. For this reason, we operationalize the reference wage increase as the average wage increase of managers with a similar amount of work experience (5-year intervals).

We control for socio-demographic characteristics, such as gender and incidence of children (1=yes), job- and firm-level factors which consist of distance from home to the workplace (measured in kilometers), firm size (3 categories), firm tenure (measured in years)[1], level of hierarchy (3 categories), actual weekly working hours, and the year of observation (6 dummies).

Table 1 shows the descriptive statistics of our variables. Managers on average report a level of job satisfaction of about 7 (of 10) and earn € 127,000 per year. About 90 % of our sample are male. They work 47 hours per week on average. The average tenure amounts to more than 16 years. About half of the managers work in firms with more than 10,000 employees. More than half of the managers work on hierarchical level 3.

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[1] Results are robust when considering age or work experience instead of firm tenure. Note that stable, long-lasting employment relationships are predominant in the German chemical sector.

Table 1: Descriptive statistics (n=12,056)

Variable	Mean/Share	Std. Dev.
job satisfaction	6.83	2.09
$wage_{i,t}$ (in € 1,000)	127.909	49.626
relative wage increase	0.000	0.17
Female (1=yes)	0.109	
Child(ren) (1=yes)	0.678	
Distance to work (km)	23.940	23.175
Weekly working time (hours)	46.972	5.593
Firm size		
< 1,000 employees	0.164	
1,000-10,000 employees	0.324	
>10,000 employees	0.512	
Tenure (years)	16.820	8.660
Years of professional experience	23.045	7.578
Levels of Hierarchy		
Level 2	0.129	
Level 3	0.558	
Level 4	0.313	
Year of observation		
2009	0.179	
2010	0.174	
2011	0.177	
2012	0.159	
2013	0.159	
2014	0.152	

4. Empirical results

Model (1) of Table 2 presents the results of OLS estimations on job satisfaction.[2] We focus on the relative wage increase as defined above, which is indeed positively related to managers` job satisfaction. The link is not significant when estimating a fixed effects model, though (model 2).

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[2] Results of corresponding ordered probit estimations lead to the same qualitative results.

Table 2: Estimations on job satisfaction

	(1) OLS	(2) Fixed effects
wage	0.0027***	0.0004
	(0.0007)	(0.0011)
relative wage increase	0.1963*	0.0661
	(0.1067)	(0.1254)
Female (1=yes)	-0.1294	
	(0.0949)	
Children (1=yes)	0.0395	-0.1151
	(0.0596)	(0.0942)
Tenure	-0.0163***	-0.0446***
	(0.0036)	(0.0139)
Distance to work (km)	-0.0028**	0.0003
	(0.0013)	(0.0025)
Weekly working time (hours)	-0.0019	-0.0052
	(0.0055)	(0.0081)
Firm size (Reference: 1,000-10,000 employees)		
<1,000 employees	-0.0934	-0.0214
	(0.0908)	(0.1846)
>10,000 employees	0.4376***	0.0772
	(0.0621)	(0.1029)
Level of Hierarchy (Reference: Level 4)		
Level 2	0.6077***	0.7074***
	(0.1082)	(0.1512)
Level 3	0.3083***	0.2485***
	(0.0649)	(0.0770)
Year dummies (7)	yes	yes
R^2	0.032	0.004
# Observations	12,056	12,056

Notes: Robust standard errors clustered on the individual level (in parentheses).
*significant at 10%, **significant at 5%, ***significant at 1%.

The results of a meta-analysis by Kooij et al. (2011) suggest that rather less experienced employees care for wage increases and career advancements. We, therefore, want to explore, whether relative wage increases are related to job satisfaction for younger employees and/or those with lower absolute wages in particular. Table 3 presents the corresponding results with corresponding additional interaction terms. Model 1 of Table 3 confirms that the relevance of relative wage increases is decreasing with experience. The same is true for absolute wages

(model 2).[3] A joint estimation shows that the wage effect outweighs the experience effect (model 3). Fixed effects panel estimations (model 4 to 6) confirm the results of the OLS approach so that the relation is not driven by unobserved heterogeneity. Significance levels are somewhat lower, though. Other possible interaction terms (e.g. with regard to sex, having children or firm size – not presented here) do not show significant results.

Table 3: Estimations on job satisfaction including interaction effects

	OLS			Fixed effects		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
wage	0.0029***	0.0033***	0.0032***	0.0012	0.0018	0.0020
	(0.0008)	(0.0008)	(0.0008)	(0.0012)	(0.0015)	(0.0015)
relative wage increase	0.6056***	0.5957***	0.6281***	0.5753**	0.3586**	0.5828**
	(0.2139)	(0.1554)	(0.2070)	(0.2509)	(0.1454)	(0.2446)
relative wage increase*experience	-0.0222**		-0.0026	-0.0250*		-0.0136
	(0.0106)		(0.0124)	(0.0129)		(0.0141)
relative wage increase*wage		-0.0028***	-0.0027***		-0.0022**	-0.0018
		(0.0008)	(0.0010)		(0.0010)	(0.0011)
Controls	yes	yes	yes	yes	yes	yes
R^2	0.033	0.033	0.033	0.006	0.007	0.008
# Observations	12,056	12,056	12,056	12,056	12,056	12,056

Notes: Robust standard errors clustered on the individual level (in parentheses). *significant at 10%, **significant at 5%, ***significant at 1%.

