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Abstract

In this study, we examine the relationship between negative reciprocity preferences, unfair treatment and turnover intentions using large-scale survey data from the German Socio-Economic Panel Study (SOEP). We apply a linear probability model to analyze the data and find that higher measures of negative reciprocity and missing recognition at the workplace are linked to higher turnover intentions. However, we do not find any conclusive evidence in the data that the effect of unfair treatment on turnover intentions is stronger for individuals with higher levels of negative reciprocity. The results are robust to a number of different robustness checks. We discuss possible explanations, such as measurement errors in the reciprocity variable or unobserved factors related to both the predictor and the outcome variable. Further research is needed to better understand this relationship.

Contents

1. Introduction

The link between unfair treatment and several market outcomes such as an individual's turnover intentions or job effort have been studied extensively. However, some studies still consider the workforce as a monolith i.e. they assume the self-interest model where individuals maximize their utility without taking reciprocity preferences into account. Unlike how the self-interest model dictates, it was shown that people reciprocate kind or unkind behavior even if that implies incurring costs at their own expense. The prevalence of reciprocal behavior was confirmed in various experimental and non-experimental settings (Fehr and Gächter, 2002,Dohmen et al., 2009 Bethwaite and Tompkinson, 1996).
While there is evidence for both positive and negative reciprocity, they differ as to how they affect the behavior and preferences. Positive reciprocity refers to "the degree to which an individual rewards kind actions", and negative reciprocity refers to "the extent which the individual punishes unkind actions" (Dohmen et al., 2009, Fehr and Gächter, 2002). Evidence for positive reciprocity can be found in economic games such as the trust game (McCabe et al., 2003) or in the labor market where workers tend to put in high effort when they believe they will be treated generously (Fehr and Gächter, 2003, Siegrist et al., 2004 , Kube et al., 2012).
Similarly, evidence for negative reciprocity as a social norm can be found in the labor market where it was shown that in a tire manufacturing facility during a period of union strike induced by cutting of workers' benefits, caused the quality of produced tires to decrease drastically. This indicates that workers reciprocate negatively if they perceive an unfair treatment (Krueger and Mas, 2004). Furthermore, Kube et al., 2013 exploits a natural experiment where some workers face a wage cut which led workers to reciprocate by decreasing the average output by 20 %. However, Dohmen et al., 2009 show that survey measures of positive and negative reciprocity are not correlated with each other, while Egloff et al., 2013 demonstrate that negatively reciprocal behaviour is not correlated with positively reciprocal behavior as exhibited in ultimatum games. Indubitably there is evidence that positive and negative reciprocity should be considered as distinct traits rather than one. This firstly justifies inspecting negative reciprocity instead of reciprocity as a whole and secondly allows us to focus at the link between perceived fairness, negative reciprocity and labor market outcomes.

Our analysis will focus on the question whether people differ in terms of their turnover intentions if they perceive unfair treatment in the workplace depending on their negatively reciprocal inclinations.

It might be of importance to examine turnover intentions next to reciprocity preferences, as they can indicate dissatisfaction among current employees, which might stem from not feeling recognized at the workplace. They are further related to potential future employee departures, which can lead to decreased productivity in firms and increased costs for recruiting and training new employees. It has been shown by Sheppard et al., 1988 that there is "a strong relationship between the intention to do something and the eventual action". Thus, career expectations mirror the driving forces for future career steps and are directly related to factual career mobility. Further, Hom

et al., 2012 argue that employee turnover depends on individual preference determinants such as reciprocal inclinations, job fit and supervisor attitude as well as work related constraints such as legal practices in the workplace and job market conditions. Most studies, including Will, 2017 and Hom et al., 2012, state that when using voluntary turnover as a dependent variable, even with a variety of explanatory variables, only a moderate amount of total variance can be explained, indicating that the determinants of turnover intentions have to be further investigated.

It remains to be shown whether unfair treatment in the workplace and negatively reciprocal inclinations are indeed linked to turnover intentions. Previous research has shown that individuals who experience unfair treatment are more likely to have higher turnover intentions Murtaza et al., 2021. If people indeed retaliate against unfair treatment by their employer by expressing a desire to leave the organization, it is compelling to examine whether that response is moderated by negative reciprocal inclinations.
There is reason to believe that negatively reciprocal inclinations are exacerbating the positive relationship between unfair treatment and turnover intentions.

This hypothesis follows directly from the concept of reciprocity preferences, and is supported by a study examining the causal relationship between reciprocity, unfair treatment and other other labor market outcomes: Montizaan et al., 2016 show that in the presence of unfair treatment, namely the reduction of pension rights, job motivation of workers decline more with increasing levels of negative reciprocity. They exploit a natural experiment by comparing the job motivation of dutch male public sector employees born in 1950 whose pension funds were cut, compared to those born in 1949 to which that policy did not apply. They show that treated individuals perceive the reform as unfair and reciprocate by displaying a reduction in job motivation and that this reduction is significantly stronger for more negatively reciprocal employees.
This paper will try to unveil a similar mechanism as in Montizaan et al., 2016, albeit focusing on a different outcome where employees are hypothesised to retaliate against unfair treatment by expressing their desire to quit their job. To our knowledge there is no literature examining that relationship. This paper aims to fill this gap. Unlike Montizaan et al., 2016, our approach is to use representative survey data (SOEP) in the absence of a fitting natural experiment. Its large sample size provides the statistical power to investigate our hypothesis. We make use of self-stated assessments to survey questions on reciprocity, fairness, turnover intentions, job effort and various controls, to examine the interaction between unfair treatment and negative reciprocity with a linear probability model.
We find that unfair treatment and negative reciprocity are both positive and statistically significant predictors of turnover intentions, confirming our hypothesis that unfair treatment in the workplace and high negative reciprocity levels lead to an increased likelihood of turnover intentions. However, we can not find conclusive evidence that the response to being unfairly treated on turnover intentions is dependent on negative reciprocal inclinations.

However following limitations to our analysis have to be noted. First, as the main variables of interest, unfair treatment and turnover intentions, were measured irregularly we could not implement a strategy to exploit the panel-structure of SOEP to establish a causal relationship between the variables. Thus we merely present correlational evidence. Further the limited data availability

requires us to include explanatory and dependent variables from different survey years into one regression which led us to make assumptions that may not hold in reality. In addition, answers to the negative reciprocity items in the SOEP-questionnaire might not reflect the true preferences of respondents and be subject to measurement error which downward-biases our estimates.

