Peer Reporting and the Perception of Fairness

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Abstract: Economic motives are not the only reasons for committing a (small) crime. People consider social norms and perceptions of fairness before judging a situation and acting upon it. If someone takes a bundle of printing paper from the office for private use at home, then a colleague who sees this can take action by talking to the offender or someone else (peer reporting). We investigate how fairness perception influences the decision to act upon incorrect behavior or not.

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1 Introduction

A young boy goes to a supermarket and sees an expensive pen which he likes a lot. He puts the pen in his pocket and walks out of the shop, but the shop assistant has seen him, grabs him, and hands him over to the police. At the police station, the boy's father is called and appears.

> *Father:* Son, why did you do this?
> *Boy:* I liked the pen so much!
> *Father:* But you know you should not steal.
> *Boy:* I liked the pen so much!
> *Father:* Why did you not tell me? I could have brought one for you from the office.

It is the father, rather than the son, who is of interest in this story. Apparently he finds taking a pen from the shop bad, but taking the same pen from his work not. Why not?

Becker (1968) would explain this by saying that the expected monetary loss caused by being caught is smaller than the gain obtained by having the pen. This can be viewed as the traditional economic approach. But there are many additional or alternative views. Maybe the father's office lacks normative pressure (social norms). Normative pressure triggers guilt and shame, and this may prevent criminal activities (Weibull and Villa, 2005). A recent field study is the honor-based flower picking business in the Black Forest in Germany (Schlüter and Vollan, 2011), which relies on the morality of the customers. Classical economic theory would predict that this market would break down, but it does not, even though serious money is involved. This shows that there can be a preference for honesty in a situation where it is difficult or impossible to detect cheating. This is closely related to 'conditional cooperation': people are more likely to comply when a larger population fraction adheres to the norm (Weibull and Villa, 2005; Traxler, 2010; Traxler and Winter, 2012).

Maybe the father feels it is fair to take a pen from the office. Greenberg (1990) and Houser et al. (2011) showed that if a situation (like a pay-cut) is perceived as unfair, employees are more likely to cheat. Honesty is affected by perceptions of fairness. Or perhaps, the father works in a disorderly environment. This is the 'broken windows theory', which suggests that a disorderly environment triggers petty crime. An experiment by Keizer et al. (2008) showed that this may indeed be the case. The father may well work in a large firm. Gneezy (2005) suggested that fraudulent behavior in a large organization is considered less severe than against individuals, even if the

monetary damage is similar, because the consequences of the deception are valued differently.

To take a pen from the office to give it to your son is a small crime, a misdemeanor, an example of incorrect behavior. In the current paper we study another small crime, namely to take home a bundle of printing paper from the office for private use. Employing our 2008 'small crime' survey taken from a Dutch household panel with about 2000 respondents, two central survey questions drive our current study: how 'justifiable' do you (the respondent) find the behavior of someone at the office taking paper home?; and, if this person were your colleague, would you report this behavior? If so, how? If not, why not?

The answers to these questions will depend on many things. They will depend on who the person is taking printing paper home (the offender): age, gender, income, and whether the offender does this often or not. They will depend on the situation: does the offender's boss also take paper home for private use or not, is it likely that someone catches the offender or not. And they will depend on who the respondent (the reporter) him/herself is: age, gender, income, education, religion, living in town or not, his/her own history as a 'small criminal', whether the respondent has been a victim of a small or large crime, and some information on the respondent's trust and social norms. All these factors will play a role in our analysis.

In order to answer the question what determines whether the respondent would peer report or not, a major modeling issue arises: one of the explanatory variables (justifiability) may be endogenous, because both peer reporting and justifiability are choices of the same individuals and the same unobservable ('confounding') factors may be associated with both. To solve this endogeneity issue, we propose an instrumental-variable-like approach (not exactly instrumental variables because the model is not linear). We introduce 'instruments' for justifiability, confirm their validity with statistical tests, and estimate a panel data probit model with random individual effects explaining justifiability as well as peer reporting.

This modeling issue is one of the distinguishing features of the current paper. Another feature is that, unlike most of the existing literature, we combine characteristics of the reporter, the offender, and the 'small crime' with the justice evaluation and information on a respondent's past victimization. A third important feature of our study it that our data set consists of a large representative sample of the Dutch population and is not limited to students or employees of a specific organization.

Studies in the area of peer reporting and whistleblowing have investigated, *inter alia*, factors related to the individual, the situation, the organization, social context, justice evaluation, and ethical ideology and religion. Sims

and Keenan (1998) analyzed a sample of 248 full-time employees enrolled in an undergraduate or graduate business program and found that external whistleblowing was significantly related to supervisor support, informal policies, gender, and ideal values. Victor et al. (1993) used a field survey in a fast food restaurant to test the influences of social context (role responsibility and interests of group members) and justice evaluations on the respondent's inclination to report theft and the actual theft-reporting behavior. Trevino and Victor (1992) found support for a positive relation between the extent to which the offender damages the interest of group members and the inclination to peer report. King and Hermodson (2000) analyzed actual peer reporting of unethical behavior by colleagues in a sample of 197 registered nurses and found that the observer's individual characteristics, situational factors such as severity of the misdemeanor, as well as organizational issues like compliance or non-compliance with policy and procedures played a significant role. Barnett et al. (1996) analyzed peer reporting of academic cheating, focusing on the role of religion and ethical ideology, and found a positive association between peer reporting and religiosity among 267 American business students.

