



**Fairness Spillovers –
The Case of Taxation**

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Abstract

It is standardly assumed that individuals react to perceived unfairness or norm violations in precisely the same area or relationship where the original offense has occurred. However, grievances over being exposed to injustice may have even broader consequences and also spill over to other contexts, causing non-compliant behavior there. We present evidence that such 'fairness spillovers' can incur large economic costs: A belief that there is unfairness in taxation in the sense that the rich don't pay enough taxes is associated with a twenty percent higher level of paid absenteeism from work.

JEL Codes: H31, H26, D63.

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1 Introduction

It is widely documented that fairness perceptions matter for economic behavior. Examples differ with respect to the notion of fairness employed, yet they all suggest that when people find themselves in situations which they consider to be inconsistent with their moral standards or expectations, they show behavioral responses which entail economic costs. Agents receiving “unkind” wage offers have been shown to react by cutting back work effort (Fehr and Falk, 1999), the belief that others don’t contribute to charitable funds induces a lower willingness to donate to charity (Frey and Meier, 2004), and people who think that there is injustice in taxation respond by increasing their own level of tax evasion (Alm et al. 1993; Andreoni et al., 1998).¹ This literature shares the premise that the behavioral response is direct in the sense that individuals adjust to perceived unfairness or norm violations in precisely the same area or relationship where the original event has occurred. A pointer that the behavioral consequences of perceived norm violations may also be less direct comes from social psychologists: in a series of field experiments, Keizer et al. (2008) find that “when people observe that others violated a certain social norm or legitimate rule, they are more likely to violate other norms [...]”: Pedestrians are more likely to steal an envelope from a mailbox when the area around the mailbox is arranged to be littered with trash, and customers outside a shopping mall are more likely to disobey a “no throughway” sign when bicycles were illegitimately parked nearby. Similarly, Mullen and Nadler (2008) find that when they have experiment participants read a newspaper article which reports on a court decision that is inconsistent with their moral values, they show higher rates of stealing the pen they were given to fill out the experiment questionnaire.

The latter examples show that a perception of unfairness in one context can have consequences in other contexts and make individuals feel less obliged to show compliant behavior there, even if this comes at the cost of third parties. While the evidence gathered by social psychologists is intriguing, the economic relevance of such cross-norm or cross-relationship adjustments – a phenomenon we label “fairness spillovers” – has not been assessed so far. In order to do so, we look at two genuinely economic norms of conduct which are at the heart of modern industrialized societies: the obligations to work hard and to pay taxes.² We evaluate whether employees who believe that there is a norm violation in taxation exhibit a lower willingness to comply with the norm to exert work effort.

¹Fehr and Falk (1999) conceptualize fairness as reciprocity. In Frey and Meier (2004) conditional cooperation drives the results, and the tax evasion literature stresses that procedural fairness may also be important. Fehr and Schmidt (2006) provide a survey of fairness concepts in economics.

²Hard work is seen as a virtue almost universally across cultures, religions and political regimes (Lipset 1992). Likewise, once a state is brought into existence, paying taxes is considered as a citizens’ duty and hence constitutes a widely accepted norm (Locke, 1690).

As a specific trigger for fairness spillovers we propose the belief that the rich do not pay their fair share in taxes. The perceived tax burden of the rich is one of the most frequently debated aspects of tax fairness, and so it seems reasonable to think that it can lead to such spillovers. The opinion that the top income brackets should contribute a substantial share to the funding of public affairs is widely held in societies that adhere to the principle of progressive taxation. Mankiw (2010) even goes so far as to state that “[t]he question, ‘Do the rich pay their fair share in taxes?’ is one of [the] defining issues of our time”. Consequently, the idea that the rich may pay too little in taxes can let emotions run high. For example, a recent *Economist* poll on US public opinion inquired how angry people get when they think about “Tax Breaks for the Rich”. Almost half of the respondents answered “Very Angry”, about one fifth get “Somewhat Angry” while only one out of ten said they “Don’t think about it”.³

There are good reasons why a violation of the perceived fairness of taxation may cause behavioral adjustments specifically in the realm of work; in the work effort of employed individuals to be more precise.⁴ First, for employed individuals it is hard to respond to a perceived unfairness in taxation by evading taxes. This would be a straightforward reaction if people were to adjust their behavior in the area of the original fairness offense.⁵ Yet in reality the opportunities for manipulating tax returns are slim for the employed population: Taxable income is often directly reported to the authorities by employers or other third-party institutions such as banks, investment and pensions funds (Kleven et al. 2011). In contrast, work effort is often a choice variable for the individual. Second, the self inflicted cost of breaking the norm to provide adequate work effort is usually low for employed individuals, because work effort is difficult to observe in general. It entails various elements of “quasi-voluntary” contributions, that the employee can adjust without having to fear immediate detection and punishment for low work effort.^{6,7}

A rigorous way of testing for the existence of this fairness spillover from taxation is difficult to come up with, because individual work effort is notoriously hard to measure. We therefore propose the following setup: As a measure of work effort, which is easy to observe and which at the same time allows us to put a price tag on the suggested fairness spillover from taxation, we use the number of days that German employees spend on paid sickness leave. Of course, not everyone on sick leave is a shirker, but the variation

³Economist/YouGov Poll, conducted March 22-24, 2009.

⁴See Austin and Walster (1975) and Mullen and Nadler (2008) for a general discussion of the conditions that make the occurrence of cross-norm adjustments likely.

⁵Tax evasion as a direct adjustment measure has been analyzed in various experiments (Spicer and Becker 1981, Kinsey et al. 1991).

⁶Some examples of quasi-voluntary contributions to work effort are: going “beyond the call of duty” in contrast to “working to rule”; showing up for work every day when one is healthy.

⁷That non-pecuniary motives such as fairness are likely to have a stronger effect on economic decisions whenever the material stakes involved in these decisions are small has also been suggested by Rabin (1993).

in absenteeism that remains after factoring out actual health should be indicative of shirking one's duty to show up for work.⁸ The German institutional setup has some features that make using absenteeism as a means to adjust effort likely: There is no reduction of earnings associated with sickness spells of up to six weeks' duration and, for the first three days of each period of leave, employees are usually not even obliged to provide a doctor's note. In addition, there are high levels of job protection, and we assume that ultimately this legal generosity provides incentives to utilize it as a means of shirking one's duty when the wealthy are suspected of not fulfilling the norm of paying ample taxes. Our empirical analysis will be based on household survey data from the German Socio-Economic Panel (GSOEP). It provides data on absenteeism and also inquires about the belief which constitutes the trigger for the proposed spillover: that the rich don't pay their fair share in taxes. We find that a perceived violation of this tax fairness norm is surprisingly strongly connected to work morale: On average, employees who harbor the perception that managers pay too little in taxes accrue 20 percent more sick days, which translates to 1.5 more days absent from work per year. This results holds, even when carefully conditioning on health status and a rich set of income, personal and job related variables. The GSOEP also allows us to test and reject a variety of alternative explanations. While we believe this strategy to go a long way in correcting potential biases, our research design additionally implements Rosenbaum-type sensitivity tests. They reveal that any remaining omitted variable would need to have implausibly strong associations with absenteeism and fairness beliefs in order to spuriously generate our results – given the large set of covariates, the existence of such an important unobserved variable is rather unlikely.