The remainder of the paper is structured as follows. Chapter 2 will give insight on the key variables and the corresponding measures as well as the source of the data. It will also emphasize the limitations of the data and the measures. Chapter 3 will provide more details on the main specification and present the results. In Chapter 4 we examine the sensitivity of the results towards different specifications. Chapter 5 will focus on a different labor market outcome, which is arguably underlying the same mechanism, namely job effort as proxied by overtime and absenteeism. Lastly Chapter 6 will conclude and discuss as to how the research could be improved and what are the limitations to our methodology.

2. Data

The data used in this study come from the German Socio-Economic Panel (SOEP). The SOEP is a long-running, multidisciplinary survey conducted annually. It involves interviews with around 30,000 individuals from 15,000 households in Germany. The survey provides a stable set of core questions asked every year such as employment, education, and income, and also includes yearly topics with additional detailed questions. It attempts to cover a wide range of personal and household information, and to gather respondents' attitudes on various topics, including political and social issues. It is conducted with the head of each household in the sample, but all other household members over the age of 17 are also asked to complete the survey (Wagner et al., 2007).

Turnover Intentions

The dependent variable turnover intentions was measured by the following survey question:

> *"How likely is it that you will experience the following career changes within the next two years? - Will you seek a new job on your own initiative?"*

Respondents were asked to rate their likelihood of seeking a new job on their own initiative on a 10-point Likert-scale from 0 (0%) to 10 (100%). The scale was recorded irregularly in the survey waves 2007, 2009, 2013 and 2018. 49.4% of the total given responses are zero, with a mean response of 2.32 (23.2 % assigned probability) and a standard deviation of 3.14. We interpret answers to the question as capturing subjective expectations about their turnover intentions. While the measure could be subject to measurement error for example induced by peoples differing assessment of probabilities thus distorting inter-person comparability, we assume that error to be random which would only lead to a loss of model precision not to systematic biases (Millimet and Parmeter, 2022, Manski, 2004). For the analysis, we construct a binary variable by employing an equal mass approach. Specifically, we recoded all self-stated assessments of the probability of turnover from

10%-100% as 1 and an assigned probability of 0% as 0, indicating no turnover intention. The outcome can then be interpreted as showing any positive level of turnover intentions.

Reciprocity Preferences

The measure of negative reciprocity is based on six survey questions constructed by Perugini et al., 2003, where we only considered the questions on negative reciprocity included in the SOEP-Questionnaire from 2005. Each of the following statements was answered on a 7-point Likert scale, where 1 indicates "does not apply" and 7 indicates "applies fully":

"If I suffer a serious wrong, I will take revenge as soon as possible, no matter what the cost"
"*If someone puts me in a difficult position, I will do the same to him/her*"
"*If someone offends me, I will offend him/her back.*"

Figure 1 shows the distribution of the answers to the aforementioned questions. We can observe some heterogeneity among the answers to the three questions, with the mean of the second question being 2.85 and the mean of the first question 3.20. **HIER NOCHMAL**

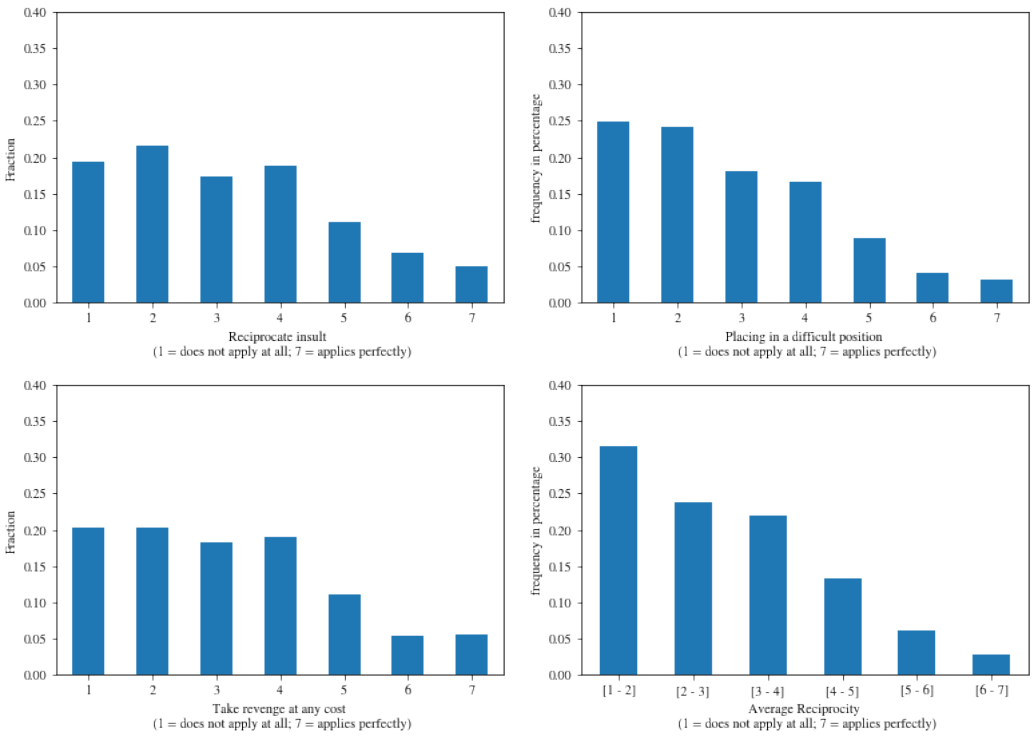

Figure 1. Distribution of Negative Reciprocity

First plot shows the distribution of the answers to the question "If someone offends me, I will offend him/her back." Second plot shows the distribution of the answers to the question "If someone puts me in a difficult position, I will do the same to him/her." and lastly the third plot shows the distribution of the answers to the question "If I suffer a serious wrong, I will take revenge as soon as possible, no matter what the cost." All answers are given on a 7-point Likert Scale. The last plot includes the average of the answers to the first three questions.