The structure of the remainder of this paper is as follows. In Section 2 we briefly describe the survey design and the elements of the survey relevant for the current paper. Some descriptive statistics are provided and discussed in Section 3. The econometric method is explained in Section 4. Our main equation is an equation for peer reporting, in which justifiability of the committed offense is one of the explanatory variables. To allow for unobserved factors correlated with justifiability as well as peer reporting, we treat justifiability as endogenous and estimate an equation for justifiability jointly with the equation for peer reporting. Estimation results are discussed in Section 5. Section 6 concludes. The Appendix gives details on the definitions of respondent and vignette variables used in the analysis.

2 Survey design

The CentERdata research institute at Tilburg University manages a panel of over two thousand 'respondents' (the CentERpanel), who participate in an online Internet survey on a weekly basis, each week on a different topic. Respondents are randomly selected from a population register. If they do not have a computer with Internet access, they are provided with the necessary equipment. Detailed background information on the respondents is available from prior surveys and the response rate is generally high. Our 'small crime' survey was conducted in the Summer of 2008. A total of 1932 panel members

completed the survey, amounting to a response rate of about 83%. The respondents form a representative sample of the Dutch population, aged 16 years and older.

We briefly describe the structure of the survey; a more detailed description can be found in Douhou et al. (2011) who used the same data source as we do. The complete questionnaire (in Dutch) is available upon request from the authors. Our survey was divided into three blocks of questions. The first block consisted of a set of 24 small offenses, ranging from taking a ballpoint from the office for private use to accepting a bribe. The respondents were asked to rate the severity of 18 offenses and the justifiability of six other offenses.

In the second block we concentrated on six offenses: (i) not having a valid (train) ticket, (ii) breaking a coffee mug and not reporting it, (iii) taking a bundle of printing paper, (iv) driving too fast on a highway, (v) accepting a bribe, and (vi) reporting a lower income than the actual income to the tax authorities. This time the offenses were described in short stories ('vignettes') concerning hypothetical persons in a hypothetical setting. Each of the six offenses was described in two vignettes with varying characteristics of the hypothetical person (the 'vignette person') committing the offense, and of the hypothetical setting. Vignettes have often been used in the social sciences. They were first introduced in economics by Van Beek et al. (1997) in the context of employer evaluations of hypothetical job applicants. An advantage of vignettes is that the characteristics (of offenses and offenders, in our case) are part of the design, making it possible to create large exogenous variation within and across respondents. Moreover, using hypothetical offenses rather than offenses actually experienced by the respondents avoids endogeneity problems (which would arise if characteristics of actually experienced offenses are correlated to unobserved respondent characteristics) as well as selection problems (possibly arising if a specific group of respondents has never experienced the type of offense). The use of vignettes makes it therefore much easier to obtain consistent and relatively efficient estimates of how justifiability and peer reporting vary with offense and offender characteristics.

A typical example (concerning offense (iii)) is:

> Anne is 27 years old and works at an office. She earns €1335 per month before tax, a low wage for the type of work she does. Anne has noticed that her boss occasionally takes printing paper home for private use. Anne takes a bundle of printing paper home for private use. This is the first time that she does this. The probability that someone will notice it is very small. Do you

> think Anne's behavior is never justifiable (1),..., always justifiable (10)?

In the first variant of this vignette question the vignette person (Anne) earns €1335; in the second variant €2500. Both variants were put to the respondents in the survey. Other items were randomized. In this case, the following six aspects of the vignettes were randomized:

- *Gender:* Anne or John;
- *Age:* 27, 43, or 55 years old;
- *Boss:* occasionally takes printing paper home for private use, or is a principled man and never takes things home from work for private use;
- *Frequency:* this is the first time or Anne does it often;
- *Catch:* probability of detection is very small or 50%;
- *Wage:* low or average if wage is €1335; average or high if wage is €2500.

The associated randomized binary vignette variables are presented in more detail in the Appendix, Table A.1. Note that each respondent sees two vignettes for each crime, and that in all of these pairs the first vignette always presents a low-income person and the second vignette a high-income person. Since the order of the income levels was not randomized, there might be a 'demand effect': Respondents realize that income varies between vignettes and feel that they should react by adjusting their responses. We cannot test the existence of this effect, but speculate that the repetitive sequencing of the income levels made the low versus high income treatment variation quite salient to respondents.

In this paper we concentrate on the above vignette question on taking a bundle of printing paper from the office, because it was the only one that was followed by a question on reporting behavior, phrased as follows:

> Suppose Anne/John is your colleague, would you report this behavior?

The respondents could then choose from the following options:

- Yes,
  - I would talk with Anne/John about it (1)

  - I would talk with my colleagues, but not with my boss (2)
  - I would immediately report this behavior to my boss (3)
  - I would report this to someone else (4);
- No,
  - because I am worried about the reaction of my colleagues (5)
  - because I am worried about my position within the company (6)
  - because I don't know to whom to report this behavior (7)
  - because this is too futile to worry about (8)
  - for some other reason (9).

Each respondent thus has to answer two questions in this block: one about fairness (Is Anne's behavior justifiable?) and one about peer reporting (Would you report Anne's behavior?). It is possible that the response to the second question is influenced by asking the first question (a framing effect). Perhaps, if the first question had not been asked, fewer respondents would have stated that they would talk to the offender. This possible framing effect could not be investigated in the current study, since the reporting question was always preceded by the justifiability question.

The third block was designed to provide more detailed background information of the respondents. The following two questions about past victimization are particularly relevant:

- Have you been a victim of a serious crime in the past five years (i.e., burglary, holdup, violence, or something similar)?
- Have you been a victim of 'incorrect' behavior in the past five years?

