

Contracts, Risk-sharing and Incentives (2)

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Road-map

1. The Labour Contract [available in Part 1]
2. Standard narrow view about motivation [available in Part 1]
 - 2.1. Incentives with verifiable results
 - 2.2. Incentives in the Absence of Verifiable Results
3. Social Preferences
 - 3.1. Introduction and Motivation
 - 3.2. Fairness and reciprocity
 - 3.3. Intrinsic Motivation
 - 3.4. Envy

3. “Social” or “other regarding” preferences

3.1 Why adopting a broader view about “preferences”?

“Psychologists have provided compelling evidence that rewards can crowd-out intrinsic motivation² (...) empirical (mostly experimental) evidence has been collected on this ambiguous effect of rewards.” (Dickinson and Villeval, 2008, p. 58)

In an experiment with students, Gneezy and Rustichini (2000b) find that “subjects who were offered monetary incentives performed more poorly than those who were offered no compensation.”

The introduction of a penalty in case of a misconduct can *increase* this behavior (see e.g. Gneezy and Rustichini, 2000a).

²I.e. the desire to perform a task for its own sake.

Some caution is needed

“Incentives work, often affecting the targeted behavior almost exactly as conventional economic theory predicts [...] But explicit economic incentives sometimes have surprisingly limited effects, and may even be counterproductive.” (Bowles and Polonia-Reyes, 2012, p. 369)

“Indeed, given that incentives work quite effectively in many instances, one needs to understand in what cases they should be used with caution.” (Benabou and Tirole, 2003, p. 490)

Social preferences

Also called “other regarding preferences”

Definition:

People “are not solely motivated by material self-interest but also care positively or negatively for the material payoffs of relevant reference agents”. (Fehr and Fischbacher, 2002, p. C1)

There are different types of social preferences (Fehr and Fischbacher, 2002, p. C2-C4):

- *Reciprocal agents* respond “to actions that are perceived to be kind in a kind manner, and to actions that are perceived to be hostile in a hostile manner”. How the behavior of others is interpreted is therefore essential.

Note: Reciprocal agents behave so “even if no material gains can be expected.” This behavior is therefore not driven by the expectation of future gains in repeated interactions.

- A second type of social preference is *inequity aversion*. Such agents are altruistic towards those whose material payoff is below the “equitable benchmark” and they feel *envy* and want to reduce the payoffs of those above the benchmark.
- A third type of social preference is *pure altruism*³. “An altruistic person (...) never takes an action that decreases the payoff of a reference agent.”

Notes:

No author claims that all economic agents have social preferences! The interactions between agents who have “standard” (selfish) preferences and those endowed with social preferences are interesting per se.

³“Pure” as opposed to the so-called “warm glow” (expression clarified below)

Warm Glow and intrinsic motivation

Under the label “social preferences”, authors like Della Vigna *et al* (2016) also put the “warm glow” (\neq Fehr and Fischbacher, 2002).

Initially, the “warm glow” designated “positive feelings” derived from generosity (e.g. a donation to a charity).

The broader notion of “warm glow” of Della Vigna *et al* includes:

- Positive feelings from doing meaningful work;
- Positive feelings from adhering to a social norm such as “one needs to put in effort”.

This can generate “intrinsic motivation”.

However, “intrinsic motivation” can also emerge from

- *Pure altruism* towards the employer (\in Fehr and Fischbacher),
- Work as *source of meaning* (under certain conditions work contributes to make life meaningful),
- ...

Social preferences and Behavioral economics

The introduction of “social preferences” can be seen as part of “behavioral economics”

“Behavioral economics uses insights from psychology to investigate human decision making that is at odds with mainstream economic models, which postulate a rational, selfish, forward-looking utility maximizing agent, also known as homo economicus. (Dohmen, 2014, p. 72)

Behavioral economics also deals with among others:

- Self-Control problems (e.g. Hyperbolic discounting);
- Reference-Dependent preferences;
- Nonstandard beliefs (e.g. Overconfidence);
- Nonstandard decision making;
- ...

The introduction of “social preferences” can lead to very “flexible” models able to account for a wide range of behaviors.

- This “flexibility” \Rightarrow It can be difficult to generate falsifiable⁴ hypotheses.
- Lab experiments bring proof of existence for some mechanisms, but is this evidence relevant in real work situations?
- Evidence provided by controlled experiments “in the field” (= in real work context) is rare. An example is developed below (Cohn, Fehr and Goette, 2015).