A valid concern is how well the survey items measure actual reciprocal inclinations. First, respondents might unknowingly, i.e by differing understanding of the questions or interpretation of the

scale, not reveal their true preferences. Further, they might intentionally misreport their actual reciprocal behaviour, due to strategic reasons or a prevalent social desirability bias. The modal response to three questions on positive reciprocity was (6,6,7) as opposed to modal responses of (1,2,2) for questions on negative reciprocity. Even though Dohmen et al., 2009 and Egloff et al., 2013 provide comprehensive evidence that positive and negative reciprocity should be seen as distinct traits rather than one, this might indicate that people understate their true negatively reciprocal inclinations due to social desirability bias (Grimm, 2010). Interestingly, Perugini et al., 2003 found differing correlations with social desirability scales in Italian (r = 0.16) and English subsamples (r = -0.29) in a laboratory setting, so the direction of the bias might depend on the extent to which the norm of negative reciprocity is internalized in the given social environment. While being aware about potential measurement errors, which are hard to completely eliminate in non-incentivized, self-stated preferences, Perugini et al., 2003 provide extensive arguments for the validity of the measure. In a laboratory setting they tested whether their questions would predict actual reciprocal behaviour in ultimatum games, conducted in Italy and England. In a similar fashion Dohmen et al., 2011 provide more evidence on the validity of survey questions on preferences, finding that the SOEP-scales for risk-preferences reliably predict risk-taking in an incentivized experiment. Further, Dohmen et al., 2009 show that the reciprocity measures in the SOEP-data predict outcomes in a way that is consistent with previous theoretical and experimental predictions. Thus, we assume that the survey scales are somewhat valid indicators for actual negatively reciprocal inclinations.

For our analysis, we constructed a composite measure to capture individuals' overall tendency to engage in negative reciprocal behavior, by averaging the responses to the three statements that assessed individuals' negative reciprocal inclinations in different scenarios. Hereby, we implicitly assume the measure to be continuous and the intervals between the scale values to be equal[1]. This approach is similar to that used by prior literature on labor outcomes and reciprocity preferences (Dohmen et al., 2009, Montizaan et al., 2016) and allows us to control for the potential non-independence of the three items. Additionally, if all three items are subject to random measurement error, averaging the three items can reduce attenuation bias.

Unfair Treatment

As a proxy for unfair treatment, we used the survey question from the 2006 wave [2]:

"I receive the recognition I deserve from my superiors"

with responses of either "*Agree*" or "*Disagree*". 5524 (64.8 %) individuals in our sample agreed to the statement while 2998 (35.2 %) individuals in our sample did not.

The question was constructed as part of a model of effort-reward imbalance (Siegrist, 2002), which was designed to measure occupational and work stress and is based on the assumption that employment relations are at its core reciprocal. Siegrist, 2002 points out that an imbalance of the

[1] We discuss and check for potential non-linearities in a robustness check

[2] Since this measure was only available for a small number of individuals in later waves of the survey our examining within-person variation over time by making use of the panel structure of the SOEP was impossible.

effort an employee puts into their work and the rewards they receive in return can lead to a "gratification crisis", resulting in stress and a termination of the work contract. Straightforward, we interpret answers to this question as whether an individual feels treated unfairly at work or not and attribute said unfair treatment to their employer. Since the subjects state subjective assessments, we do not have to worry about to what extent the self-perception coincides with reality, since only the perception of unfair treatment matters for possible reciprocal inclinations.
Again, there are some caveats to what extent the answer to the question can capture the concept of an unfair treatment at the workplace which can lead to retaliation. First, the question of fairness in the workplace is multi-faceted, including but not limited to recognition by superiors. Additionally, factors such as recognition by colleagues, financial compensation and overall working conditions can also play a role in an individual's perception of fairness in their workplace. Further, the question does not capture any information about the magnitude of perceived unfair treatment.[3]. In order to align with our analysis, we recoded this question so that "*Disagree*" responses indicate that a person feels treated unfairly.

3. Estimation / Specification /Results

3.1. Assumptions

In order to test our hypothesis that unfair treatment at the workplace induces retaliation by employees in form of voluntary turnover intentions depending on the level of negative reciprocity, we must ensure that subjects attribute unfair or fair treatment to the same job as the one for which they are stating their turnover intentions. To address this, we included individuals who actually changed their job in 2006, dropped 2007 controls, added 2006 controls and assumed their turnover intentions to be 1. While there could be other reasons for an individual changing their job unexpectedly, it is likely that those subjects would have assigned a positive probability to "changing their job within the next 2 years" in 2006. Furthermore, since the workload (effort-reward imbalance) module with the treatment indicator was only available in the SOEP-Questionnaire in waves where the outcome variable turnover intentions was not measured, we assume that the treatment status did not change for all subjects who stayed in their job between the two survey waves. We are aware that this assumption may not fully capture the complexity of reality, as people may experience a change of perception of unfair treatment due to certain circumstances such as a promotion or positive/negative interactions with superiors or colleagues, especially over a full year. This may introduce substantial measurement error and lead to a downward bias of our estimates. Since reciprocity measures were taken from the 2005 survey wave, we assumed reciprocity preferences to be stable and non-malleable. This assumption can be questioned, since recent experimental literature Chuang and Schechter, 2015 and Bruhin et al., 2019 did not find any conclusive evidence pointing towards the time-stability of reciprocity preferences. We checked this assumption with the available data from the three survey waves where questions on reciprocity were included (2005,2010,2015). 24.9% of the subjects (n=15702) exhibited a change in average reciprocity by 1

[3]We conduct a robustness check where we specify a slightly different measure for unfair treatment using more information collected as part of the effort-reward imbalance module in the SOEP

or more in any of the three years.[4]
Despite these assumptions, we believe that our approach is the best way to handle the limitations in the available data and provide insights into the relationship between unfair treatment, negative reciprocity and turnover intentions.