If either question is answered with 'yes', then a follow-up question asks to rate the severity of the most serious crime on a scale from 1 (very severe) to 10 (not severe). We used this information to construct an index of self-reported severity of past victimization. The reason that we only ask about the past five years is to avoid a bias towards older respondents that have a higher probability of being victimized. Note that there is a subtle difference between seriousness and severity of a crime. Seriousness reflects our judgment, while severity reflects the judgment of the respondent. In the questionnaire, 'incorrect' behavior is defined as an infringement or misdemeanor which carries (almost) no punishment, but disadvantages others, such as the government, the employer, co-users of the road, or the neighbors. Since 'incorrect' behavior ranges from stealing a pen to smoking in a public place,

it is highly unlikely that a respondent has never been a victim of this type of behavior. Still, only about one quarter of the respondents reported being a victim of incorrect behavior, suggesting that the answer reflects the respondent's attitude or sensitivity towards social norm violations.

Since peer reporting may be associated with trust in other people (Trevino and Victor, 1992), we used a trust index as one of our explanatory variables. Questions on trust were not included in our survey, but they were asked to the same panel of respondents in another CentERpanel survey, conducted around the same time, entitled 'Victims of (attempt to) fraud' (Oudejans and Vis, 2008). This survey was merged with our own data to obtain an index for trust. Three questions were used to construct trust_index:

- Do you think that, in general, most people can be trusted or that you cannot be careful enough when dealing with people? Please answer on a scale from 1 (you have to be careful) to 11 (most people can be trusted);
- Do you think that most people would try to take advantage of you if they would have the chance, or would they try to be honest? Please answer on a scale from 1 (most people would try to make advantage of me) to 11 (most people would try to be honest); and
- Do you think that people try to be helpful most of the time or do they think mostly of themselves only? Please answer on a scale from 1 (people think mostly of themselves) to 11 (people try to be helpful).

3 Descriptive statistics

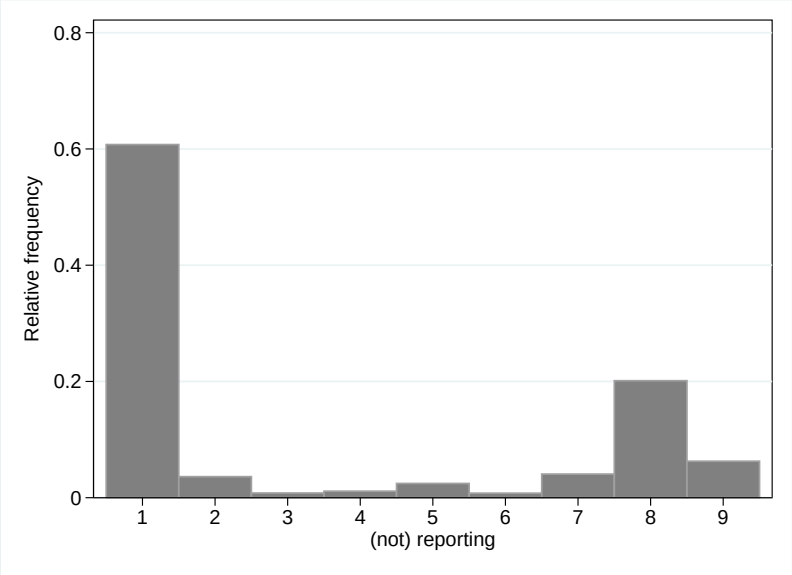
Descriptive statistics of the respondent variables used in our analysis are presented in Table 1. Peer reporting and justifiability are the main variables of interest (and the dependent variables in our econometric model); the other variables are used as explanatory variables for peer reporting, justifiability, or both. The corresponding variable definitions are listed in the Appendix, Table A.2. We mentioned in Section 2 that the response rate is high, namely 83%. Still, the nonrespondents may have an effect on the estimates due to selectivity bias. Upon further investigation we find that the average age of the nonrespondents is 44.9 (50.7 for the respondents), urban_middle is 0.25 (0.20 for the respondents), and hh_lincome 7.79 (7.93 for the respondents). A probit regression of key respondent characteristics on the binary response variable confirms these results. Older people, in particular, are overrepresented in our sample.

Table 1: Descriptive statistics — respondent characteristics

Binary				*Non-binary*			
	Mean	Std	N		Mean	Std	N
female	0.47	0.50	1931	age	50.68	16.13	1931
edu_middle	0.31	0.46	1924	hh_lincome	7.93	1.43	1931
edu_high	0.36	0.48	1924	vict_index	1.87	3.20	1919
urban_high	0.41	0.49	1924	trust_index	21.69	5.00	1635
urban_middle	0.20	0.40	1924	social_norm	7.01	1.33	1929
religion	0.58	0.49	1932	justifiability*	3.19	2.03	3840
victim_small	0.25	0.44	1919				
victim_serious	0.12	0.32	1919				
takematerial	0.33	0.47	1919				
peer_report*	0.66	0.47	3840				

* = dependent variable.