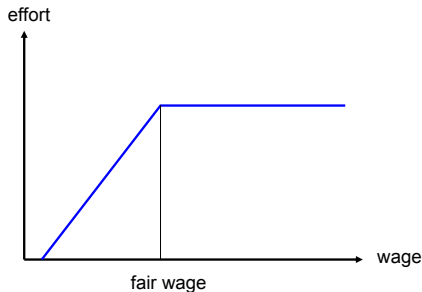
⁴Falsifiability also called refutability is a notion introduced by Popper. It is the capacity for a statement, theory or hypothesis to be contradicted by (empirical) evidence.

3.2. Fairness and reciprocity

The “Gift Exchange” or “Fair-Wage” hypothesis

Akerlof and Yellen (1990) develop a theoretical model in which workers care about being treated fairly. The model predicts that fair-minded workers *reciprocate* higher wages with greater effort as follows:

- If actual wage < fair wage, increase in wages raises effort.
- If actual wage > fair wage, increase in wages leaves effort unchanged.



The fair reference wage may be affected by all kinds of factors that *have nothing to do with the market clearing wage*:

- Past wages;
- Wages of a reference group (e.g. workers in another sector or workers in the same sector but located in another region);
- Current or past profits of the company or industry.

If

- The fair wage is above the market clearing wage and
- The level of wages affect the non verifiable in-work effort,

firms may have an incentive to pay a wage that is incompatible with market clearing.

But is there evidence of the “Gift Exchange” or “Fair-Wage” hypothesis?

Evidence of the Gift exchange hypothesis

Experiments in the lab (Fehr et al. 1993)

- The gift-exchange game tries to simulate a labor market situation.
- Participants in the experiment are divided into firms and workers.
- A firm i proposes a wage w_j to worker j to maximize profits defined as $(v - w_j)e_j$ with $v = 126$ the value of the output and e_j the effort of worker j .
- A worker accepts or rejects the contract.
- If a worker accepts the contract, he chooses effort to maximize utility $(w_j - c - m(e_j))$, with $c = 26$ a fixed time cost and $m(e_j)$ the cost of exerting effort ($m(e_{\min}) = 0$, $e_{\min} = 0.1$).
- Predictions of standard model: firms should anticipate that workers have no interest in providing more effort than the costless e_{\min} , and therefore offer lowest level of wage, \underline{w} such that $\underline{w} - c - 0 = 0$ (the RHS being the outside option).

Evidence of the Gift exchange hypothesis

Assumption: Wage offers have to be a multiple of 5 $\Rightarrow \underline{w} = 30$.

- Results of the experiment (Fehr et al. 1993):
 - Firms propose wages typically much higher than the minimum.
 - Workers reciprocate by offering effort clearly higher than the minimum.

TABLE II
THE WAGE-EFFORT RELATION

Wage	Average observed effort level	Median observed effort level
30–44	0.17	0.1
45–59	0.18	0.2
60–74	0.34	0.4
75–89	0.45	0.4
90–110	0.52	0.5

Difficulties of field experiments

- Changes in compensation generally reflect firms' choices and are therefore potentially endogenous due to unobservable confounds;
- Employment contracts are frequently embedded in ongoing relationships between workers and employers: reputation, punishment strategies, ...;
- Self-selection of workers.

⇒ **Experimental approach in the field** to control for above issues.

Evidence of the Gift exchange hypothesis

Gift-exchange in the field

Outside of the lab, do workers reciprocate? Unsettled question.

- Experiment with students: treatment group is paid a higher hourly wage than expected for a given task (Gneezy and List, 2006).
 - Higher effort in the treatment group
 - But only at the beginning of the task
- Experiment with students: two treatments, one receiving a lower wage than expected, the other one a higher wage (Kube et al. 2011)
 - Underpaid group performed clearly worse than the control group
 - Overpaid group did not differ from control group significantly
- DellaVigna et al. (2016) find weak effects in a similar experiment.
- Kube et al. (2012) find that cash gifts do not work but some in-kind gift does work.