Probit models are commonly used for modeling binary outcome, as they offer a number of advantages compared to Linear Probability Models (LPM). They are better equipped to deal with heteroscedasticity and do not assume normally distributed standard errors. More importantly, they cannot produce predictions outside the feasible range of 0-1 (Aldrich and Nelson, 1984). Despite the advantages of Probit models for binary outcomes, we decided to use OLS estimation because we are specifically interested in the interaction between unfair treatment and negative reciprocity and the interaction effects are easier to interpret in linear models like OLS. Interpreting the interaction effect between a binary independent variable (unfair treatment) and a continuous independent variable (negative reciprocity) in nonlinear models can be a source of confusion and error (Ai and Norton, 2003) whereas in linear models, the interaction effect between two variables is equal to the cross-derivative of the expected value of the dependent variable with respect to the two independent variables and straightforward to interpret. Understanding the interaction effect in nonlinear models is more complex, and it is common to mistakenly compute the marginal effect instead of the true interaction effect. In a linear model the two effects are the same , whereas in nonlinear models they can have opposing signs Ai and Norton, 2003. Therefore, in order to ensure the proper interpretation of our interaction term, we chose to use OLS estimation, where the marginal effect is constant and thus interpret coefficients as probabilities. We overcome the heteroscedasticity by clustering standard errors at the sector level. However, the production of unbounded predicted probabilities is a fundamental limitation of Linear Probability Models that cannot be resolved, thus we have to be aware of when interpreting our results.

The model was specified as follows:

$$\begin{aligned}\text{Turnover intentions}_{2007} = \beta_0 + \beta_1 \text{Unfair Treatment}_{2006} + \beta_2 \text{Negative Reciprocity}_{2005} + \\ \beta_3 \text{Unfair Treatment}_{2006} \times \text{Negative Reciprocity}_{2005} + \beta_n \text{Controls}_{2007} + \epsilon\end{aligned}$$

We use the SOEP-measures of 2006 for unfair treatment, 2005 for negative reciprocity, 2007 for turnover intentions and control variables. The outcome turnover intention takes the value 1 if an individual reported turnover intentions, and 0 otherwise.
In our model, we controlled for several other factors that may have an impact on turnover intentions. Working hours, age, years of education, firm size, commute distance, and tenure were included as continuous variables to control for any potential relationship between these factors and turnover intentions. For example, working long hours may lead to decreased work-life balance and job satisfaction, which may increase the likelihood of turnover intentions. Similarly, age may be related to turnover intentions as older workers may have different career goals than younger employees. Years of education may be related to better job opportunities and higher earnings, which may

[4]Here we dropped people which only participated in one of the three survey waves.

decrease the likelihood of turnover intentions. We controlled for firm size as it can impact job opportunities, benefits and compensation, career development, and organizational culture which are all factors that may influence an employee's decision to leave a job. Longer commute distances may lead to increased stress and time pressure, which may increase the likelihood of turnover intentions. Longer tenure may indicate greater commitment to the current job, which may decrease the likelihood of turnover intentions. Gender was included as a binary variable as it may be related to turnover intentions as men and women may have different job preferences or work-life balance expectations. In addition, we also controlled for the binary variable "jobatrisk", which measures an individual's perception of the likelihood of losing their job within the next two years. This variable can help control for the effect of job insecurity on turnover intentions, as individuals who perceive a high risk of losing their job may be less likely to express intentions to leave their current position and may be more motivated to keep their job. To capture any potential non-linear relationship between turnover intentions and these controls, we also included squared terms for age (*age_squared*) and tenure (*tenure_squared*) in our model.

We additionally included residuals from a Mincer-wage regression (Mincer, 1958)[5] as a control variable for wage to account for any unobserved factors that may affect both wages and turnover intentions. Positive residuals indicate that the individual earns more than the wage which their age, potential experience, education, gender and firm size predict (and vice versa). In contrast to just including a raw wage variable, the Mincer residuals are by construction uncorrelated with the controls that were also used in the Mincer-regression. We clustered our standard errors at the sector level as it helps to mitigate the issue of heteroscedasticity by taking into account the possible correlation between observations within a sector and estimating the standard errors more consistently, resulting in reducing the variance of the error terms. This method also accounts for potential presence of unobserved group level effects at the sector level such as outside options, general job availability, or work culture, which may be correlated with both independent and outcome variables. This approach was chosen after a review of previous literature on turnover intentions, which showed that average turnover intentions vary strongly between sectors (Weller, 2005).

[5] $log(wage_t) = \beta_0 + \beta_1 \text{Age}_t + \beta_2 \text{Potential experience}_t + \beta_3 \text{Education}_t + \beta_4 \text{Gender}_t + \beta_4 \text{Firmsize}_t + \epsilon$

3.2. Results

Table 1. Turnover Intentions

	Coefficients	**Standard Errors**
Intercept	0.0463***	(0.009)
Unfair Treatment	0.1228***	(0.031)
Negative Reciprocity	0.0222***	(0.006)
Interaction	-0.0104	(0.008)
Working Hours	0.0019*	(0.001)
Firm Size	-0.0117***	(0.004)
Tenure	-0.0159***	(0.002)
$Tenure^2/100$	0.0203***	(0.004)
Age	0.0517***	(0.007)
$Age^2/100$	-0.1313***	(0.025)
Years of Education	0.0216***	(0.007)
Commute Distance	0.0004***	(0.000)
Pot. Experience	0.0010***	(0.000)
Mincer Residuals	-0.0709***	(0.020)
Job at Risk	-0.1449***	(0.019)
Observations	5380	
R-Squared	0.195	

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

The main results show that average negative reciprocity and unfair treatment are positively associated with turnover intentions, which is in line with our expectations. The interaction term between "recog_sup" and "avg_rec" had a negative coefficient, however, not statistically significant, indicating that the relationship between these variables needs further investigation to understand the effect of negative reciprocity on turnover intentions among employees who feel unfairly treated. We would expect a positive relation as individuals with high negative reciprocal inclinations are theorized be more likely to retaliate unfair treatment in this case by exhibiting higher turnover intentions. Additionally, the results also indicate that factors such as age, tenure, firm size, education, potential experience, Mincer residuals, job at risk and working hours also have a significant impact on turnover intentions. The significant and positive coefficient for "age" and significant and negative coefficient for "age_squared" indicate that the probability of turnover intentions initially increases with age, but as age increases the probability starts to decrease. The results of the analysis show that tenure has a negative and significant relationship with turnover intentions. Furthermore, the positive and significant coefficient "tenure_squared" suggests that employees who have been with the company for a short period of time may have a higher likelihood of turnover intentions, but as their tenure with the firm increases, the likelihood of turnover intentions decreases. "firmsize", "years_educ" and "potential_experience" were also found to be significant predictors of turnover intentions. The negative significant coefficient for the Mincer residuals indicates that if an individuals deviation earns more than their wage predicted by the Mincer-wage regression, the predicted probability of turnover intentions decrease. However, it is important to note that the relationship between wages and turnover intentions is complex. High-paid employees may seek

new opportunities for career advancement, while low-paid employees may experience involuntary turnover such as being dismissed or laid off due to economic conditions and company's financial situation. The variable "jobatrisk" was also found to be a highly significant, suggesting that the likelihood of having intentions to leave the current job decreases as the individual's perception of the risk of losing their job increases.