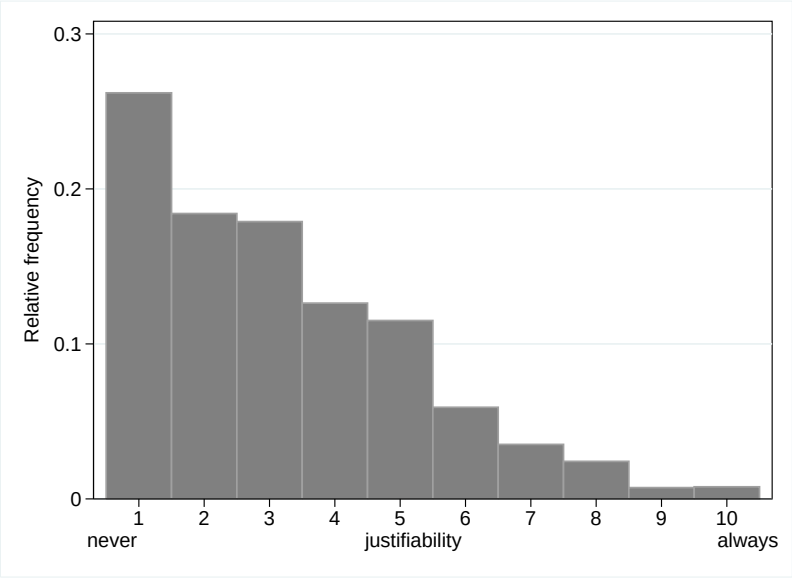
Figure 1: Peer reporting



Our principal dependent variable is peer_report. About 66% of the respondents would report a colleague if this colleague would take a bundle of printing paper from the office for private use. As explained in Section 2, labels 1–4 in Figure 1 refer to the situation where the respondent decides to report, while labels 5–9 refer to the situation where the respondent does not report. If respondents choose not to report the offense, it is usually because they find the offense too futile to worry about it (label 8). Most respondents,

if they report, choose to talk to the offender (label 1). Only 6 percent choose to talk to another colleague, the boss, or someone else. One might argue that only this small group literally reports the incorrect behavior of their peer; those who talk to the offender take action but do not report the offense to another person (at least not before talking to the offender first). Our main interest is in whether any action is taken and this motivates the definition of the peer reporting variable in the main analysis. However, we also investigate (Section 5.3) if and how the results are affected when the definition of peer_report is changed so that only respondents who report (immediately) to someone else are considered to peer report.

Figure 2: Justifiability



Our second variable of main interest (used both as a dependent variable and as an explanatory variable for peer reporting) is justifiability, and Figure 2 presents its empirical distribution. The mean and median are around 3. Since a low value of justifiability means that the respondent does not find the action justifiable, the figure shows that most respondents disapprove of taking a bundle of printing paper home. Some authors claim that it is the perceived severity of a small crime rather than its justifiability which should play a role in the analysis (King and Hermodson, 2000; King, 1997). The relationship between justice evaluations and the severity of a small crime was discussed by De Graaf (2010) based on interviews performed with employees of public organizations. He shows that the two concepts are closely related.

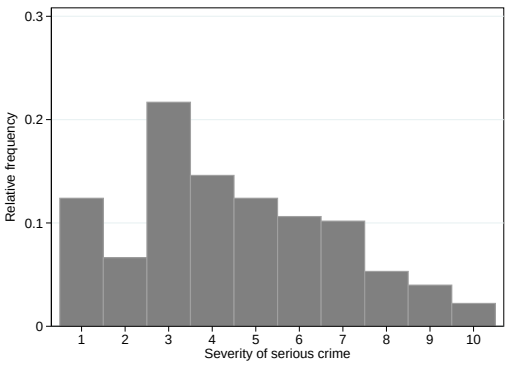
The explanatory variables include a set of basic socio-economic and de-

mographic characteristics. The age of the respondents ranges from 15 to 93 with a mean of 51 (Table 1). Median household income before tax was about €2780 per month. A slight majority of the respondents is male. The three levels of education are approximately equally represented: 33% of the respondents have a 'low' level of education; 31% have attained the 'middle' level (edu_middle=1); and 36% the 'high' level (edu_high=1). About 41% live in more urbanized areas (cities, urban_high=1).

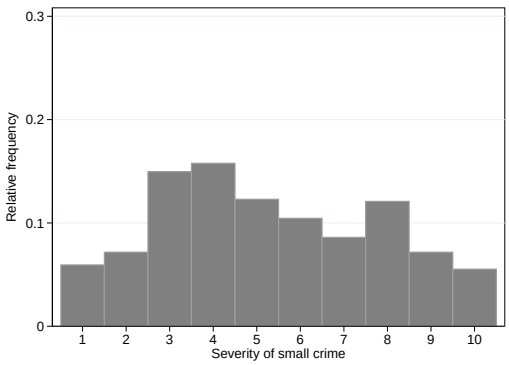
The other explanatory variables are specific to the current analysis. There are three variables relating to victimization. In our sample of 1932 respondents, 488 (25%) reported that they had been victim to a 'small' crime (victim_small) in the past five years, and 226 (12%) that they had been victim to a 'serious' crime (victim_serious) during the same period. The range of 'incorrect' actions is wide, and this makes it unlikely that someone has never been a 'victim' of incorrect behavior. The fact that only one quarter of the respondents reported being a victim of incorrect behavior therefore suggests that the answer may not only reflect victimization, but also the respondent's susceptibility to harm or injustice.