While the possible existence of what we label 'fairness spillovers' has gone largely unnoticed by economists, the general phenomenon that individuals may use apparently unrelated outlets in response to external emotional cues is enjoying increasing interest in the recent economics literature: Upset losses by the home football team have been shown to induce higher levels of domestic violence (Card and Dahl, 2011); similarly the incidence of offenses against police officers (Rees and Schnepel, 2009) as well as vandalism (Priks, 2010) have been found to be especially high whenever home teams suffer an upset loss. Our result parallels these findings in that they can all be interpreted to be consistent with the frustration-aggression hypothesis – deviation from a reference point of expectation leads to anger which in turn results in adverse behavior. There are, however, several important differences. First, the reference point we have in mind is genuinely moralistic or ethical in nature, thus distinguishing the 'fairness spillover' from the above mechanisms,

⁸That absence due to illness is not purely a response to medical conditions is widely accepted in the labor economics literature (Barmby et al. 2002; Johannsen and Palme 2005; Puhani and Sonderhof 2010), and so interpreting absenteeism (after having controlled for health) as a measure for low work effort or shirking is in line with the labor economics literature – see Ichino and Riphahn (2005) for a prominent example.

which following our terminology could be labeled 'emotional spillovers'. Second, in our case the suspected triggering event is not a real event but rather a belief. Third, because beliefs about justice in the world can be considered to form slowly over time, the decision to reduce work morale because of suspected injustice in taxation is not very likely to be an immediate and spontaneous reaction to a single event. Finally, our dependent variable work effort is a core variable of economic analysis.

The remainder of the paper is organized as follows. Section 2 explains the choice of variables, describes the data and gives some descriptive statistics. Section 3 presents the empirical results. Section 4 discusses alternative explanations for the findings, and section 5 concludes.

2 Data and descriptive statistics

It is challenging to test whether the belief that there is injustice in taxation of the rich is associated with lower work morale, because real-world data on beliefs towards justice in taxation and on work morale are usually not readily available. An exception is the 2005 wave of the German Socio-Economic Panel (GSOEP), a large nationally representative household panel data set.⁹

The 2005 questionnaire of the GSOEP asked respondents how they perceive the tax burden of individuals at the upper end of the income distribution, exemplified by "managers". The introduction to the question reads: "In Germany, everyone has to pay taxes in relation to his or her income. Those who earn more have to pay higher taxes (also known as 'progressive taxes')". Respondents are then asked: "[...] what do you think about the taxes paid by a manager on the board of directors of a large company? Does he/she pay too much, too little, or an exactly appropriate amount in taxes compared to other groups?". There are four categories among which respondents could choose: "too much", "too little", "appropriate", "don't know".

The framing of the question alludes to the principle of progressive taxation, which postulates that an individual's average tax rate should increase as income increases. Yet the question does not explicitly ask "is there enough progression in the German tax system?", and so there is scope for individuals to apply fairness principles other than that of sufficient progression. The feeling that the rich pay too little in taxes compared to other groups may stem from the belief that the rich do not contribute adequately to the tax pool by taking advantage of loopholes or by flat out evading taxes in an illegal manner. Yet the blame need not be on the rich themselves: agents may just as well feel that politi-

⁹See Wagner et al. (2007) for a description of the panel survey.

cians fail to implement tax policies that sufficiently strain the rich and thus deem the tax system unfair. In the end, while we cannot say which tax fairness principle respondents actually have in mind, we assume that individuals apply *some* tax fairness principle when answering the question.

The share of respondents who say that managers are taxed too little is shown in Table 1. We exclude those who answered “don’t know” and coded the variable to zero when managers’ taxation was deemed “too high” or “appropriate”. Hence, the reference group is composed of people who do not think that managers are taxed too little.¹⁰ The first column of the Table shows that an overwhelming 72% of respondents think that managers are taxed too little. One might suspect that this view is more strongly held by individuals at the lower end of the income distribution. In the remaining columns of the table we therefore break this figure up by income, education, and the respondent’s position in the firm of employment. It is striking how strongly the belief that managers are taxed too little is also held by individuals from the higher income and occupation groups. It is held by 66% of the respondents with above-median income (compared to 78% of individuals with below-median income) and by 68.9% of those who have completed at least the medium track of German secondary education (compared to 81.4% of those with lower secondary education or no formal degree at all). Interestingly, even among employees holding a managerial position in the firm, the view that managers are taxed too little is still held by 58.7% of the respondents.¹¹ Obviously, the belief that managers do not pay their fair share in taxes is not confined to individuals from low status groups. Quite the contrary: it is held by a wide range of individuals from different social backgrounds.¹²

TABLE 1: ARE MANAGERS BEING TAXED TOO LITTLE?

	full sample	income		education		managerial position	
		below median	above median	low	high	no manager	manager
Yes (%)	72.1	78.0	65.8	81.4	68.9	75.9	58.7
<i>N</i>	4565	2366	2199	1110	3241	3552	1013

Note: Data is taken from the 2005 wave of the German Socio-Economic Panel. The sample is the same as the estimation sample used in Table 3. The question reads: “In Germany, everyone has to pay taxes in relation to his or her income. Those who earn more have to pay higher taxes (also known as ‘progressive taxes’).[...]And what do you think about the taxes paid by a manager on the board of directors of a large company? Does he/she pay too much, too little, or an exactly appropriate amount in taxes compared to other groups?” There are four categories among which respondents could choose: “too much”, “too little”, “appropriate”, “don’t know”. The indicator variable used in this paper drops all individuals that answered “don’t know”. In addition, all individuals that answered either “too much” or “appropriate” are coded as zero, i.e. they do not think that managers are being taxed too little.

If these widely held perceptions of unfairness induce individuals to reduce work morale,

¹⁰Perhaps not surprisingly, the view that managers pay too much in taxes is only held by 6% of the respondents.

¹¹This may not be so surprising, given that even the billionaire Warren Buffett publicly points out that his own average tax rate is much lower than that of his receptionist, another indicator that believing the tax system to be unfair at the top is not confined to working class individuals. See www.nytimes.com/2007/07/15/business/yourmoney/15view.html

¹²These findings are reflected by other data sources as well. In the YouGov/Economist Poll cited in the introduction, around forty percent of college graduates declare to get “Very Angry” when thinking about tax breaks for the wealthy. The same is true for those with a household income above \$100,000.

they are most likely to choose an easily manipulable margin of adjustment that is not costly to the individual and that comes with a low probability of detection. In Germany, the number of days absent from work due to (alleged) illness meets these requirements, because employees are usually not obliged to produce a doctor’s note for the first three days of each sickness spell and there is no reduction of payments for spells of up to six weeks. The analysis will thus use employee absenteeism due to sickness as the dependent variable.¹³

The GSOEP also provides the self-reported annual number of days absent from work due to illness. The corresponding question reads ”How many days were you not able to work [last year] because of illness?”. Because of the retrospective nature of the question we draw the information on work absence from the 2006 GSOEP wave so that we can relate it to the fairness perceptions collected in the 2005 wave.

TABLE 2: DAYS ABSENT BY ANSWER TO “ARE MANAGERS TAXED TOO LITTLE?”.

	managers taxed too little		difference in days absent
	yes	no	
Days absent by answer category	8.78 (.36)	5.87 (.58)	2.91*** (.69)
<i>N</i>	3291	1274	

Note: Mean days absent by opinion on manager taxation and t-test of difference in means of absenteeism (standard errors in parentheses). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 2 shows that those who think that managers are taxed too little are absent from work 8.78 days, while those who think that managers are appropriately or excessively taxed are absent for only 5.87 days. This “fairness gap” – defined as the difference in sick days between two individuals who differ in their assessment of whether or not the rich pay their fair share in taxes – of 2.91 days is highly statistically significant, and in relative terms it amounts to a 50% increase in the average number of days absent associated with the belief that managers are taxed too little. These highly suggestive observations are consistent with the idea that individuals not only “get angry” when thinking about tax breaks for the rich – as implied by the Economist poll mentioned above – but that behavioral consequences to perceived unjust taxation of the rich may spill over to other areas, specifically to the realm of work.

¹³There are other measures of work effort such as hours worked or (un)paid overtime. However, it is not clear that these are choice variables: often “at least ex post, workers cannot freely vary their hours on a particular job” (Kahn and Lang, 1991), and overtime is often mandatory whenever circumstances make it necessary. In addition, even if they were choice variables, they do not meet the conditions of low cost and low detection probability. Fewer hours worked or paid overtime show in the bank account, and even refusing unpaid overtime rather openly signals low effort. This is in stark contrast to sick days, which in Germany come at no monetary cost, and are much less likely to be taken for low work morale – after all, everyone gets sick at some point.