It is important to note that the findings of this study are based on correlation and do not establish causality. The main independent variables of this study, unfair treatment and negative reciprocity, have shown a significant correlation with turnover intentions which suggests that employees who perceive a lack of fair treatment at the workplace or are highly negatively reciprocal are more likely to consider leaving the organization. Additional contributing factors to employee turnover intentions include firm size, tenure, years of education, gender, and potential experience. However, it is important to consider that other factors we could not control for may also play a role in this relationship. Weller, 2005 highlights various elements that can impact turnover intentions, including general economic conditions, the characteristics of the organization in which an individual is employed, the dynamics within the individual's working group and individual characteristics, circumstances and personality traits. (Kattenbach et al., 2011). The presence of these unobserved factors can result in omitted variable bias in the analysis, potentially causing inaccurate or incomplete conclusions about the relationship between negative reciprocity, unfair treatment, and turnover intentions.

4. Robustness Checks

4.1. Cardinal Measure of Turnover Intentions

The outcome in our main specification considers people who showed any level of turnover intentions versus people who showed none, thus not differentiating between high and low turnover intentions. To examine the association between reciprocity, unfair treatment and turnover intentions across the entire range of possible scores, rather than just at the extremes of the binary outcome. Unfairly treated employees could state particularly high turnover intentions if they are highly reciprocal. To make use of the additional information, we re-estimate the model from Section 3 with the dependent variable coded as a continuous variable, corresponding to the percentage chance the individuals assigned to the likelihood of looking for a new job (10 intervals from 0% to 100%). Despite this change, the main results hold, with our measures for reciprocity and unfair treatment predicting higher levels of turnover intentions. When coding turnover intentions as a continuous variable, the interaction term between reciprocity and unfair treatment stays insignificant, indicating that the relationship between these variables is not sensitive to the different scaling of the dependent variable.

4.2. Dummy Coding Reciprocity measure

By averaging over the reciprocity measures in our main specification, we implicitly consider the intervals between the scale values to be equal. When evaluating the effect of averaged reciprocity preferences on turnover intentions we thus assume that a change from scale 1 to 2 has the same effect on the outcome as a one unit change from 6 to 7. While Rhemtulla et al., 2012 argue that with a 7-point Likert scale there is not much information lost by treating a categorical variable as continuous, we re-estimate the model with a dummy-coded reciprocity-measure to account for the potential bias which is introduced when averaging over a Likert-scale item. The lowest scale item "*[1] Does not apply [Scale 1-7]*" was chosen as the reference category and included as a zero column. [6]

Our results, presented in Appendix C Table 2, suggest that we did not lose important information by averaging over the reciprocity measure. The coefficients of all reciprocity levels 2-6 were roughly of the same size and significant. The mean of turnover intentions at those levels was about 0.10-0.19 larger than the mean of the reference group, holding everything else constant. We found that individuals were 12% more likely to state turnover intentions when increasing the reciprocity level from 1 to 2. Comparing this to an effect of 2% per unit increase of average reciprocity measure in the main specification, this result suggests that most of the increase in turnover intentions when increasing the average reciprocity level in the main specification seems to stem from the jump from scale 1 to 2. The only interaction effects that is borderline significant was at reciprocity level 2. The additional effect (compared to the reference category) of the reciprocity level 2 on turnover intentions when being unfairly treated there is around 0.06 lower than when being fairly treated.

4.3. Averaging reciprocity measure over the years

While being externally validated , it can be assumed that not everybody's answer to the reciprocity preferences question captures the true scale of their negatively reciprocal inclinations. If there is a substantial amount of noise in the measurement of reciprocity preferences, the true effect of reciprocity on turnover intentions as well as its interaction term with the treatment indicator would be underestimated.

Assuming reciprocity preferences are time-stable, the parts of the measurement error, which are random, can be reduced by averaging over repeated measures of the concept (Frost and Thompson, 2000). To reduce the attenuation bias towards-zero biased coefficients, we use the average item scale of the three questions over the years 2005, 2010 and 2015[7] as the measure for neg. reciprocal inclinations. The effect of negative reciprocity in this specification is a negligible amount higher than in the main specification, and there are no notable differences about the controls. The results indicate that by averaging over the years we might have slightly reduced the measurement error, even if only averaging over at most 3 observations per individual. However, if reciprocity preferences

[6] Instead of considering all 3 questions on negative reciprocity and creating 18 dummy variables, we assumed the question *"If somebody puts me in a difficult position, I will do the same to him/her"* captures the negatively reciprocal inclinations similarly as the composite measure.

[7] The years in which questions capturing reciprocity preferences where included in the SOEP-Questionnaire. Individuals who were not interviewed in any of the latter years were assigned the average over all available waves.

are not a time stable and malleable, a composite measure of reciprocity preferences over the years would even increase the measurement error, thus we refrained from doing so in the main part.

4.4. Conditioning on job-satisfaction

Due to limited data availability, we made the assumption that employees treatment status did not change from 2006 to 2007.
To partly account for our initial assumption we re-estimate the model on a subset of individuals whose job-satisfaction between 2006 and 2007 did not change much, assuming unfair treatment has a negative causal effect on job satisfaction. This assumption is based on a significant negative correlation between those two in our sample.[8] On the one hand a change in job satisfaction levels over the years can also be explained by changes in a lot of the control variables or unobserved factors, irrelevant of the treatment status. On the other hand, there is reason to believe that for persons being satisfied with their work in 2006 while being treated fairly, a drop in work satisfaction in 2007 can at least partly be explained by an altered perception of being treated fairly (and vice versa). Persons who changed their job between 2006 and 2007 were included in the analysis regardless of their level of work satisfaction. [9]
Indeed the effect of unfair treatment on turnover intentions seems to be a little higher in this specification (0.02), which suggests dropping individuals with changed work satisfaction partly reduces the downward bias introduced by the measurement error. We find no significant evidence that the effect depends on the level of average reciprocity.