Cohn, Fehr and Goette (2015): A field experiment

- A *publishing company* commissioned a *promotion agency* to organize over a 3 month period a sales promotion (free distribution of a new newspaper) in Zurich. Effort? To approach passers-by actively or not. Output? Number of copies of newspapers distributed.
- Workers recruited by the *publishing company* on a one-shot basis: No prospect of being recruited later by the *publishing company*!



Conditions before the beginning

- All workers had agreed to work for a performance-**un**related hourly wage of CHF 22 = “baseline treatment”.
- Workers could freely choose when to work, but they had to indicate their availability three to four weeks in advance, and once they had signed up for particular shifts they were not allowed to switch or cancel their chosen shifts. Workers had to sign up for blocks of three hours (4pm to 7pm) from Monday to Friday.
- The city is divided in two equally-sized sectors and workers are randomly assigned to a given sector.
- Team leaders (supervisors) were assigned different controlling tasks: checking that workers would not throw copies away, counting the remaining copies at the end of a shift.
- Neither workers nor team leaders knew they were part of an experiment.

Treatment

- Shortly before the beginning of a shift, a postcard and a text message announcing a wage supplement of CHF 5.
- Clear announcement: The publishing company, not the promotion agency, is paying the higher wage.
- Randomization of the two treatments across the two sectors on a weekly basis. Weekly rotation of the treatment during the last 4 weeks of the 3 month promotion period.

	Week 1	Week 2	Week 3	Week 4	Week 14 - 16
Region A	Baseline	Extra Pay	Baseline	Extra Pay	Survey & Lab exp.
Region B	Extra Pay	Baseline	Extra Pay	Baseline	

Three stages after the experiment

1. Anonymous survey conducted asking workers' opinion:
"I consider the regular (higher) hourly wage of CHF 22 (27) for doing this job to be [1 = very unfair, 2 = moderately unfair, 3 = neither ... nor, 4 = moderately fair, 5 = very fair]".

Follow-up survey concerning 3 *earlier* employers:

2. "The questions of key interest to us asked the participants to state the wage they were effectively paid and the wage they considered to be fair for their work:

"What hourly wage did you earn at employer X?" and

"What hourly wage would you find appropriate for doing this job at employer X?".

By subtracting the answers of the first question from the second, we are able to **construct an individual measure of perceived underpayment.**"

Three stages after the experiment

3. At the end of the follow-up survey, workers were asked to take part to a **one-shot** “moonlighting game” played for real money.

Aim: to measure workers’ inclination towards **reciprocal fairness**.

◇ “The first movers could divide CHF 24 in three different ways: they could choose between (i) an *unfair* allocation (CHF 18 for the first mover and CHF 6 for the second mover), (ii) an *equitable* allocation (CHF 12 for both players), or (iii) a *generous* allocation (CHF 6 for the first mover and CHF 18 for the second mover).

◇ The second movers could then reward or punish the first movers by assigning up to two positive or negative points, respectively; they could also decide not to assign any points at all. The reward and punishment technology was designed in a way such that one positive (negative) point cost the second-mover CHF 2 and increased (decreased) the first-mover’s payoff by CHF 6. ”

Descriptive statistics

	Number of workers
Observed during 4 experimental weeks	196
Returned opinion survey (1)	113
Completed follow-up survey (2)	119
Took part to the one-shot game (3)	118

The randomization appears to have worked:

- Worker' median exposure to the higher wage was 50 percent of the shifts.
- Worker characteristics in the two treatments are statistically identical for every dimension we measured (e.g., underpayment judgments, age, gender, etc.)." (▶ Table 2)
- Workers had to sign up for shifts well in advance. So, we should see no selection into shifts where the higher wage was paid. Table 3 confirms the absence of selectivity (▶ Table 3). See also Table 5 (▶ Table 5).

Fairness perception of wages

In the follow-up survey, what wage workers would consider appropriate for this type of job?

- The average reply was CHF 1 more than the CHF 22 paid in the baseline treatment.
- Slightly less than half of the workers considered the base wage as the appropriate wage.
- The majority of the workers (53 percent) perceived themselves to be underpaid at the base wage of CHF 22, with a sizable group of workers (20 percent) perceived CHF 25 to be the appropriate wage.

Game in the Lab

Who is reciprocal?

“We classify the workers as **reciprocal** if they returned more positive points in the generous allocation than in the equitable allocation, or more positive points in the equitable allocation than in the unfair allocation.”