3 Estimation results

The descriptive statistics presented in section 2 show a positive correlation between the belief that managers pay too little in taxes and days absent from work – a first indicator that there may indeed be spillovers from tax fairness perceptions to work morale. Still, before drawing any further conclusions, this raw “fairness gap” needs to be adjusted for a number of respondent characteristics. The GSOEP provides a vast array of control variables, far beyond what is usually available in survey data, and this section shows estimates of the association between fairness perceptions and absenteeism after netting out such possibly confounding factors. Table 8 gives descriptions of all variables used in the analysis, with the corresponding summary statistics displayed in Table 9. We first present the baseline results for different sets of control variables and with different functional forms of the empirical model. These estimates give an idea of the magnitude of the general “fairness gap”, and in what follows we also provide a sub-group analysis in order to uncover whether our coefficient of interest differs across socio-economic groups.

3.1 Baseline results

The main explanatory variable throughout the paper is an indicator for whether an individual believes that “managers are being taxed too little”, which we take as a measure of whether taxation at the top of the income distribution is in line with a respondent’s concept of tax fairness. We expect people holding this belief to react by increasing their days absent from work and thus the dependent variable is the number of sick days in the year of the survey. As this is a count variable that only takes on non-negative integer values, we employ the two-step Negative Binomial Quasi Maximum Likelihood Estimator (QMLE) proposed by Wooldridge (2002), which has desirable robustness properties.¹⁴

Column (1) in Table 3 shows the results from a bivariate regression model without further control variables. Coefficients must be interpreted as in a log-linear regression: the difference in absenteeism between individuals who perceive manager taxes as unfair, and those who do not, is 40 log points. When transformed, this corresponds to the 50% increase (2.9 days) associated with the belief that manager taxes are unfair which we found in the descriptive statistics (Table 2).¹⁵ A first natural candidate to control for is a person’s individual health. It might be argued that the correlation in column (1) is driven by reverse

¹⁴It is a fully robust estimator in the sense that it does not rely on the distributional assumption and the variance assumption of the conventional negative binomial (Negbin II) estimator. Only the conditional mean assumption is needed for consistency. See Wooldridge (2002) for details. Note also that throughout our estimations we find that the over-dispersion parameter η^2 in the count-data models is significantly greater than zero. This rejects the null hypothesis of equi-dispersion, and implies that a simple Poisson count-data model would not be appropriate for our data.

¹⁵ $\exp(0.4) - 1 = 0.492$.

TABLE 3: COUNT DATA ESTIMATES, DEPENDENT VARIABLE DAYS ABSENT.

	(1)	(2)	(3)	(4)	(5)	(6)
Main explanatory variables						
managers taxed too little	.402*** (0.088)	.277*** (0.066)	.229*** (0.067)	.232*** (0.067)	.236*** (0.066)	.25*** (0.066)
health score	-.342*** (0.058)	-.335*** (0.054)	-.336*** (0.053)	-.336*** (0.053)	-.346*** (0.051)	-.356*** (0.050)
health satisfaction	-.129*** (0.026)	-.132*** (0.025)	-.13*** (0.023)	-.13*** (0.023)	-.125*** (0.022)	-.115*** (0.024)
disability	.528*** (0.113)	.524*** (0.113)	.488*** (0.111)	.488*** (0.111)	.481*** (0.115)	.478*** (0.115)
Personal characteristics and attitudes						
gross income			-.011 (0.024)	-.036 (0.026)	-.053** (0.025)	-.049** (0.025)
age			-.047* (0.024)	-.033 (0.031)	-.045 (0.031)	-.042 (0.030)
agesq			4.9e-04* (0.000)	3.4e-04 (0.000)	5.2e-04 (0.000)	4.8e-04 (0.000)
male			-.038 (0.068)	-.142* (0.073)	-.103 (0.070)	-.109 (0.071)
children			-.129* (0.068)	-.034 (0.067)	-.033 (0.065)	-.033 (0.066)
foreign			.146 (0.148)	.148 (0.137)	.124 (0.137)	.121 (0.139)
schooling			-.049*** (0.013)	-.045*** (0.016)	-.038** (0.016)	-.039** (0.016)
Job related variables						
tenure			.027** (0.010)	.027** (0.010)	.019* (0.010)	.018* (0.010)
tenure sq			-6.5e-04** (0.000)	-6.5e-04** (0.000)	-5.4e-04* (0.000)	-5.2e-04* (0.000)
full time experience			-.019 (0.017)	-.019 (0.017)	-.021 (0.017)	-.022 (0.016)
full time experience sq			4.3e-04 (0.000)	4.3e-04 (0.000)	4.1e-04 (0.000)	4.2e-04 (0.000)
part time experience			-3.4e-03 (0.018)	-3.4e-03 (0.018)	-.011 (0.018)	-.011 (0.018)
part time experience sq			-1.1e-04 (0.001)	-1.1e-04 (0.001)	1.5e-04 (0.001)	1.7e-04 (0.001)
part time			-.289*** (0.106)	-.289*** (0.106)	-.282** (0.103)	-.277*** (0.102)
marginally employed			-1.29*** (0.255)	-1.29*** (0.255)	-1.13*** (0.244)	-1.13*** (0.246)
Firm level variables						
20 < employees < 200			.289*** (0.091)	.289*** (0.091)	.289*** (0.091)	.276*** (0.090)
200 < = employees < 2000			.475*** (0.093)	.475*** (0.093)	.475*** (0.093)	.461*** (0.093)
employees > 2000			.392*** (0.094)	.392*** (0.094)	.392*** (0.094)	.378*** (0.093)
agriculture			-.662*** (0.334)	-.662*** (0.334)	-.662*** (0.334)	-.721** (0.314)
mining/energy			.69*** (0.274)	.69*** (0.274)	.69*** (0.274)	.686** (0.272)
processing			.318** (0.147)	.318** (0.147)	.318** (0.147)	.324** (0.147)
traffic/media			.292** (0.138)	.292** (0.138)	.292** (0.138)	.305** (0.138)
construction			.081 (0.157)	.081 (0.157)	.081 (0.157)	.086 (0.158)
wholesale			.226* (0.124)	.226* (0.124)	.226* (0.124)	.237* (0.124)
services			4.8e-03 (0.106)	4.8e-03 (0.106)	4.8e-03 (0.106)	-5.0e-04 (0.105)
banking/insurance			.105 (0.121)	.105 (0.121)	.105 (0.121)	.111 (0.121)
public sector			.223*** (0.095)	.223*** (0.095)	.223*** (0.095)	.228*** (0.094)
Personal attitudes						
own income unfair			2.4e-03 (0.062)	2.4e-03 (0.062)	2.4e-03 (0.062)	2.4e-03 (0.062)
afraid to lose job			-.042 (0.063)	-.042 (0.063)	-.042 (0.063)	-.042 (0.063)
satisfied w/ job			-.031* (0.017)	-.031* (0.017)	-.031* (0.017)	-.031* (0.017)
lazy			-3.0e-03 (0.019)	-3.0e-03 (0.019)	-3.0e-03 (0.019)	-3.0e-03 (0.019)
risk taker			.012 (0.015)	.012 (0.015)	.012 (0.015)	.012 (0.015)
pessimist			-.033 (0.067)	-.033 (0.067)	-.033 (0.067)	-.033 (0.067)
life satisfaction			3.1e-03 (0.022)	3.1e-03 (0.022)	3.1e-03 (0.022)	3.1e-03 (0.022)
Constant	1.77*** (0.075)	3.77*** (0.154)	5.79*** (0.571)	5.44*** (0.642)	5.22*** (0.632)	5.32*** (0.668)
16 region dummies	No	No	No	Yes	Yes	Yes
9 occupation dummies	No	No	No	Yes	Yes	Yes
parental education dummies	No	No	Yes	Yes	Yes	Yes
η^2	6.503*** (0.904)	3.642*** (0.229)	3.182*** (.197)	2.715*** (0.166)	2.284*** (0.142)	2.156*** (0.137)
N	4565	4565	4565	4565	4565	4565

Note: Standard errors in parentheses. Reference categories are: (a) full-time for "job status", (b) less than 20 employees for "firm size", (c) manufacturing for "sectoral dummies". η^2 is associated with the estimate of the variance of absenteeism and indicates the degree of over-dispersion. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

causality: Those who stay at home due to illness may become aware that they are net beneficiaries of the social security system and therefore always think that taxation levels are too low. Column (2) therefore adds three indicators of respondents' health status. Health score is a self-reported assessment of an individual's objective health status. Respondents can rate their health on a scale ranging from "poor" [1] to "very good" [5]. However, there may be vast differences in the health threshold that needs to be reached before a person decides to call in sick. Hence, we also control for the subjective satisfaction with health status. This variable is coded on an 11-point scale ranging from "totally unhappy" [0] to "totally happy" [10]. We also add a dummy variable indicating whether a person has a disability. All three variables are significant and the coefficients bear the expected sign, i.e. being or feeling less healthy is associated with more absenteeism. While their inclusion does reduce our coefficient of interest, there remains a substantial difference in absenteeism after controlling for health of 28 log points (32%).