4.5. Effort-reward ratio as measure for unfair treatment

One possible explanation for the lack of conclusive evidence for our hypothesis could be that our measure of unfair treatment does not fully capture all facets of perceived fairness at the workplace nor its magnitude. Also, if an employee does not feel particularly bothered by unfair treatment it is plausible that his response to it will be rather small. To adress those concerns, we make use of the effort-reward imbalance model (ERI) Siegrist, 2002 , which assumes that reciprocity is a core principle of employment. If the norm of performing job tasks (exerting effort in expectation of an appropriate return is violated, the employment might be be terminatedRichter et al., 2013. The validity of the ERI model was shown in various studies, for example by Rydstedt et al., 2007 who showed that a high effort-to-reward ratio (ERR) predicts stress at a workplace. To examine whether our results are robust to a multidimensional measure of unfair treatment, which eliminates some confounding factors which likely affected both turnover intentions and the interaction between unfair treatment and reciprocity, we reestimate the model with the ERR. We calculated the ratio for each individual by combining 4 items for extrinsic job effort (job at risk , workload , worsening working conditions, interruptions) and 4 items for 4 for rewards (recognition by superiors, recognition for effort, wage perceived as fair, chances of personal advancements), each

[8] In an additional OLS regression of unfair treatment on Job Satisfaction, unfair treatment predicts roughly 20 % decrease in Job satisfaction

[9] We split the job satisfaction, which was initially measured on a 10-point Likert scale,into a binary variable of equal observation count. Dropping the subset cuts the sample size in this regression to ca. 1500.

of them followed up by a question where the subjects indicate how much of a burden the particular item poses to them (Siegrist, 2002).[10]. An ERR value close to 0 indicates a low perceived effort at high perceived reward, while a value greater than 1 indicates an effort-reward imbalance Richter et al., 2013. In this specification a one point increase in the ERR[11] is linked with a 21% probability increase of stating turnover intentions at all significance levels compared to a 12 % increase of being unfairly treated in the main specification. The interaction term with average reciprocity however, stays insignificant.

5. Job Effort

Turnover intentions might not be seen or used as a retaliation device by reciprocal types, who may resort to alternative channels of punishment, as they depend on their current employment and income. Thus, in this section we investigate the relationship between unfair treatment, negative reciprocity a different potential punishment channel: job effort proxied by i) overtime hours or ii) absent days. Using SOEP-data, Dohmen et al., 2009 showed that higher average negative reciprocity is linked to more sick days of work and less effort as measured by overtime hours. We try to replicate those findings while taking into account additional information about the perception of unfair treatment at the workplace. We again hypothesize that the response to unfair treatment is moderated by reciprocity preferences in both cases, specifically the interaction to be positive when looking at absenteeism as an outcome and to be negative when examining job effort. Since both outcome variables are part of the SOEP-dataset of 2006, we do not have to the make the same assumptions about a possibly changed occupation or treatment status, as in our model for turnover intentions. However, both new models face a clear endogeneity issue which violates the OLS assumptions: On the one hand, perceiving ones treatment as fair or unfair likely influences how much effort an employee exerts. Simultaneously, our proxies for work effort, i) working overtime and ii) days of sick leave in the survey year, are plausibly influencing the perception of unfair treatment. We would expect an individual who works a lot of overtime or rarely takes days off to demand more recognition to feel treated fairly. Given the Simultaneity bias, the conditional exogeneity assumption of the OLS-estimator is violated and our estimates will be biased.[12]

Again, we set up a linear model with the same controls as in the main specification and clustered standard errors at the sector level whose results can be seen in Appendix C Table 4. More information on the proxies can be found in Appendix A. When using overtime as a proxy for effort, negative reciprocity has no significant effect on the probability of working overtime. Unfair treatment however is significantly linked to a higher probability of working overtime, indicating that people who do not feel recognized for their work might be using overtime as a signal device for effort to be recognized in the future. If an employee already feels treated fairly he might see no need to exert additional effort. The interaction term is negative and borderline significant which indicates that the effect of unfair treatment decreases with higher level of negative reciprocity.

[10]The exact wording of the questions and steps for the calculation of the ratio is in the Appendix
[11]In our sample mean of the ERR was 0.56 its standard deviation 0.4 and the maximum 5.
[12]Both, the outcome and the error term will be correlated with the proxies for job effort.

This is in line with our hypothesis and theory that higher reciprocal types retaliate against unfair treatment by exerting less effort, compared to lower types.
Considering the other proxy for work effort, we found that feeling treated unfairly significantly predicts a higher number of absent days from work. Negative reciprocity is no significant predictor for absenteeism. The interaction between those two is significant and negative suggesting that if unfairly treated the days absent from work decrease with increasing level of negative reciprocity. This result is contrary to our hypothesis, as we would have expected that highly negatively reciprocal types rather shirk on the job when being treated unfairly compared to lesser neg. reciprocal types.

6. Discussion/Conclusion

Our study examined the relationship between negative reciprocity, unfair treatment and turnover intentions using data from the German Socio-Economic Panel Study (SOEP). The findings suggest that individuals who exhibit higher levels of negative reciprocity are more likely to consider leaving their employment. We also found that not feeling recognized at work is linked to significantly higher turnover intentions. Those results are in line with previous research: Murtaza et al., 2021 found that a lack of appreciation at work is associated with increased burnout and a higher likelihood of turnover intentions.
However, we did not find any conclusive evidence in the data that this effect is higher for more reciprocal individuals, as the interaction effect between negative reciprocity and unfair treatment was not significant. The results withstand a number of robustness checks where we used different measures of outcome and main explanatory variables to predict the interaction effect. Even when examining the flip-side of the relationship, we could not find evidence that turnover intentions of fairly treated individuals decrease with their stated levels of positive reciprocity (summary in Appendix).
A possible explanation why reciprocity levels are linked to turnover intentions irrespective of the treatment status could be that higher negatively reciprocal individuals might anticipate their response to a possible unfair treatment and thus state higher turnover intentions. Further, negative reciprocity could be related to unobserved factors which are in turn correlated with turnover intention, such as job satisfaction, personality traits or organizational culture. Exemplarily, negative reciprocity was shown to be negatively associated with life satisfaction (Dohmen et al., 2009). If an individual feels dissatisfied with his life in general this could lead to turnover intentions for reasons unrelated to unfair treatment at the workplace. On a different matter, it could be the case that turnover intentions are not seen or used as a punishment device by reciprocal types, who may resort to alternative channels of punishment because they depend on their current employment and income.
Next to those points, our model might be specified in a way which makes it hard to identify the true interaction effect. One reason is the irregular timing of data collection for our main measures of interest, unfair treatment and turnover intentions, which were recorded in different years with no overlap, which may introduce measurement error in the unfair treatment variable and skew our