Figure 3: Severity of victimization

(a) Serious crime



(b) Small crime



If a respondent reported having been victim of a crime (small or serious) in the past five years, then the perceived severity of this crime (or the worst of them, if they experienced more than one) was also asked (on a ten-point scale: 1 is very severe, 10 is not severe). Figure 3 shows that a few victims of a serious crime judge the crime to be very severe (1 or 2), while most respondents find the crime rather severe (mode is 3), and only a few do not find the crime severe at all. For small crimes the distribution is more even, as one would expect. The average severity of a small crime is 5.3 (median

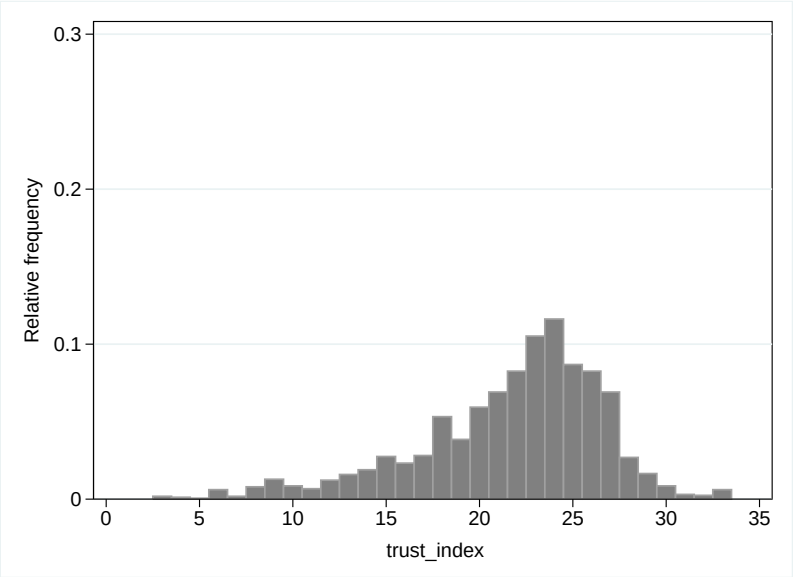
is 5), and of a serious crime 4.5 (median 4). We constructed an index for the degree of severity of victimization from these two variables (vict_index) ranging from 0 (not a victim of any crime) to 20 (victim of both small and serious crime and both rated as very severe).

Respondents were also asked three questions relating to their own criminal behavior. In particular, they were asked about shoplifting, taking materials from work for private use, and claiming government benefits they were not entitled to. Few respondents reported that they had committed these crimes (which may or may not be truthful), with the exception of taking work material home for private use (the variable takematerial). One third of the respondents admitted having done this at least once, and 26% at least twice. This variable is of interest because it relates closely to the vignette question used in our analysis, and it allows us to verify whether the respondents' own incorrect behavior in a similar situation is associated with their action in the hypothetical situation.

Ethical judgements of a situation and the reaction to it can also be influenced by religious views, social norms, and trust. The literature on moral attitudes suggests that religious people hold more traditional views on moral issues than non-religious people (Barnett et al., 1996). There is reason to believe that people with a religion may respond differently to an unethical act (in this case: taking a bundle of printing paper from the office for private use). About 58% of our respondents reported being religious (interpreted in a broad sense). Regarding social norms, we constructed a social_norm index as the average of the responses on severity (on a scale from 1 (not severe at all) to 10 (very severe)) of a list of 18 offenses that differ in the level of damage caused; see Table 2 in Douhou et al. (2011) for the 18 questions and the mean answer to each of them. The overall mean (and the mean of our index) is 7.01. A low value of the index means that the respondent considers small crimes as less severe, indicating a lower value placed on social norms.

Finally, a variable measuring how much trust the respondent has in other people can be important for one's actions and beliefs in general (Deutsch, 1958), and for peer reporting in particular (Trevino and Victor, 1992). The variable trust_index is constructed as the sum of three variables, formulated at the end of Section 2, that measure several aspects of a person's trust, each on a scale from 1 to 11 (a higher value means more trust), so that the trust index ranges from 3 (very low trust) to 33 (maximum trust level). Since these questions come from a different CentERpanel survey, they were asked in a different week, and therefore they were not answered by all respondents who answered our peer reporting and justifiability questions. This is why we have fewer observations for this variable. (Respondents who answered the trust questions but did not participate in our crime perception and peer

Figure 4: Trust



reporting survey are not included.) Figure 4 with a mode of 24 and a mean of 21.7 shows that respondents on the whole appear to have trust in others.

4 Models

Each respondent i answers questions on two vignettes describing taking home a bundle of printing paper from work for private purposes. In the first variant ($t = 1$) the offender's income is €1335; in the second variant ($t = 2$) it is €2500. In addition, several other aspects of the vignettes differ in a randomized way, as described in Section 2. Our main dependent variable is peer reporting (peer_report, y_{it}), and this is a binary variable: respondents choose to report ($y_{it} = 1$) or not to report ($y_{it} = 0$) the offense for each of the two vignettes. Observations on different respondents i are all assumed to be independent of each other, but it is very likely that there is a positive correlation between the two answers of the same respondent ($t = 1$ and $t = 2$), and we shall take this correlation explicitly into account.

For this purpose we use the following bivariate probit model, which is similar to a panel data probit model with random individual effects, where $t = 1$ and $t = 2$ are the (two) time periods:

$$\begin{aligned} &y^*_{it} = \beta_0 + x^{'}_{it}\beta + \delta z_{it} + \epsilon_{it} \qquad (i = 1, \ldots, N; \;\; t = 1, 2); \\ &y_{it} = 1 \text{ if } y^*_{it} > 0, \quad y_{it} = 0 \text{ if } y^*_{it} \leq 0. \end{aligned} \tag{1}$$

In our specification there are 21 regressors in the model: the constant term, 19 regressors $\{x_{it}\}$ (vignette characteristics and respondent characteristics and attitudes), and the justifiability assessment z_{it}, which plays a special role (see below). Regarding the unobserved error terms ϵ_{it} we assume that

$$\epsilon_i = \begin{pmatrix} \epsilon_{i1} \\ \epsilon_{i2} \end{pmatrix} \sim_{iid} \mathrm{N}_2(0, \Sigma), \qquad \Sigma = \begin{pmatrix} 1 & \rho_1 \\ \rho_1 & 1 \end{pmatrix},$$

and also that ϵ_i is independent of x_{it}. The specification implies that $\mathrm{var}(\epsilon_{i1}) = \mathrm{var}(\epsilon_{i2})$; the fact that both are equal to one is a harmless normalization. The parameter ρ_1 is expected to be positive since ϵ_{i1} and ϵ_{i2} contain a common individual-specific component (a random individual effect in panel data modeling terminology).