Individual income is another important control. Low-income earners may systematically want higher tax levels for the rich, and they may also have a higher probability of shirking, as they have less at stake when getting caught. Since omitting income would then bias our coefficient of interest upwards, it is included in column (3) along with other personal characteristics, among them the standard controls from a Mincer equation. We also include dummies for parental education to proxy for skills or family background factors that may not yet be captured adequately by an individual's own formal education. It turns out that a higher level of education is associated with fewer sick days, as is advanced age and having children. The belief that the tax system at the upper end of the income distribution is unfair is still associated with significantly higher levels of absenteeism, despite the gap being cut down to 23 log points (26%). Adding job and firm related variables in columns (4) and (5) does not further diminish the tax fairness coefficient. Longer job tenure and larger firm size are both associated with higher levels of absenteeism. A possible explanation would be that longer tenure makes it harder for employers to punish shirking due to lay-off protection laws, while a larger firm size reduces the probability of getting caught shirking. From column (4) on, the specifications also include indicators for the 16 German federal states. We add them in order to rule out that regional economic and cultural differences drive our results, for example between the former socialist East Germany and West Germany. The controls from here on also include 9 occupation dummies – these are constructed such that there are three subgroups for each of the following categories: blue-collar, white-collar and public sector employees. The subgroups indicate skill requirements of the job (low, medium, high) and can be interpreted as indicators of the job hierarchy level. The highly qualified white-collar employees are made up of those in managerial positions, and so they control for the possibility that managers have different tax fairness perceptions (as shown in Table 1) while at the same time exhibiting a distinct behavior in taking sick leave.

The GSOEP also allows us to account for some personal attitudes and mental states directly, rather than using proxies for them. One of the GSOEP questions reads "Is the income that you earn at your current job just, from your point of view? [Yes/No]". By including a dummy for whether the respondent thinks that the received income is unfair, we can separate tax fairness beliefs from perceptions of income fairness. Furthermore, we control for whether the respondent is satisfied with their job, since the job related and firm related variables we included so far may not fully capture workplace characteristics driving both work morale and attitudes towards taxing the rich. Low job satisfaction can reduce an individual's work morale and may be the result of antipathy against own superiors, whom individuals may equate with the "rich" or the "managers". An indicator for whether an individual is concerned about losing their job is also included, although perceived job security should already be at least partly covered by the dummies for part-time and marginally employed. Self-reported laziness as well as a person's degree of risk aversion are included, too – the latter because shirking is still a risky behavior even under the high job protection levels in Germany. Finally, we add variables capturing whether a respondent is "pessimistic about the future" and the respondent's degree of general life satisfaction. This is to assure that the link between perceived unfairness in taxing the rich and absenteeism is not driven by general pessimism or complainer attitudes, in which case our interpretation of fairness adjustments would be inappropriate.¹⁶ Remarkably, the fairness gap is not reduced by the inclusion of these "soft" variables.

Overall, the gap in absenteeism associated with differing perceptions of tax fairness appears very robust to the specification chosen and hardly changes at all after health and personal characteristics are added. The main message of these estimates is that the connection between tax fairness beliefs and absenteeism, described in section 2, does not seem to be an artefact of failing to control for these observable characteristics.

3.2 Robustness to choice of functional form

All results presented thus far have relied on the two-step Negative Binomial QMLE, which we believe to be the most conservative and appropriate method, given the nature of our dependent variable. Yet there are reasons why we might want to check the robustness of the results to using different functional forms.

First, given that a large fraction of individuals reports no sick day at all (45%), one could question whether the decision to take any sick day at all is governed by the same process as the decision which specific positive number of sick days to take. Second, when using a dummy variable for having had at least one day of absenteeism as the dependent

¹⁶Individuals who lament about everything may have a lower intrinsic work motivation, and hence, higher levels of absenteeism, too.

TABLE 4: OTHER METHODS

	(1) Probit	(2) Count data Logit	(3) Hurdle Model Negbin	(4) OLS	(5) OLS Loglinear
managers taxed too little	.044** (0.018)	.04** (0.016)	.135** (0.055)	1.51*** (0.572)	.137*** (0.0406)
η^2			1.16*** (0.137)		
R^2 / Pseudo R^2	0.0825			0.1113	0.1461
N	4565		4565	4565	4565

Note: In columns (1) and (2) the dependent variable is a dummy variable indicating at least one sick day, and marginal effects are reported. The equations in columns (2) and (3) are two jointly estimated equations from a count data hurdle model. In columns (3) and (4) the dependent variable is absenteeism (the number of sick days). In column (5) the dependent variable is $\log(\text{absenteeism} + 1)$. η^2 is associated with the estimate of the variance of absenteeism and indicates the degree of over-dispersion. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

variable, our results are not likely to be affected by reporting error which could arise when people don't remember the exact number of days they were absent during the past year.¹⁷ The reason is that even if people forget the exact number of days, they are likely to remember whether they stayed home sick at all. We apply two methods which are suited to investigate these issues: we estimate a probit model for the decision to have any positive number of sick days as opposed to having no sick day at all, and we also estimate a negative binomial hurdle model. The latter consists of two jointly estimated equations, where the first is a logit model to explain whether an individual has any sick day at all. The second equation is a zero-truncated negative binomial count data model to explain the number of sick days conditional on having chosen a positive number of sick days.

Table 4 contains the results (all specifications employ the large number of controls that we used in the rightmost column of Table 3). In the probit model (column 1), and in the logit equation of the hurdle model (column 2), we find that the perception that manager taxes are unfair is statistically significantly associated with an increase in the probability to have any sick day. Our main result also holds for the process of how many positive sick days to choose as can be seen from the count-data equation of the hurdle model (column 3). The sum of these estimates show that our results hold regardless of the nature of reporting error in the number of sick days.

In the final two columns of the table, we present two OLS regressions, which serve to check whether results similar to those from the count-data models can be obtained by employing linear methods. An OLS regression using as the dependent variable the number of days absent from work yields a coefficient on tax fairness perceptions of about 1.5 additional days per year (column 4). The final column of the table presents an OLS regression using the transformed dependent variable $\log(\text{absenteeism} + 1)$. This log-linear functional form is more in line with that of a count data model than the previous simple

¹⁷Multiples of 5 in the number of sick days are more frequently observed in our data than other values, which may be due to reporting error but it may also be driven by the practice that doctors often write sick notes for an entire workweek – which usually amounts to five days. Furthermore, it is reassuring that there is evidence from medical research which demonstrates a high agreement between the annual number of self-reported sick days and the number of sick days obtained from UK register data (Ferrie et al., 2005).

OLS equation, and we continue to find a positive and highly significant coefficient on tax fairness perceptions.¹⁸ Taken together, these findings show that the positive association of perceived tax unfairness and absenteeism is not simply a peculiarity of the particular functional form implied by the count data models. On the contrary, our result holds across functional forms, and it holds for both the decision to take sick days at all, and the choice of the number of sick days conditional on taking sick days at all.