Results:

- 77 participants turn out to be reciprocal;
- 41 participants turn out to be non-reciprocal.

Empirical strategy

- y_{ikt} = Number of copies distributed per hour by individual i , at location k and on day t .
- Let $\mathbb{1}[\text{CHF27}]_{kt}$ be a treatment dummy for high-wage condition in k at t . Basic specification:

$$\log(y_{ikt}) = \beta_0 + \beta_1 \mathbb{1}[\text{CHF27}]_{kt} + (\nu_i) + \lambda_k + \delta_t + \varepsilon_{ikt}$$

- To investigate heterogeneity in treatment:

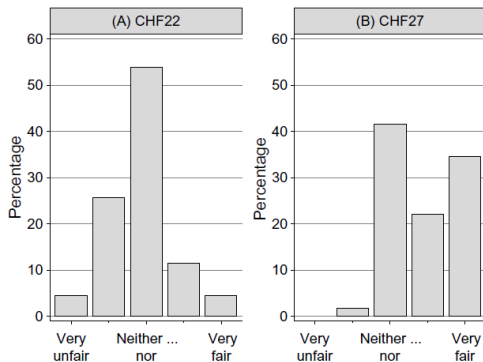
$$\begin{aligned} \log(y_{ikt}) = & \beta_0 + \beta_1 \mathbb{1}[\text{CHF27}]_{kt} + \beta_2 \mathbb{1}[\text{CHF27}]_{kt} \times \Delta_i \\ & + \beta_3 \Delta_i + \lambda_k + (\nu_i) + \delta_t + \varepsilon_{ikt} \end{aligned}$$

where Δ_i measures worker i 's perceived underpayment, i.e. the max between 0 and the difference between what worker i considered to be a fair wage for this job and the wage she was paid in the baseline treatment.

Main results

The wage increase is associated with an increase in the perceived fairness of pay on average. The wage increase raises the perceived fairness of pay particularly among workers who evaluate the base wage as unfairly low.

Figure 2 Workers' Fairness Assessments of the Base Wage and Higher Wage



Main results

Someone paid CHF 27 instead of CHF 22 will on average distribute **3.7%** copies more.

Table 6 Average Treatment Effect of the Wage Increase on Workers' Performance

	(1)	(2)
Dependent variable:	<i>log(Hourly copies distributed)</i>	
<i>CHF27</i>	0.037** (0.017)	0.030** (0.014)
<i>Intercept</i>	5.608*** (0.090)	5.269*** (0.084)
Fixed effects		
Worker	No	Yes
Location	Yes	Yes
Day	Yes	Yes
R^2	0.594	0.718
N	1,269	1,269

Main results

“There is significant heterogeneity in workers’ response to a wage increase. Workers who perceive themselves to be underpaid at the base wage raise their performance significantly when they are paid a higher wage, while workers who feel adequately paid or overpaid at the base wage do not respond to a wage increase.”

⇒ consistent with the fair-wage effort hypothesis of **AY**. [▶ Table 8](#)

“There is considerable heterogeneity in workers’ preferences for reciprocal fairness. Underpaid reciprocal workers strongly increase their performance when they are paid a higher wage, while the pattern is significantly different for non-reciprocal workers: even when feeling underpaid, non-reciprocal workers do not respond to a wage increase.”

[▶ Table 10](#)

Critical Appraisal

External validity of this study?

- The type of effort produced by the workers in this field experiment is quite specific and narrow.
- So, to what extent can we extrapolate what we have learned here to, say
 - An ordinary production worker in an automobile factory,
 - A salesman,
 - A worker whose occupation is characterized by multitasking?
- What is the persistence of positive reciprocal reaction of workers? On this, see e.g. Kube et al. (2011) and Sliwka and Werner (2017).

3.3. Intrinsic Motivation

Social Psychology and social experiments:

Intrinsic motivation depends on how workers see themselves in relation to the firm, their job and their tasks.

“Chandler and Kapelner (2013) (...) hired M-Turk workers to label tumor cells, but some workers were explicitly told the purpose of their task was to help researchers identify tumor cells while other workers were not. When the task was framed in terms of meaning, workers were more likely to participate and, conditional on participating, they labeled a higher quantity of images.” (Cassar and Meier, 2018, p. 217)

Other evidence about the relevance of intrinsic motivation is summarized by Cassar and Meier (2018). See also Kosfeld, Neckermann, and Yang (2017).