In our first model, given in Equation (1), we assume that justifiability z_{it} is exogenous. This exogeneity assumption may, however, be criticized, since both justifiability and peer reporting are choices of the same individuals, and it seems plausible that there are unobserved confounding factors — unobserved variables that have an influence on both justifiability and peer reporting. For example, people who do not tend to worry about relatively minor issues may more easily qualify incorrect behavior as justifiable and may also not think it is worthwhile to act upon incorrect behavior. This leads to a (negative) correlation between z_{it} and ϵ_{it}, making justifiability potentially endogenous. In a linear model it would be natural to use an instrumental variables approach to deal with the endogeneity problem. Our approach is similar in terms of identifying assumptions, but because of the nonlinear nature of the model, we do not use instrumental variable estimation as such. Instead, we add equations for assessed justifiability of the two vignette offenses and estimate these equations jointly with the equations for peer reporting (using maximum likelihood). By allowing for arbitrary correlations between the error terms of the peer reporting and the justifiability equations, we allow z_{it} to be endogenous in the equation for y_{it}.

To identify the model (other than through functional form assumptions), we have to exclude at least one variable from the equation for y_{it} that appears in the equation for z_{it}. For this purpose, we include three vignette variables (a vector w_{it}, our 'instruments') in the justifiability equation that are not included in Equation (1): two dummies describing the relative wage of the vignette person (vign_wage_low and vign_wage_high) and the probability of getting caught given in the vignette (vign_catch). These instruments indeed contribute to explaining justifiability of the offense described in the vignette (see Section 5), giving them enough power to serve as instruments. The key identifying assumption that makes these three variables suitable instruments

is that they do not to have a direct effect on peer reporting (keeping justifiability constant). This seems a plausible assumption. There is no apparent reason why there should be such a direct effect. Note that these variables are part of the randomized design (they are vignette characteristics and not respondent characteristics), so that they are by construction independent of the unobserved confounding factors leading to correlation between z_{it} and ϵ_{it}. This also applies to the other vignette variables, but these might have a direct effect on peer reporting. For example, behavior of the supervisor (vign_boss) may matter since a respondent may decide not to peer report if the behavior of the supervisor indicates that the incorrect behavior is apparently common in the organization, even though justifiability does not change. For the three variables in w_{it} no such argument applies.

The equation for justifiability is specified as follows:

$$\begin{aligned} z^*_{it} &= x'_{it}\alpha + w'_{it}\gamma + \zeta_{it} \qquad (i = 1, \ldots, N; \;\; t = 1, 2), \\ z_{it} &= j \quad \text{if } \lambda_{j-1,t} < z^*_{it} \leq \lambda_{j,t} \qquad (j = 1, \ldots, 10; \;\; t = 1, 2), \end{aligned} \tag{2}$$

where

$$\zeta_i = \begin{pmatrix} \zeta_{i1} \\ \zeta_{i2} \end{pmatrix} \sim_{iid} \mathrm{N}_2(0, \Omega), \qquad \Omega = \begin{pmatrix} 1 & \rho_2 \\ \rho_2 & 1 \end{pmatrix},$$

and ζ_i is assumed to be independent of (x_{it}, w_{it}). Again, there is no loss of generality in normalizing the Ω matrix. Like ρ_1, we expect ρ_2 to be positive, because of an individual-specific component in both justifiability assessments. We allow ζ_i to be correlated with ϵ_i. More precisely, we assume that the vector $(\epsilon_{i1}, \epsilon_{i2}, \zeta_{i1}, \zeta_{i2})'$ is multivariate normal with variances normalized to one and with unrestricted correlation coefficients $\rho_{st} = \mathrm{corr}(\epsilon_{is}, \zeta_{it})$. Since unobserved respondent characteristics that are associated with a stronger tendency of peer reporting are likely to be also associated with harsher assessments of the vignette offenses, that is, to lower scores on the justifiability scale (which runs from never justifiable to always justifiable), we expect the four ρ_{st} correlations all to be negative.

The six correlations ρ_1, ρ_2, and ρ_{st} $(s, t = 1, 2)$ are auxiliary model parameters to be estimated, as well as the thresholds $\lambda_{j,t}$ $(j = 1, \ldots, 9; t = 1, 2)$. We set $\lambda_{0,t} = -\infty$ and $\lambda_{10,t} = \infty$. By means of normalization, there is no constant term in (2). The four equations (1) and (2) $(t = 1, 2)$ are estimated jointly by maximum likelihood using Roodman's 2009 conditional mixed process (CMP) routine.

5 Results

We present the estimation results in Tables 2 (for the equation with justifiability as the dependent variable) and 3 (for the equation in which peer reporting is the dependent variable). In the second and third columns of Table 3, labeled 'exogeneity', we assume that justifiability is exogenous and explain peer reporting from the bivariate probit model (1) with exogenous z_{it}. In the fourth and fifth columns, labeled 'endogeneity', we allow justifiability to be endogenous and present the estimates of the peer reporting equation in the complete model given by (1) and (2). Table 2 reports the estimates of the justifiability equation in this complete model. Table 4 presents the estimated correlation structure of the error terms in the complete model.