3.3 Are the spillovers a “low-class phenomenon”?

When assessing the economic relevance of fairness spillovers, we may go beyond regarding the full sample coefficient, and also ask whether the spillover mechanism is confined to particular groups within society. Therefore, in this section we analyze various subgroups. The first part of Table 5 presents separate results for those with below and those with above median income. The coefficient for the former group is much larger when compared to the full sample. Still, there is a positive relationship for higher income earners which is non-negligible in size: respondents with above median income who perceive manager taxation to be unfair accrue more than 18 percent higher levels of absenteeism than those who do not have this belief. A similar picture is revealed when splitting up the sample along the education dimension. The fairness gap in absent days is larger for individuals with lower secondary education or no formal degree at all (low education), but it is also found for groups of higher status in terms of schooling (panel (b) of Table 5, column 2). Finally, we do not find a significant relationship between the fairness indicator and absenteeism for individuals who report holding a managerial job position (panel (c) of Table 5, column 2). The reason might be that even though this is a much broader group of individuals than just CEOs, these people may see themselves as beneficiaries of unfair taxation.¹⁹ Even though there seem to be different underlying processes for managers and non-managers, the sum of our subgroup results does not suggest that the hypothesized fairness spillover is a pure low social class peculiarity.

¹⁸We find that the simple OLS regression of absenteeism fits the data not very well according to common model selection criteria. This is not surprising, because the simple OLS regression on absenteeism models the dependent variable y as $E[y|x] = x'\beta$, while in a count data model we have $E[y|x] = \exp(x'\beta)$. We therefore prefer the linear model of $\log(\text{absenteeism} + 1)$ to the one using untransformed absenteeism, and we will use the model of $\log(\text{absenteeism} + 1)$ for our sensitivity analysis in section 4.3.

¹⁹Recent research suggests that behavioral responses to disadvantageous inequity are different from those to advantageous inequity, see Gächter and Thöni (2010.)

TABLE 5: SUBSAMPLE RESULTS

	(a) income		(b) education		(c) managerial position	
	below median	above median	low	high	no manager	manager
managers taxed too little	.267*** (0.095)	.182** (0.085)	.3403** (0.145)	.2609*** (0.075)	.281*** (0.075)	.0844 (0.124)
<i>N</i>	2366	2199	1110	3241	3552	1013

Note: The full sample is split by: (a) below median and above median income (b) education levels and (c) whether respondents have a managerial position at their job. All estimations employ the two-step quasi-maximum likelihood estimator (QMLE) implying fully robust standard errors and include the full set of control variables from the last regression of table 3. The dependent variable is “number of days absent”. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

4 Evidence against alternative explanations

So far, we observed a quite robust and stable association between perceived unfairness in taxing the rich and absenteeism. We have interpreted this finding as evidence that fairness spillovers occur in economic contexts, and that they are economically relevant in magnitude. In this section we discuss to what extent the presented connection may be explained by mechanisms other than the hypothesized fairness spillovers. Several objections can be rejected on plausibility grounds, and we also provide sensitivity tests, showing that in order to annihilate our main result, any remaining omitted factors would have to exhibit implausibly strong associations with absenteeism and fairness beliefs.

4.1 Spillover, selfishness, or direct reciprocity?

The plausibility checks presented in Table 6 help us shed some light on issues of selfishness and direct reciprocity. Only the coefficient of manager taxation and regressors in excess of the full QMLE specification from the rightmost column of Table 3 are shown in this table – column (1) reproduces the coefficient from this full specification as a reference point.

A reasonable objection to the spillover mechanism we have proposed would be that the link between beliefs about manager taxation and work morale can be a result of individuals pursuing standard selfish preferences. This would render the label “fairness spillovers” inappropriate, since the underlying mechanism would be independent of agents’ fairness perceptions.

Assume that a belief that managers pay too little in taxes is positively related to one’s own tax burden. Then, the coefficient on manager taxation may be confounded with the following standard neoclassical mechanism: a higher tax rate reduces an individual’s net income or, equivalently, the expected loss from being detected, which calls for higher levels of shirking. We calculate an individual’s average tax rate by taking the difference between reported gross income and net income and divide it by gross income. When including this

TABLE 6: ADDITIONAL CONTROLS.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
managers taxed too little	.2501*** (0.066)	.2389*** (0.067)	.2519*** (0.066)	.2512*** (0.067)	.2512*** (0.067)	.1881** (0.079)	.1809** (0.081)
effective average tax rate		-.2543 (0.325)					-.5883 (0.400)
unfavorable job prospects			.1798*** (0.062)				.2586*** (0.076)
achievements determined by luck				.1285* (0.067)			.0127 (0.086)
leftist/right					-7.2e-04 (0.018)		-.02 (0.020)
manager income unfair						.1606** (0.082)	.146* (0.084)
72 controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	4565	4499	4554	4549	4501	3074	2974

Note: All estimations are two-step quasi-maximum likelihood estimators (QMLE) implying fully robust standard errors. The dependent variable is the number of days absent due to illness and various additional controls are added to the full specification in the count data models. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

variable in column (2), the coefficient of the tax unfairness indicator remains virtually unaltered. In a similar vein, the belief that those in charge pay too little in taxes could be just another way of expressing frustration about one’s own career opportunities. In that case the hypothesized fairness spillover boils down to the notion that expecting low returns to effort is detrimental to work incentives – a rather selfish argument, too. Column (3) adds a variable measuring the self-evaluated opportunities of rising up within the firm hierarchy. As expected, a perceived lower chance of advancing in the ranks of the company is associated with a higher number of days absent. However, the coefficient on manager taxation remains very similar to the reference specification in column (1). Expectations of low returns from effort may also arise when one thinks that hard work generally does not pay in life, e.g. when one believes that success is a matter of luck. In the GSOEP, respondents were asked the question “What a person achieves in life is above all a question of fate or luck”. We use an indicator taking on the value 1 if the respondent chose at least value 5 on a 7-point scale (“disagree” (0) – “agree” (7)). This regressor is added in column (4) and its coefficient is statistically significant with the expected positive sign.²⁰ Again, the fact that the coefficient of the tax unfairness indicator does not change allows us to counter the objection that we are just measuring a response to the belief that spending work effort is fruitless. Finally, we reconsider the redistribution argument from section 3.1: Perhaps those who are sick often become aware that they are net beneficiaries of the social security system, creating a very self-interested motive to favor higher levels of redistribution. In the event that income and risk aversion don’t already pick up this redistributive motive, in column (5) we add a control for the respondent’s position within the political spectrum. Lower values indicate a leftist stance, which can be assumed to go with a high preference for redistribution, yet controlling for such political inclinations does not do any harm to the tax fairness coefficient.

²⁰This is interesting in its own right. Alesina and Angeletos (2005) introduce the disutility stemming from the perception that luck determines income in an additive-separable manner, and hence, as having no behavioral affects. However, our results can also be seen as evidence for justifying incentive shaping variants.

There is also some concern that the statement “managers of large companies don’t pay enough taxes” may be an expression of a negative attitude individuals may have towards managers at their own workplace, and that the reaction of higher absenteeism is an act of direct reciprocity rather than a fairness spillover. It is possible that individuals who have had bad experiences with their own CEO may want to retaliate, and hence, stay at home to “get even”. If our effect were largely driven by this mechanism, we would expect it to be bigger in large companies, which are more likely to have CEOs. However, this is not the case: we find no evidence that the size of the tax fairness coefficient is positively related to firm size when looking at subgroups defined by the number of employees on the respondent’s employer’s payroll, and running the baseline regressions on these subsamples separately.²¹

There are more reasons why directly reciprocal behavior is unlikely to be the driving force behind our results: Above all, we do already control for job satisfaction which should net out many negative job aspects that could trigger reciprocal actions against the employer. Notice also that our regressions already include a dummy for whether one perceives own income to be unfair, thus factoring out another important motive for retaliation (dissatisfaction with pay). Nevertheless, it might be that these controls do not adequately capture perceptions of large vertical pay inequity within the company – which may constitute a particular motive to punish the managers of one’s own company. To check whether such a channel drives our results, we use an indicator for whether the respondent thinks that the income of managers is unjust in relation to the job demands. This variable is significant when added to the baseline specification (column (6) of Table 6).²² Nevertheless, the tax fairness indicator still has strong explanatory power for absenteeism behavior, and so there is no evidence that the tax fairness coefficient is driven by either motives of direct reciprocity in general, or motives of retaliation for own employers offering unfair wages in particular.²³ Adding all additional controls jointly in column (7) does not further reduce the coefficient.