A model on intrinsic motivation and supervision of workers

Akerlof and Kranton (2008) Start from regularities found in ethnography and social psychology:

- Workers resent supervision;
- In the absence of supervision, workers develop their own output (effort) norm.

Then they enlarge preferences in the following way

- Workers have an identity c that determines their *intrinsic* motivation:
 - No Supervision and no Monitoring \Rightarrow a work group identity ($c = G$) to which is associated a specific ideal norm of effort (e_T).
 - Supervision+Monitoring \Rightarrow an outsider identity ($c = O$) to which is associated another, low, ideal of effort ($e_B < e_T$).

A model on intrinsic motivation

Preferences: Utility $U(W, e | c)$ sums three terms

- An increasing and concave function of consumption (say, $\ln W$),
- A decreasing function of non verifiable effort (say, $-e$),
- A loss if effort deviates from the ideal $e^*(c)$, $c \in \{G, O\}$ (say, $-t_c \cdot |e^*(c) - e|$), where $0 \leq t_c < 1$.

The effort level takes three possible values: $e_A > e_I > e_B$.

Verifiable firms revenues are either high (π_H) or low (π_L). Let

$0 \leq \gamma \leq 1$,

	π_H	π_L
e_A	$1/2$	$1/2$
e_I	$\gamma/2$	$1 - \gamma/2$
e_B	0	1

Table: Probability of revenue for the firm as a function of effort level.

A model on intrinsic motivation

When there is a supervisor, a low effort, e_B , is verified with an exogenous probability p while the high effort level, e_A , is never verifiable.

Akerlof and Kranton (2008) compare two settings:

- With Supervision+Monitoring: Eliciting e_A instead of e_B :⁵
 - Instruments of the principal: contingent wages w_H^O, w_L^O and a fine f if the agent exerts e_B ;
 - These instruments have to maximize expected profits subject to
 - (i) a participation constraint,
 - (ii) an incentive constraint to elicit effort e_A , knowing that $e^*(c = O) = e_B$,
 - (iii) an upper-bound on f .

⁵Akerlof and Kranton (2008) assume that getting π_L for sure cannot be preferable.

A model on intrinsic motivation

- No {Supervision+Monitoring}: Eliciting e_A or e_T ?
 - Instruments of the principal: contingent wages w_H^G, w_L^G
 - These instruments maximize expected profits subject to
 - (i) a participation constraint and
 - (ii) *either* incentive constraints to elicit effort e_A instead of e_T or e_B , knowing that $e^*(c = G) = e_T$
 - (ii') *or* an incentive constraint to elicit e_T instead of e_B .

A model on intrinsic motivation

No detailed study of the solution.
(many configurations are possible)

Some intuition of properties only:

- Obviously, the interest of a supervisor heavily depends on the detection probability p and the upper-bound on f .
If these are low, introducing a supervisor can be detrimental to the principal since there is a need to compensate for $t_O \cdot |e_B - e_A|$.
- In the absence of a supervisor, for high enough γ and t_G , the principal prefers to elicit e_T than e_A .
- Comparing across the principal's options, there is a threshold $p' > 0$ under which the principal does not want to institute a supervisor.

3.4. Envy

- Individuals care about both their absolute income and their income relative to others. Studies have documented systematic correlations between relative income and:
 - Job satisfaction (Clark and Oswald, 1996)
 - Life satisfaction (see overview by Clark et al., 2008)
- Measurement problems:
 - Is variation in the income of the peer group really exogenous?
 - Who is the peer group really?
- Card et al. (2012) study the effect of disclosing information on peers' salaries on workers' job satisfaction and job search intensities.

Envy: Card et al. (2012)

- Card et al. (2012) make use of a court decision about the right to know about the salary of state employees.
- A website listing the salaries of all employees was launched, including faculty and staff of the University of California.
- The authors conducted an experiment and sent a random sample of the employees of UC an e-mail to inform them about the existence of the website (= treatment).
- 10 days later, survey a larger sample ($n=6411$), including this treatment group:
 - Did they look at the site?
 - Job satisfaction, willingness to quit job?
- Match survey sample with administrative data on wages.