The number of observations is always 1615, which is lower than the number of respondents to our survey because we included the variable (trust_index) based upon questions from another survey (see Sections 2 and 3), and not all respondents of our small crime survey participated in this other survey.

From the three tables, we can draw three broad conclusions. First, most of the exogenous variables have both a direct effect and an indirect effect (via justifiability) on peer reporting. Second, the correlations between the error terms of (1) and (2) in Table 4 are negative and significant, confirming our hypothesis that justifiability should be treated as an endogenous variable. The negative signs are also in line with what we expected: unobserved respondent characteristics associated with a stronger tendency of peer reporting are also associated with lower justifiability scores. Third, in spite of this finding, the differences between the estimates of the peer reporting equation allowing and not allowing for endogeneity of justifiability are generally rather small. We also note that ρ_1 and ρ_2 are close to one and that $\rho_{st} \approx -0.2$ in all four cases, irrespective of whether $s = t$ or not (Table 4). This suggests that the individual effects play a much larger role than the vignette-specific idiosyncratic error terms.

5.1 Justifiability

Although our main interest is in the peer reporting estimates (the second column in Table 3), we also briefly consider the estimates of the equation for justifiability. These are reported in Table 2. The behavior of the boss is important: if the offender's boss behaves incorrectly according to the vignette, then the offense is considered more justified. First-time offenders are evaluated less harshly. When the probability of getting caught is higher, the incorrect behavior is considered less justified. If the offending employee in the vignette receives a relatively low wage for the work he or she does, the

Table 2: Regression results — justifiability

vign_female	0.013	(0.024)
vign_43y	0.047	(0.029)
vign_55y	0.045	(0.029)
vign_boss	-0.253^{***}	(0.024)
vign_freq	-0.189^{***}	(0.024)
vign_catch	-0.064^{***}	(0.024)
vign_wage_low	0.074^{**}	(0.034)
vign_wage_high	-0.022	(0.034)
female	0.030	(0.052)
age	-0.001	(0.002)
hh_lincome	0.004	(0.019)
edu_middle	-0.089	(0.064)
edu_high	-0.115^{*}	(0.063)
urban_high	0.030	(0.057)
urban_middle	-0.036	(0.068)
religion	-0.002	(0.051)
vict_index	-0.007	(0.016)
trust_index	-0.015^{***}	(0.005)
social_norm	-0.488^{***}	(0.022)
victim_small	-0.114	(0.102)
victim_serious	0.024	(0.101)
takematerial	0.279^{***}	(0.057)

Dependent variable is justifiability;
standard errors in parentheses.
$^{***} = \{p < 0.01\}$; $^{**} = \{0.01 \leq p < 0.05\}$; $^{*} = \{0.05 \leq p < 0.10\}$.

offense is considered more justifiable than if the employee receives a usual or high wage (keeping other variables constant, including the absolute wage level). Both vign_catch and vign_wage_low (two of the three variables used as instruments in the peer reporting equation, see Section 4) are significant and the three instruments are also jointly significant, confirming that our instruments have sufficient predictive power (conditional on the exogenous variables x_{it}) for the justifiability variable that is instrumented.

Neither having been a victim of a serious or a small crime, nor the victimization index are significant, so that victimization has no apparent influence on the justifiability assessments (keeping other variables constant). As expected, own involvement in employee theft (takematerial) is associated with judging the hypothetical offender more lightly. A lower score on the social

norm index implies that a respondent considers small crimes as relatively less severe. Respondents with higher trust in others (a higher score on the variable trust_index) also tend to assess the offenses in the vignettes significantly more harshly.

5.2 Peer reporting

Before we present the parameter estimates, we first discuss the results of the tests based upon overidentifying restrictions: when the instruments are included one by one in the peer reporting equation, they are always insignificant (at the 5% level). We already saw that the instruments are jointly significant in the justifiability equation (p-value is 0.000). Taken together these results confirm the validity of our instruments.

In discussing the estimates of the peer reporting equation in Table 3, we distinguish between three types of explanatory variables, following the analysis of Mesmer-Magnus and Viswesvaran (2005) in the context of whistleblowing: characteristics of the offense, context of the offense, and characteristics of the reporter.

Characteristics of the offense

There is only one variable in this group, namely justifiability. We know from Figure 2 that most respondents disapprove of taking a bundle of printing paper home. Justifiability has a significant negative effect on reporting: respondents who disapprove more are more likely to report (keeping other variables constant). This is not as trivial a result as it may appear, because it shows that the potential respondent's moral judgement plays a substantial role in the decision whether or not to report. In our case, most respondents find the 'crime' of taking a bundle of printing paper home too futile (see Section 3), and would therefore not report it. Including justice evaluation as a possible explanation for peer reporting was considered by Victor et al. (1993), who distinguished between different forms of justice evaluations (distributive, procedural, and retributive justice) and concluded that justice evaluations matter for peer reporting. This is in line with our findings.