4.2 Exploiting the panel nature of the data

Despite the wide range of personal characteristics and attitudes, one might still be worried that some part of a person’s character is not controlled for in our cross sectional models.

²¹Results available upon request.

²²That perceptions about CEO payments are associated with absenteeism behavior is interesting in its own right, and further analyzed in a short note by Cornelissen et al. (2011).

²³The tax fairness coefficient is not as precisely estimated as before, yet still significant at the 5% level. The imprecision stems in part from a drop in the number of observations by roughly one third. This is due to the fact that respondents were only asked about the fairness of manager income if they could exactly specify how much they think managers earn – to which many respondents replied “don’t know”, causing the sample size to drop dramatically.

TABLE 7: ROBUSTNESS USING THE PANEL STRUCTURE OF THE DATA

	(1)	(2)	(3)
managers taxed too little	.1863*** (0.069)	.2463*** (0.066)	.1821*** (0.067)
estimated fixed effect of absenteeism	.0351*** (0.004)		
lagged absenteeism			.0257*** (0.003)
Person means of time-varying variables	No	Yes	No
<i>N</i>	4446	4431	4458

Note: All estimations are two-step quasi-maximum likelihood (QMLE) implying fully robust standard errors. The dependent variable is “number of days absent”. All regressions include the same control variables as the last column of Table 3. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

If for some reason, such as upbringing or prior life events in general, individuals with a tendency towards shirking also develop the view that manager taxes are unfair, then this biases our coefficient. Despite the fact that tax fairness perceptions were only asked in the 2005 wave of the GSOEP, we do have repeated observations for most of the other variables in our model, and this allows us to employ several ways of using the panel structure to address unobserved heterogeneity and backwards causality.

First, we predict a person specific intercept for absenteeism from a fixed effects regression of absenteeism on a set of standard labor market regressors for which panel data is available.²⁴ This predicted “absenteeism fixed effect” proxies for time constant drivers of absenteeism. After adding it to the regression, the fairness coefficient is reduced but remains highly statistically significant and large (column (1) of Table 7).

Another way of controlling unobserved fixed factors is to follow a Mundlak-type approach (Mundlak, 1978), and add the person means of all time-varying explanatory variables, computed from the GSOEP waves 1984-2004, to the regression. Clearly, the averages over time of individual characteristics such as health, income, firm size, job satisfaction, and others provide valuable additional information to explain absenteeism. Even though these additional regressors significantly improve the explanatory power of the model – the p-value for the test of joint significance of the additional regressors is .017 – the coefficient on tax fairness perceptions remains virtually unchanged, suggesting that beliefs about taxation are not driven by these factors (column (2) of Table 7).

Finally, we augment the baseline model with lagged absenteeism. The main advantage of including the lagged dependent variable is that it enables us to deal with reverse causality which can arise when past absenteeism drives the current tax fairness beliefs, e.g. because those who are often sick may benefit from higher taxes by way of the health care system. At the same time, this variable captures unobserved factors that have established a certain “permanent” level of absenteeism of an individual, and that may also affect beliefs about taxation. In column (3) of Table 7 the tax fairness coefficient is similar to the one obtained

²⁴We use all GSOEP waves from 1984 to 2004. The included regressors are linear and quadratic terms in age, job tenure as well as part-time and full-time work experience, and dummies for firm size, part-time work, occupation, region and year.

with the absenteeism fixed effect in column (1). It remains statistically significant at the 1%-level and it still is of an economically relevant magnitude at 18 log points (20%).

Taken together, these estimates support the results from the pure cross-sectional analysis in chapter 3. The coefficient of tax fairness is somewhat reduced when exploiting the panel structure, but it remains strong enough to give us confidence that neither are fairness beliefs driven by past absenteeism to a large extent, nor are our baseline results heavily biased by failing to account for unobserved factors.

4.3 Sensitivity analysis

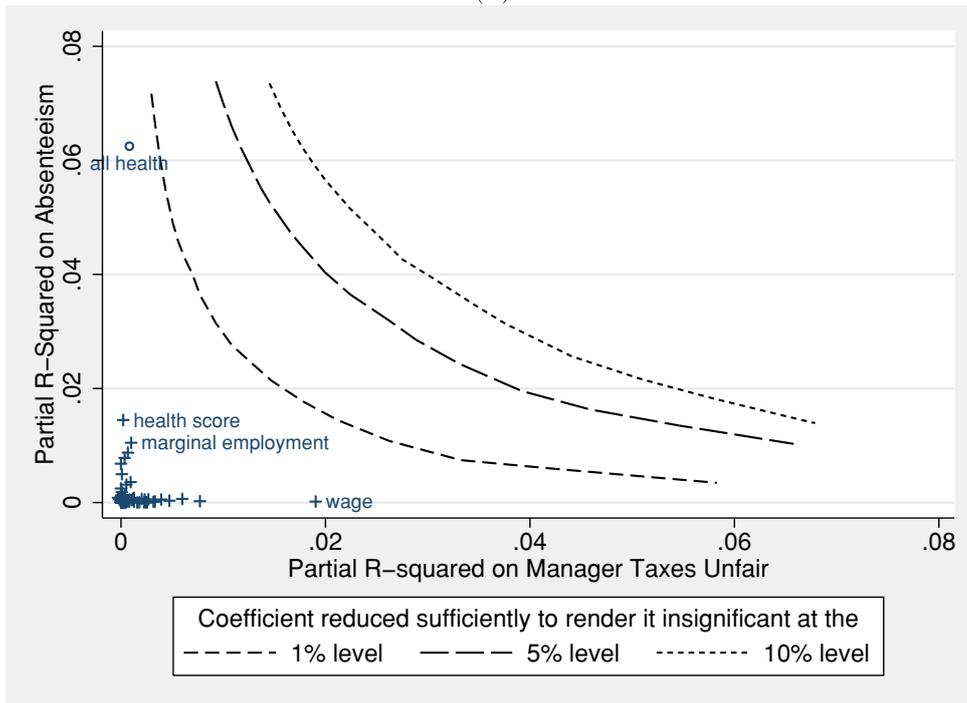
Assume for now that, despite the evidence presented in the previous sections, there is still an unobserved variable which greatly biases our results. In this section we carry out a sensitivity check, which allows us to get an idea of exactly what properties such an omitted variable would have to have, in order to render the fairness coefficient insignificant. With this information we can judge whether it is plausible that such a variable exists.

The fairness coefficient will be biased upwards if an unobserved confounder exists that is positively associated with both absenteeism and tax fairness perceptions. In general, the idea of the sensitivity analysis is therefore to simulate such a variable, introduce it into the regression model and see by how much it reduces the fairness coefficient. This analysis is repeated with simulated variables of different strengths, in order to identify those confounders that would cause the coefficient of interest to lose statistical significance at a prespecified level.