Envy: Card et al. (2012)

Results: first stage

- Those who received the e-mail about the website were twice more likely to consult it (50% vs 20%).
- 4/5 reported that they investigated the earnings of colleagues in their own department.
- First indication that people care about their co-workers' pay.
- Importantly, probability to check the website after receiving first e-mail was independent of individual characteristics and of their position in the earnings distribution.

Envy: Card et al. (2012)

Results: second stage

TABLE 4—EFFECT OF INFORMATION TREATMENT ON MEASURES OF JOB SATISFACTION

	Satisfaction index (10 point scale)			Reports very likely to look for new job (Yes = 1)			Dissatisfied and likely looking for a new job (Yes = 1)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treated individual	-2.0 (2.2)	—	—	1.0 (1.2)	—	—	2.0 (1.1)	—	—
I. Treated individual with earnings ≤ median pay in unit	—	-6.3 (2.9)	—	—	4.3 (1.8)	—	—	5.2 (1.8)	—
II. Treated individual with earnings > median pay in unit	—	2.0 (2.6)	2.2 (2.6)	—	-2.0 (1.6)	-2.0 (1.6)	—	-0.9 (1.3)	-0.9 (1.3)
II-I	—	8.3 (3.5)	—	—	-6.3 (2.4)	—	—	-6.1 (2.1)	—
Treated × earnings in first quartile in pay unit	—	—	-15.0 (4.0)	—	—	8.0 (2.6)	—	—	8.1 (2.4)
Treated × earnings in second quartile in pay unit	—	—	1.9 (3.9)	—	—	0.8 (2.5)	—	—	2.5 (2.3)
p-value for exclusion of treatment effects	0.36	0.05	0.00	0.85	0.03	0.01	0.08	0.01	0.00
Mean of the dependent variable in the control group [standard deviation]		274.2 [66.1]			21.9 [41.4]			12.9 [33.5]	

Notes: All models are estimated by OLS. All coefficients and means are multiplied by 100. Standard errors, clustered by campus/department, are in parentheses (818 clusters for all models). “Earnings” refers to total UC payments in 2007. Pay unit refers to the respondent’s department or administrative unit. Median pay is computed separately for faculty and staff. The satisfaction index is the average of responses for the questions: “How satisfied are you with your wage/salary on this job?”; “How satisfied are you with your job?”; and “Do you agree or disagree that your wage is set fairly in relation to others in your department/unit?” Responses to each of these questions are on a 1–4 scale and are ordered so that higher values indicate greater satisfaction. The variable “Dissatisfied and Likely Looking for a New Job” is 1 if the respondent is below the median value of the satisfaction index and reports being “very likely” to make an effort to find a new job. See text and Appendix Table A3 for further details on the construction of the dependent variables. In addition to the explanatory variables presented in the table, all models include controls for campus × (staff/faculty), a cubic in earnings, and main effects. The sample size is 6,411.

Envy: Card et al. (2012)

Results: second stage

- Reduction in job satisfaction among workers with pay below the median for their department and occupation group.
- Increase in intentions to look for a new job for the same group.
- Some evidence that treated individuals in the lowest quartile of earnings distribution also did leave UC more in the 2-3 years following the first survey.
- For those paid above the median in their group, no effect on job satisfaction or intentions to look for another job.

Table 2: Randomization check for worker characteristics

Variable	Treatment		CHF27		<i>p</i> -value
	CHF22		CHF27		
Mean		SD	Mean	SD	
Perceived underpayment (in CHF)	1.1	(2.1)	1.1	(2.1)	0.69
Age (in years)	23.4	(5.3)	23.3	(5.4)	0.77
Male (in %)	28.1	(45.0)	26.7	(44.3)	0.68
Foreigner (in %)	16.1	(36.8)	17.2	(37.8)	0.70
Number of siblings	1.4	(0.9)	1.4	(0.9)	0.91
Secondary school (in %)	64.8	(47.8)	63.3	(48.3)	0.69
Apprenticeship/vocational school (in %)	33.1	(47.1)	30.8	(46.2)	0.52
Additional, further education (in %)	24.8	(43.2)	24.2	(42.9)	0.85
Baccalaureate (in %)	61.8	(48.7)	65.8	(47.5)	0.27
Technical school (in %)	25.1	(43.4)	21.1	(40.9)	0.22
University (in %)	24.5	(43.1)	21.1	(40.9)	0.29
Points returned if 1 st mover proposed (18, 6)	-0.65	(1.02)	-0.66	(1.00)	0.98
Points returned if 1 st mover proposed (12, 12)	0.25	(0.73)	0.25	(0.68)	0.88
Points returned if 1 st mover proposed (6, 18)	0.81	(0.90)	0.86	(0.89)	0.46