Godechot and Senik (2015) show that social comparisons in terms of absolute wages can prevail not only to similar employees on the market level, but also to colleagues in the same firm. We can attach part of our observations to certain firms and can then use about 6,900 of 73 firms to run corresponding estimations with relative wage increases compared to colleagues of the same

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[3] Corresponding estimations of subgroups with regard to median splits of experience and wage confirm that the relation between relative wage increases and job satisfaction is relevant for younger employees and those with lower wages in particular (see Table A in the Appendix).

firm. The results confirm the same interaction effects of experience as well as wage level and relative wage increases (see Table B to D in the Appendix).

5. Conclusion

We combine two prominent reference point concepts – status quo preferences and social comparisons with peers – and suggest that relative wage increases defined as the difference of own wage increases compared to those of peers act as a relevant monetary reference point. Using panel data on middle managers in the German chemical industry, we investigate whether relative wage increases are associated to managers` job satisfaction. Indeed, we find first evidence for this relation. The relevance of the link between relative wage increases and job satisfaction is decreasing with the absolute wage level.

Our results have practical implications for the pay policy of firms, which may consider the relation to job satisfaction for certain groups of employees when implementing monetary incentive systems. Future research may explore this identified relationship in more detail both theoretically and empirically.

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Appendix

Table A: Group-specific OLS and fixed effects estimations on job satisfaction

	exp. ≤20	exp. >20	wage ≤ median wage	wage > median wage
	(1)	**(2)**	**(3)**	**(4)**
OLS				
wage	0.0050***	0.0034***	0.0055**	0.0018**
	(0.0018)	(0.0008)	(0.0027)	(0.0009)
relative wage increase	0.3176**	-0.1480	0.3824***	-0.0238
	(0.1426)	(0.1831)	(0.1435)	(0.1774)
Controls	yes	yes	yes	yes
	(5)	**(6)**	**(7)**	**(8)**
Fixed effects				
wage	0.0013	0.0012	-0.0040	0.0011
	(0.0033)	(0.0013)	(0.0049)	(0.0013)
relative wage increase	0.2474*	-0.2239	0.2784**	-0.1587
	(0.1486)	(0.2210)	(0.1382)	(0.2339)
Controls	yes	yes	yes	yes
# Observations	4,380	7,676	6,030	6,026

Notes: Robust standard errors clustered on the individual level (in parentheses).
*significant at 10%, **significant at 5%, ***significant at 1%.

Table B: Descriptive statistics (firm level, n=6,939)

Variable	Mean/Share	Std. Dev.
job satisfaction	6.79	2.09
$wage_{i,t}$ (in € 1,000)	132.083	44.148
relative wage increase	0.000	0.14
Female (1=yes)	0.109	
Child(ren) (1=yes)	0.701	
Distance to work (km)	22.810	21.452
Weekly working time (hours)	47.156	5.589
Firm size		
< 1,000 employees	0.066	
1,000-10,000 employees	0.385	
>10,000 employees	0.549	
Tenure (years)	18.227	8.221
Years of professional experience	23.720	7.214
Levels of Hierarchy		
Level 2	0.090	
Level 3	0.597	
Level 4	0.313	
2009	0.180	
2010	0.178	
2011	0.181	
2012	0.158	
2013	0.156	
2014	0.147	

Table C: Estimations on job satisfaction (firm level)

	(1) OLS	(2) Fixed effects
wage	0.0059***	0.0026*
	(0.0011)	(0.0014)
relative wage increase (firm level)	0.0207	-0.1055
	(0.1412)	(0.1550)
Female (1=yes)	-0.0508	
	(0.1196)	
Children (1=yes)	0.0652	-0.1897
	(0.0824)	(0.1268)
Tenure	-0.0005	-0.0262
	(0.0075)	(0.0172)
Distance to work (km)	-0.0026	-0.0004
	(0.0018)	(0.0022)
Weekly working time (hours)	-0.0014	-0.0050
	(0.0075)	(0.0104)
Firm size (Reference: 1,000-10,000 employees)		
<1,000 employees	0.1214	0.1908
	(0.1596)	(0.2692)
>10,000 employees	0.3965***	0.1796
	(0.0765)	(0.1213)
Years of experience	-0.1073***	-0.0948
	(0.0280)	(0.0599)
Level of Hierarchy (Reference: Level 4)		
Level 2	0.5755***	0.6439***
	(0.1513)	(0.1940)
Level 3	0.2910***	0.1711*
	(0.0888)	(0.1039)
Year dummies (7)	yes	yes
R²	0.041	0.011
# Observations	6,939	6,939

Notes: Robust standard errors clustered on the individual level (in parentheses).
*significant at 10%, **significant at 5%, ***significant at 1%.

Table D: Estimations on job satisfaction including interaction effects (firm level)

	OLS			Fixed effects		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
wage	0.0061***	0.0065***	0.0065***	0.0032**	0.0033**	0.0033**
	(0.0011)	(0.0012)	(0.0012)	(0.0016)	(0.0016)	(0.0017)
relative wage increase	0.5633*	0.7269***	0.7413**	0.4075	0.1670	0.4238
	(0.3363)	(0.2446)	(0.3113)	(0.3302)	(0.2491)	(0.3248)
relative wage increase*experience	-0.0288*		-0.0016	-0.0253		-0.0212
	(0.0167)		(0.0211)	(0.0165)		(0.0220)
relative wage increase*wage		-0.0053***	-0.0055**		-0.0021	-0.0008
		(0.0017)	(0.0024)		(0.0017)	(0.0023)
Controls	yes	yes	yes	yes	yes	yes
R^2	0.041	0.042	0.042	0.011	0.011	0.011
# Observations	6,939	6,939	6,939	6,939	6,939	6,939

Notes: Robust standard errors clustered on the individual level (in parentheses).

*significant at 10%, **significant at 5%, ***significant at 1%.