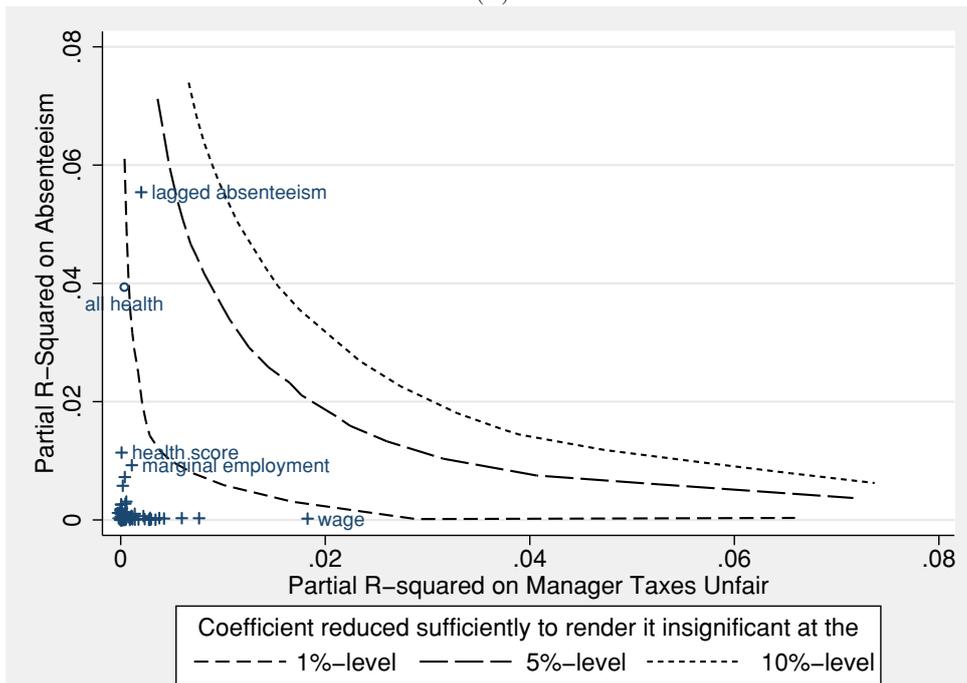
The specific method we employ is a Rosenbaum-type sensitivity check that was developed by Imbens (2003) within the context of a linear model, and so for this exercise we use the linear specification which comes closest to the count data methods: an OLS regression where the dependent variable is $\log(\text{absenteeism} + 1)$.²⁵ Within this setup, the strength of a simulated confounder can be described by two partial R-squareds. These quantify to what extent the confounder explains variation in absenteeism and fairness beliefs, respectively. In Figure 1 we can then graphically represent any simulated confounder by its R-squared combination, where points that lie more towards the North East depict stronger confounders. From the simulation we also know the effect that each of these confounders has on the tax fairness coefficient. Hence, we can pinpoint the set of R-squared pairs, each of which would reduce the tax fairness coefficient to a given level. We

²⁵The parametric assumptions of this sensitivity test are that the confounder is binary, following a binomial distribution; that the indicator of interest (in our case “manager taxes unfair”) has a logistic regression on the confounder and on the vector of control variables, and that the outcome variable has a linear regression with normally distributed error terms on the treatment, the confounder and the control variables. See Imbens (2003) for details, and Blattmann and Annan (2010) for a recent application of this sensitivity analysis in a different context.

FIGURE 1: SENSITIVITY ANALYSIS
(A)



(B)



Note: The diagrams represent the strength of the association of a potential unobserved confounder with absenteeism (vertical axis) and with tax fairness perceptions (horizontal axis). Points that lie more towards the North East in the diagram indicate confounders that are more strongly associated with these two variables, and that would reduce the coefficient of interest more strongly if added to the model. The three dashed lines show how strong an omitted confounder would need to be in order to reduce the original coefficient sufficiently to make it insignificant at the 1%, 5% and 10%-level under the assumption of a constant standard error. As a frame of reference the diagrams also show dots indicating how strongly our observed variables are associated with absenteeism and with tax fairness perceptions. In order to significantly reduce our coefficient of interest, a confounder would need to be more strongly related to absenteeism and tax fairness perceptions than any of our covariates, all health variables jointly, and even lagged absenteeism.

choose as reference points those levels of the tax fairness coefficient that would, under the assumption of a constant standard error, render the fairness coefficient insignificant. The dashed line closest to the origin in Figure 1 represents confounders that would cause the fairness coefficient to lose statistical significance at the 1%-level. The remaining dashed lines represent confounders that cause a large enough drop in the fairness coefficient to make it insignificant at the 5% and 10%-level. In order to get a feel for whether it is plausible that an omitted variable has the required strength (as measured by its R-squared combination), the dots in the figure represent how strongly the covariates which are already included in the regression are associated with absenteeism and tax fairness perceptions.

When we apply the sensitivity analysis to our baseline estimates (column 6 of Table 3), panel A of Figure 1 shows that in order to reduce the tax fairness coefficient sufficiently to change its statistical significance from the 1%-level to the 5%-level, an omitted variable would have to be much more strongly associated with absenteeism and tax fairness perceptions than any of the included covariates are. This can be seen from the fact that all the dots are to the left of and far from the first dashed line. Even a confounder that is as strongly associated with absenteeism and tax fairness perceptions as all health variables combined (health score, health satisfaction and disability) would not be strong enough to have this effect (as evidenced by the dot labeled “all health”). Panel B of Figure 1 repeats the sensitivity analysis based on the specification which so far was able to reduce the fairness coefficient by the largest amount in the full sample, i.e. the lagged absenteeism specification presented in column (3) of Table 7. Even after including lagged absenteeism in the estimations, any remaining omitted variable could be as strongly related to current absenteeism and fairness beliefs as lagged absenteeism is, and we would continue to find a fairness spillover that is statistically significant at the 5-% level. Furthermore, the magnitude of that fairness spillover would still amount to almost 90% of its initial estimate, because the bias represented by the lowest dashed line is equal to about 10% of the original coefficient.

The sensitivity check results suggest that not even an extremely strong confounder could induce omitted variable bias in the fairness coefficient that is sufficient to negate our results. We already controlled for an unusually rich set of control variables, and so the existence of additional unobserved factors of the required strength seems very unlikely. Put differently, it is hardly possible to come up with an unobserved factor that has a stronger relation to fairness beliefs and especially absenteeism than absenteeism itself, lagged by one period. We take this as tentative evidence that the suggested fairness spillover exists and that it has an economically relevant magnitude.

5 Conclusion

What are the behavioral correlates of perceived unfairness in taxation? It has been proposed that people who believe the tax system to be unfair tend to withhold their contributions to the tax system, i.e. to cheat on taxes. Building on the argument that opportunities for evading taxes are rather slim for most individuals, we go one step further and ask whether people may then try to find alternative ways of adjustment – specifically, we analyze whether people start to shirk their work duties when they feel that there is injustice in taxation. Using a large-scale German dataset, we find that this link between tax fairness beliefs and work morale is surprisingly strong: the belief that the top income earners don’t pay their fair share in taxes is associated with a 20 percent increase in absenteeism. This result proves robust to the inclusion of an extremely rich set of control variables that are not generally available in other data sets. Besides standard labor market controls, these include a wide variety of individual attitudes that may affect absenteeism, as well as panel data information on past values of absenteeism – which proxy for unobserved factors that drive absenteeism. In addition, Rosenbaum-type sensitivity tests provide evidence that any remaining omitted variable would have to exhibit implausibly strong associations with absenteeism and fairness beliefs in order to spuriously generate our results.

The main contribution of this paper is that it adds a new angle to the literature on fairness in economics. It is standardly assumed that people adjust to perceived unfairness in precisely the same area or relationship where the fairness violation is considered to have occurred, yet our results suggest that behavioral adjustments to perceived violations of what is considered to be a “just” outcome may be rather indirect, i.e. the cue may elicit responses across spheres and across certain relationships. Our results indicate that these “fairness spillovers” are relevant in a genuinely economic context, and may come with large economic costs. If we tentatively interpret the association as causal, the range of our estimates corresponds to a monetary cost of 3.5 – 5 billion euros per year in continued wage payments associated with the spillover.²⁶

More narrowly, our results also raise new aspects concerning the welfare costs of taxation. Traditionally, welfare effects of taxation are assessed in terms of distorting monetary incentives. However, our analysis revealed that there are other channels through which tax policy may have an impact on economic behavior. People have beliefs about fairness in taxation, and it is these beliefs that may provide an incentive on their own. While neglecting these fairness-induced costs of taxation bears the risk of arriving at misleading policy recommendations, it is also important to realize that the implication of this research

²⁶Assuming an 8-hour workday at the average gross hourly wage in 2005 of around 20 euros, and 26 million gainfully employed. Wage rate and number of employed obtained from the German Federal Statistical office.

cannot simply be higher tax rates for managers or the wealthy in order to avoid this “extra” excess burden. First, it is unclear whether beliefs about fairness in taxation correspond to real tax burdens of the wealthy at all. Even if the fairness beliefs emerge from correct beliefs about the tax system, positive welfare effects at the bottom of the income distribution must be weighed against possibly negative welfare effects induced by behavioral responses to increased taxation at the upper end of the income distribution. In the end, this study can be considered as a pointer that quite likely there are hidden effects of taxation in areas that have not been considered thus far, and that these effects can be non-negligible in size.