Table 3: Participation at the individual level during the experiment

	(1)	(2)
Dependent variable:	Number of shifts per treatment	
CHF27	0.189 (0.130)	0.189 (0.184)
Intercept	3.143*** (0.162)	3.143*** (0.092)
Fixed effects		
Worker	No	Yes
N	392	392

OLS estimates. Standard errors in parentheses are clustered on the individual level. The unit of observation is a worker in each treatment. The dependent variable is the number of shifts per treatment and CHF27 is an indicator variable for treatment status. The levels of significance are * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

► Return

Table 5: Randomization check for outcomes measured after the field experiment

	(1)	(2)	(3)	(4)
Dependent variable:	Perceived underpayment	Points returned if 1 st mover proposed		
		(18, 6)	(12, 12)	(6, 18)
Fraction of shifts in CHF27	0.190 (0.684)	0.008 (0.431)	0.180 (0.299)	0.497 (0.360)
Intercept	0.992** (0.431)	-0.564** (0.256)	0.155 (0.178)	0.617*** (0.214)
<i>N</i>	119	118	118	118

Column (1) reports OLS estimates with robust standard errors in parentheses, while columns (2) to (4) report the estimates of seemingly unrelated regressions. Throughout all columns, the independent variable is workers' exposure to treatment CHF27 indicated as the fraction of shifts they worked under the higher wage. In column (1) the dependent variable is the perceived underpayment at the base wage, and in columns (2) to (4) the dependent variable is workers' back-transfers in the moonlighting game. The levels of significance are * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 8: Heterogeneous treatment effect of the wage increase on workers' performance

	(1)	(2)	(3)
Dependent variable:	log(hourly copies distributed)		
CHF27	0.039 (0.019)**	0.018 (0.023)	0.005 (0.020)
CHF27 \times Δ_i		0.019 (0.008)**	0.019 (0.007)**
Δ_i		0.001 (0.006)	
Intercept	5.619 (0.113)***	5.633 (0.108)***	5.317 (0.130)***
Fixed effects			
Worker	No	No	Yes
Location	Yes	Yes	Yes
Day	Yes	Yes	Yes
<i>N</i>	722	722	722

OLS estimates. Standard errors in parentheses take account of serial correlation within an individual's residuals and spatial correlation among the residuals of spatially close observations on the same day (up to a distance of 3 km). The dependent variable is the logarithm of the number of hourly copies distributed and serves as our performance measure. The variable CHF27 is an indicator variable for the treatment in which the workers were paid the higher wage. The variable Δ_i is the difference between the wage a worker considered to be fair and the base wage. The interaction term CHF27 \times Δ_i thus measures the treatment effect as a function of workers' perceived underpayment. The levels of significance are * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 10: The effect of the wage increase on the performance of reciprocal vs. non-reciprocal workers

	(1)	(2)
Sample:	Reciprocal workers	Non-reciprocal workers
Dependent variable:	log(hourly copies distributed)	
CHF27	0.000 (0.023)	0.018 (0.023)
CHF27 $\times \Delta_i$	0.028 (0.012)**	-0.010 (0.009)
Intercept	5.036 (0.148)***	5.928 (0.231)***
Fixed effects		
Worker	Yes	Yes
Location	Yes	Yes
Day	Yes	Yes
N	466	243

OLS estimates. Standard errors in parentheses take account of serial correlation within an individual's residuals and spatial correlation among the residuals of spatially close observations on the same day (up to a distance of 3 km). The dependent variable is the logarithm of the number of hourly copies distributed and serves as our performance measure. The variable CHF27 is an indicator variable for the treatment in which the workers were paid the higher wage. The variable Δ_i is the difference between the wage a worker considered to be fair and the base wage. The interaction term CHF27 $\times \Delta_i$ thus measures the treatment effect as a function of workers' perceived underpayment. Column (1) shows the estimates for reciprocal workers, while column (2) shows the same for non-reciprocal workers. The levels of significance are * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

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