estimates. One crucial assumption was that the treatment status did not change during 2005 and 2006 for people which stayed at the same employer during that time. A person who felt treated unfairly in 2006 but due to some circumstances like a promotion, or clarifying conversations with the superiors feels recognized in 2007 would presumably not feel as inclined to change his job but would still show up in our data as being treated unfairly (same argument stands vice versa). If there is a considerable amount of people where that is the case, our coefficients for both, the effect of unfair treatment on turnover intentions as well as the interaction effect are biased towards zero. Furthermore, we relied on reciprocity measures collected in the 2005 survey wave, assuming that individuals' reciprocity preferences would remain unchanged. However, recent research has challenged this assumption, with studies Bruhin et al., 2019; Chuang and Schechter, 2015 finding no evidence for the stability of reciprocity preferences over time. This raises the possibility that some individuals' reciprocal inclinations may have changed between the 2005 and 2007 survey waves, potentially affecting our ability to accurately capture the relationship between reciprocity and turnover intentions. Another possible factor could be a measurement error in the reciprocity variable, as some individuals may understate their true levels of reciprocity for strategic reasons or social desirability, again downward skewing our estimates.

To our knowledge, the relationship between negative reciprocity, unfair treatment and turnover intentions has not been explored in previous literature. Our study contributes to the existing literature by considering the role of reciprocity preferences in understanding how individuals respond to unfair treatment in the workplace. While our results did not provide clear evidence for the hypothesis that more negatively reciprocal individuals are more likely to consider leaving their employment when feeling unfairly treated, our study highlights the importance of considering both negative reciprocity and unfair treatment in understanding turnover intentions.

Overall, our findings suggest that further research is needed to fully understand the relationship between negative reciprocity, unfair treatment, and turnover intentions. To this end, it would be beneficial to have more comprehensive data availability. With panel data which includes measures on unfair treatment and labor market outcomes in multiple waves one would be able to estimate a causal effect using a within-person fixed effects model. Alternatively, one could exploit exogenous variation by finding fitting natural experiments, similarly to Montizaan et al., 2016) and apply approaches such as difference-in-differences or regression discontinuity design to provide further insight into the causal relationship between these variables.

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Appendices

A. Other Outcomes

A.1. Overtime

As there is no direct measure for job effort in the data, following Dohmen et al., 2009 we use working overtime as a proxy which was measured by the following question measured in 2006:

"Do you work overtime?"

with answers *"Yes"*, *"No"* or *"Does Not Apply: Self-Employed"*. We dropped people who stated they are self-employed.

A.2. Absenteeism

Another proxy for job effort we us is the number of days absent from work. It would be interesting to see if negative reciprocity has also an impact on this outcome. Absenteeism was measured with by the following question, elicited in 2007:

"How many times were you not able to work in 2006 because of illness?"

Following Dohmen et al., 2009, we dropped all who were absent for six weeks or longer in 2006.[13]. We further dropped all employees who changed job in the previous year so that the number of days missing are only connected to the same employer.

B. ERI-module

To construct the effort-reward ratio (ERR) we built a composite measure out of the questions 2,3,5,6 for efforts and 1,2,3,4 for rewards in the Screenshot below (each with the corresponding follow-up question).
The ERR for each subject was constructed as follows,

$$ERR = \frac{\sum S_i^e \cdot e}{\sum S_i^r \cdot r}$$

where S_i^e equals 1 if a person answered "No" to the effort question i and $1 + Burdenscale_i$ if he/she answered "Yes" in the first stage.
S_i^r equals 5 if a person answered "Yes" to the effort question and $1 - Burdenscale_i$ if he/she answered "Yes" in the first stage.

[13] In Germany, when being absent less than six weeks an employee still gets paid by the employer

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I will now read you some statements about possible job-related burdens of your current job.
Please indicate whether each point applies to you and, if so, how much of a burden it is for you.

Applicable?

	[1] Yes	[2] No
Because of the high volume of work, there is often high time pressure	○	○
I am often interrupted and distracted while working	○	○
The amount of work has increased steadely over the last two years	○	○
The chances of promotion in my company are bad	○	○
I am undergoing – or I expect to undergo – a worsening in my working situation	○	○
My job is in jeopardy	○	○

And how much does it burden you?

	[1] Not at all	[2] Not much	[3] A bit	[4] A lot
Because of the high volume of work, there is often high time pressure	○	○	○	○
I am often interrupted and distracted while working	○	○	○	○
The amount of work has increased steadely over the last two years	○	○	○	○
The chances of promotion in my company are bad	○	○	○	○
I am undergoing – or I expect to undergo – a worsening in my working situation	○	○	○	○
My job is in jeopardy	○	○	○	○

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And what about for the following points?
Please indicate whether each applies to you and,
if not, how much of a burden it is for you.

Applicable?

	[1] Yes	[2] No
I receive the recognition I deserve from my superiors	○	○
When I consider all my accomplishments and efforts, the recognition of I've received seems about right to me	○	○
When I consider all my accomplishments and efforts, my personal chances of career advancement seem about right to me	○	○
When I consider all my accomplishments and efforts / my pay seems about right to me	○	○

And how much does it burden you?