Several questions are left for future research. It should be interesting to see whether our finding can be confirmed in other countries or whether this result is a German peculiarity. At least with respect to the willingness to comply with work norms, Germany does not seem to be a negative outlier in international comparisons (Hofstede, 1980), and so we don’t expect our results to be upper bound estimates. Still, it would be interesting to see, whether in a country like the United States, where people believe in social mobility and in being in charge of their own destiny (Alesina and Angeletos, 2005), a link between perceived unfairness of taxation and work effort can be found, too. It should also be noted that we proposed just *one* type of fairness spillover that bears the potential of being relevant from an economic point of view. A general question is whether there are other such examples. Finally, it is reasonable to ask whether the recent financial crisis has aggravated the issue. Believing that the rich illegitimately generate high incomes and enjoy uncalled for tax privileges may have become even more prevalent during the financial crisis, and our suspicion is that the potential economic costs associated with fairness spillovers from taxation may then also have increased.

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Appendix

TABLE 8: DESCRIPTION OF VARIABLES.

Variable	Description
Main variables	
absenteeism	number of days absent in the year of survey. Asked retrospectively in 2006.
managers taxed too little	indicator variable, takes on value 1 if respondent thinks managers are being taxed too little.
health score	'How would you describe your current health?'. Scale: 'Poor' (1) to 'Very good' (5).
health satisfaction	'How satisfied are you with your health?'. Scale: 'totally unhappy' (0) to 'totally happy' (10).
disability	'Are you legally classified as handicapped or capable of gainful employment only to a reduced extent due to medical reasons?'
Personal characteristics	
gross income	gross monthly income in 1000 Euros.
age	age in years.
agesq	age in years squared.
male	indicator variable, 1 if male.
children	the number of children <16 years in the household.
foreign	indicator variable, 1 if non-German citizen.
schooling	years of schooling (includes tertiary education and vocational training).
Job related variables	
tenure	tenure with current employer.
tenure sq	tenure with current employer squared.
full time experience	years of full time experience.
full time experience sq	years of full time experience squared.
part time experience	years of part time experience.
part time experience sq	years of part time experience squared.
part time	indicator variable, 1 if currently part time employed.
marginally employed	indicator variable, 1 if currently marginally employed.
Firm level variables	
20<employees< 200	indicator variable, 1 if number of employees at current employer 20<employees<200.
200<employees<2000	indicator variable, 1 if number of employees at current employer 200<=employees<2000.
employees>=2000	indicator variable, 1 if number of employees at current employer >2000.
agriculture	indicator variable, 1 if employed in this sector.
mining/energy	indicator variable, 1 if employed in this sector.
processing	indicator variable, 1 if employed in this sector.
traffic/media	indicator variable, 1 if employed in this sector.
construction	indicator variable, 1 if employed in this sector.
wholesale	indicator variable, 1 if employed in this sector.
services	indicator variable, 1 if employed in this sector.
banking/insurance	indicator variable, 1 if employed in this sector.
public sector	indicator variable, 1 if employed in this sector.
Personal attitudes	
afraid to lose job	indicator variable, 1 if individual is 'very concerned' or 'somewhat concerned' about job security.
satisfied w/ job	'How satisfied are you with your job?'. Scale: 'totally unhappy' (0) to 'totally happy' (10).
lazy	'I see myself as someone who tends to be lazy.' Scale: 'not at all' (1) to 'applies perfectly' (7).
risk taker	'Are you prepared to take risks?'. Scale: 'avoid risks' (0) to 'fully prepared' (10).
Robustness checks	
effective avg tax rate	1-(net monthly income in Euros/gross monthly income in Euros).
achievements determined by luck	indicator, 1 if respondent gave at least (5) on a (7)-point scale ('disagree' (0) – 'agree' (7)) to the question 'What a person achieves in life is above all a question of fate or luck'.
unfavorable job prospects	How likely is respondent to receive a promotion at current place of employment within next two years? Scale: 'certainly' (1) to 'certainly not' (4).
pessimist	indicator variable, 1 if individual states to be either 'pessimistic' or 'more pessimistic than optimistic' about the future.
life satisfaction	'How satisfied are you with your life' Scale: 'not at all' (0) to 'fully' (10).
leftist/right	'How would you rate your political views?' Scale: 'Far left' (0) to 'Far right' (10).
own income unfair	indicator variable, 1 if respondent thinks her/his own pay is unfair.
manager income unfair	indicator variable, 1 if respondent thinks manager pay is unfair.
Other	
region dummies	16 indicator variables for the German states.
occupation dummies	3 blue collar indicator variables: low, medium, high skilled, 3 white collar indicator variables: low, medium, high skilled, 3 public servant indicator variables: low, medium, high skilled.
parental education dummies	5 dummies for each parent, capturing the type of secondary school track completed

TABLE 9: SUMMARY STATISTICS.

	Mean	Std. Dev.	Min	Max	N
<i>Main variables</i>					
absenteeism dummy	0.554	0.497	0	1	4565
absenteeism	7.966	20.893	0	365	4565
managers taxed too little	0.721	0.449	0	1	4565
health score	3.553	0.818	1	5	4565
health satisfaction	7.007	1.898	0	10	4565
disability	0.062	0.241	0	1	4565
<i>Personal characteristics</i>					
gross income	2.804	1.805	0.25	28	4565
age	43.001	10.138	18	74	4565
male	0.563	0.496	0	1	4565
children	0.374	0.484	0	1	4565
foreign	0.053	0.225	0	1	4565
schooling	12.971	2.808	7	18	4565
school_mother	1.441	1.051	0	5	4565
school_father	1.695	1.358	0	5	4565
<i>Job related variables</i>					
tenure	12.199	10.153	0	48.8	4565
full time experience	16.682	10.918	0	47	4565
part time experience	2.664	5.361	0	45	4565
parttime	0.191	0.393	0	1	4565
marginally employed	0.031	0.173	0	1	4565
<i>Firm level variables</i>					
employees<= 20	0.204	0.403	0	1	4565
20<employees< 200	0.308	0.462	0	1	4565
200<=employees<2000	0.228	0.42	0	1	4565
employees>2000	0.26	0.439	0	1	4565
agriculture	0.011	0.102	0	1	4565
mining/energy	0.014	0.117	0	1	4565
manufacturing	0.212	0.409	0	1	4565
processing	0.049	0.216	0	1	4565
traffic/media	0.058	0.234	0	1	4565
construction	0.048	0.213	0	1	4565
wholesale	0.109	0.312	0	1	4565
services	0.136	0.343	0	1	4565
banking/insurance	0.056	0.23	0	1	4565
public sector	0.307	0.461	0	1	4565
<i>Personal attitudes</i>					
afraid to lose job	0.593	0.491	0	1	4565
satisfied with job	7.043	1.92	0	10	4565
lazy	2.213	1.452	1	7	4565
risk taker	4.862	2.133	0	10	4565
pessimist	0.255	0.436	0	1	4565
life satisfaction	7.189	1.601	0	10	4565
own income unfair	0.329	0.47	0	1	4565
<i>Robustness checks</i>					
effective average tax rate	0.33	0.125	-0.138	0.702	4499
achievements determined by luck	0.241	0.428	0	1	4549
unfavorable job prospects	0.5	0.5	0	1	4554
leftist/right	4.7	1.73	0	10	4501
manager income unfair	0.75	0.433	0	1	3074