	[1] Not at all	[2] Not much	[3] A bit	[4] A lot
I receive the recognition I deserve from my superiors	○	○	○	○
When I consider all my accomplishments and efforts, the recognition of I've received seems about right to me	○	○	○	○
When I consider all my accomplishments and efforts, my personal chances of career advancement seem about right to me	○	○	○	○
When I consider all my accomplishments and efforts / my pay seems about right to me	○	○	○	○

https://paneldata.org/soep-core/instruments/soep-core-2011-pe/59

C. Tables

Table 2. Robustness Checks

	Cardinal TI	**Rec years**	**Job Satisfaction**	**ERR**
Intercept	5.7259***	0.0455***	0.0486***	0.0303***
	(0.573)	(0.008)	(0.008)	(0.008)
Unfair Treatment	8.3798***	0.1090***	0.1427***	0.2141***[a]
	(1.429)	(0.035)	(0.031)	(0.046)
Negative Reciprocity	0.8030***	0.0245***	0.0211***	0.0262***
	(0.225)	(0.006)	(0.006)	(0.009)
Interaction	-0.4742	-0.0062	-0.0088	-0.0119
	(0.400)	(0.010)	(0.008)	(0.012)
Working Hours	0.0718	0.0019*	0.0017	0.0018
	(0.055)	(0.001)	(0.001)	(0.001)
Firm size	-0.3755**	-0.0116***	-0.0115***	-0.0116***
	(0.152)	(0.004)	(0.004)	(0.004)
Tenure	-1.5030***	-0.0161***	-0.0151***	-0.0165***
	(0.129)	(0.002)	(0.002)	(0.002)
$Tenure^2$	2.6795***	0.0208***	0.0200***	0.0196***
	(0.281)	(0.004)	(0.005)	(0.005)
Age	5.1298***	0.0509***	0.0523***	0.0353***
	(0.475)	(0.007)	(0.007)	(0.007)
Age^2	-16.7033***	-0.1290***	-0.1387***	-0.0855***
	(1.687)	(0.025)	(0.024)	(0.025)
Years of Education	1.0564***	0.0220***	0.0223***	0.0195***
	(0.219)	(0.007)	(0.007)	(0.007)
Commute distance	0.0004***	0.0004***	0.0004***	0.004***
	(0.008)	(0.000)	(0.000)	(0.000)
Pot. Experience	0.1698***	0.0010***	0.0011***	0.0005*
	(0.019)	(0.000)	(0.000)	(0.000)
Mincer Residuals	-6.1042***	-0.0694***	-0.0552**	-0.0805***
	(1.074)	(0.020)	(0.022)	(0.021)
Job at Risk	-10.1536***	-0.1450***	-0.1502***	
	(1.144)	(0.019)	(0.022)	
Observations:	5380	5380	4331	5380
R-squared	0.224	0.196	0.186	0.193

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

[a] In this case ERR

Table 3. Reciprocity Dummies

	Coefficients	**Standard Errors**
Intercept	0.0449***	(0.008)
Unfair Treatment	0.1172***	(0.026)
Negative Reciprocity 2	0.1642***	(0.015)
Negative Reciprocity 3	0.1535***	(0.020)
Negative Reciprocity 4	0.1008***	(0.023)
Negative Reciprocity 5	0.1600***	(0.027)
Negative Reciprocity 6	0.1982***	(0.046)
Negative Reciprocity 7	0.0515	(0.044)
Interaction 2	-0.0661**	(0.032)
Interaction 3	0.0047	(0.039)
Interaction 4	-0.0175	(0.032)
Interaction 5	-0.0580	(0.045)
Interaction 6	-0.0778	(0.069)
Interaction 7	-0.0458	(0.066)
Working Hours	0.0018	(0.001)
Firm Size	-0.0120***	(0.004)
Tenure	-0.0159***	(0.002)
$Tenure^2/100$	0.0198***	(0.004)
Age	0.0504***	(0.006)
$Age^2/100$	-0.1273***	(0.023)
Years of Education	0.0196***	(0.007)
Commute Distance	0.0004***	(0.000)
Pot. Experience	0.0009***	(0.000)
Mincer Residuals	-0.0712***	(0.019)
Job at Risk	-0.1489***	(0.018)
Observations:	5380	
R-Squared:	0.208	

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table 4. Different Outcomes

	Turnover Intentions	**Work Effort**	**Absenteeism**
Intercept	0.0463***	-0.0188***	1.6544***
	(0.009)	(0.007)	(0.197)
Unfair Treatment	0.1228***	0.1125***	3.2904***
	(0.031)	(0.021)	(1.087)
Negative Reciprocity	0.0049***	0.0044	0.2024
	(0.006)	(0.005)	(0.198)
Interaction	-0.0104	-0.0118*	-0.6537**
	(0.008)	(0.006)	(0.307)
Working Hours	0.0019*	0.0052***	0.0243
	(0.001)	(0.001)	(0.019)
Firm size	-0.0117***	0.0098***	0.1678**
	(0.004)	(0.002)	(0.078)
Tenure	-0.0159***	-0.0018	
	(0.002)	(0.002)	
$Tenure^2/100$	0.0203***	0.0040	
	(0.004)	(0.005)	
Age	0.0517***	-0.0065	1.5659***
	(0.007)	(0.006)	(0.165)
$Age^2/100$	-0.1313***	0.0586***	-4.7960***
	(0.025)	(0.021)	(0.579)
Years of Education	0.0216***	0.0243***	-0.5867***
	(0.007)	(0.003)	(0.053)
Commute Distance	0.0004***	0.0001**	0.0051*
	(0.000)	(0.000)	(0.003)
Pot Experience	0.0010***	-0.0009***	0.0531***
	(0.000)	(0.000)	(0.007)
Mincer Residuals	-0.0709***	0.1430***	-1.0740**
	(0.020)	(0.010)	(0.426)
Job at Risk	-0.1449***	0.0051	
	(0.019)	(0.012)	
Observations:	5380	6559	2990
R-squared:	0.195	0.115	0.046

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Positive Reciprocity

Table 5. Turnover Intentions

	Coefficients	**Standard Errors**
$Intercept$	0.0805***	(0.010)
$Fair\,Treatment$	-0.1032	(0.088)
$Avg\,Positive\,Reciprocity$	-0.0285***	(0.012)
$Interaction$	-0.0017**	(0.015)
$Working\,Hours$	0.0019*	(0.001)
$Firm\,Size$	-0.0117***	(0.004)
$Tenure$	-0.0159***	(0.002)
$Tenure^2/100$	0.0203***	(0.004)
Age	0.0517***	(0.007)
$Age^2/100$	-0.1313***	(0.025)
$Years\,of\,Education$	0.0216***	(0.007)
$Commute\,Distance$	0.0004***	(0.000)
$Pot.\,Experience$	0.0010***	(0.000)
$Mincer\,Residuals$	-0.0709***	(0.020)
$Job\,at\,Risk$	-0.1449***	(0.019)
Observations	5380	
R-Squared	0.195	

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$