The magnitude of the estimated coefficient (-0.161) implies that, for a benchmark respondent with average peer reporting probability, an increase of 1 in the justifiability score leads to a reduction of 0.059 in the probability of peer reporting, keeping x_{it} constant. Since the sample standard deviation of the justifiability scores is 2.03, a one standard deviation increase would lead to a fall in the probability of peer reporting of about 12 percentage points. The effect is therefore not only statistically but also economically

Table 3: Regression results — peer reporting

	Exogeneity		Endogeneity	
vign_female	−0.007	(0.028)	−0.008	(0.029)
vign_43y	0.001	(0.033)	−0.002	(0.034)
vign_55y	0.026	(0.033)	0.024	(0.033)
vign_boss	0.009	(0.028)	0.029	(0.030)
vign_freq	0.098***	(0.027)	0.116***	(0.029)
female	−0.156***	(0.051)	−0.177***	(0.068)
age	0.003	(0.002)	0.003	(0.002)
hh_lincome	−0.002	(0.021)	0.001	(0.024)
edu_middle	0.122*	(0.066)	0.166**	(0.084)
edu_high	0.110*	(0.062)	0.153*	(0.083)
urban_high	0.008	(0.056)	0.024	(0.075)
urban_middle	−0.104	(0.066)	−0.124	(0.088)
religion	0.021	(0.051)	0.029	(0.067)
vict_index	−0.020	(0.017)	−0.029	(0.021)
trust_index	0.013**	(0.005)	0.015**	(0.007)
social_norm	0.045*	(0.023)	0.094***	(0.036)
victim_small	0.323***	(0.102)	0.390***	(0.138)
victim_serious	0.215**	(0.106)	0.276**	(0.137)
takematerial	−0.107*	(0.062)	−0.154**	(0.076)
justifiability	−0.207***	(0.014)	−0.161***	(0.032)
Loglikelihood	−1226.42		−6122.62	

Dependent variable is peer_report; standard errors in parentheses.
*** = $\{p < 0.01\}$; ** = $\{0.01 \leq p < 0.05\}$; * = $\{0.05 \leq p < 0.10\}$.

Table 4: Regression results — correlations

	ρ_1	ρ_2	ρ_{11}	ρ_{12}	ρ_{21}	ρ_{22}
Exogeneity	0.97					
	(0.00)					
Endogeneity	0.97	0.81	−0.15	−0.23	−0.16	−0.22
	(0.01)	(0.01)	(0.06)	(0.05)	(0.05)	(0.06)

Standard errors in parentheses

significant. According to the estimates in the second column of Table 3, the effect of justifiability would be even larger if we assumed peer reporting to be exogenous.

Context of the offense

The context is captured by five vignette characteristics, relating peer reporting to the hypothetical situation (for example, behavior of the boss) and to the hypothetical offender (for example, age and gender). Interestingly, we find no evidence that peer reporting is influenced by the age of the offender, nor by the fact whether the offender is a man or a woman. The behavior of the boss does not matter, *ceteris paribus*. The only thing which does matter is whether the offender has engaged in this type of incorrect behavior before or not (vign_freq).

Characteristics of the reporter

While we find no evidence that peer reporting is influenced by the age or gender of the offender, the gender of the potential reporter does matter: Men are significantly more likely to report than women (keeping other characteristics constant, including justifiability and personal traits like trust and social norms). This corresponds with other findings (Near and Miceli, 1985; Sims and Keenan, 1998), although the reason for the different reporting behavior of men and women is not clear. We find no significant effect for age. The literature is also ambiguous in this respect (Mesmer-Magnus and Viswesvaran, 2005; Sims and Keenan, 1998; Jones and Kavanagh, 1996). Neither do we find a significant effect of income. Regarding education, we find not much difference in reporting probability between respondents with a 'middle' or a 'high' level of education. But there is difference with respondents with a 'low' level—this group is less likely to report. If justifiability is assumed endogenous then this difference is slightly larger than in the exogenous case. Mesmer-Magnus and Viswesvaran (2005) cite studies that find an education effect, but Sims and Keenan (1998) find no significant effect. Whether the respondent lives in a city or in the country does not matter either. We find no evidence that religious people are more likely to report than non-religious people, possibly because religion has an indirect effect on reporting, through ethical ideology (Barnett et al., 1996).

Trust (as measured by the trust_index) is significantly associated with peer reporting: More trust in others significantly increases the likelihood of peer reporting, probably because a violation of trust affects trusting people more than it affects suspicious people. Important is also the social_norm index, which measures the perceived severity of a wide range of situations of incorrect behavior. We find, as expected, that someone who judges incorrect behavior mildly (low value of social_norm) is significantly less likely to report such behavior, keeping justifiability and other variables constant. The size of

the parameter estimate implies, for example, that a one standard deviation decrease in social_norm reduces the probability of peer reporting by about 5 percentage points for an average respondent. The effect of the social norm is much stronger in the model allowing for endogeneity than in the model assuming that justifiability is exogenous. While the existing literature emphasizes the importance of social context (Victor et al., 1993), we are not aware of other studies on peer reporting that incorporate social norms.

New in the literature on peer reporting is also to consider past victimization of the potential reporter. We include a victimization index (vict_index) which measures the perceived severity of the different types of crime a respondent has possibly been a victim of, and we also include the fact whether a respondent has been a victim of a small or a serious crime or not. We find that victims of serious crimes and victims of small crimes are more likely to report. The marginal effect of having been a victim of a small crime (an increase of about 14 percentage points in the probability of reporting, for the average respondent) seems to be larger than the effect of victim_serious (an increase of about 10 percentage points). Regarding the impact on one's behavior regarding a small crime, this implies that victimization of a small crime has a larger impact than victimization of a serious crime.

Finally, we included a variable 'takematerial' which measures whether the respondent him/herself has taken material from work for private use at home. This allows us to see whether a person's own past behavior in a similar situation is of influence on the reporting decision. Note that takematerial is negative and significant, which means that respondents that have been in a similar situation as the offender in the vignette are less likely to report.

5.3 Peer reporting in a strict sense

As discussed in Sections 2 and 3, answering 'yes' to the peer reporting question means either that the respondent would talk to the offender or that he/she would take the matter further and involve others. In fact, the large majority of the respondents indicate that they would talk to the offender and it is not clear whether they would then also talk to a supervisor, another colleague, or someone else. In this subsection we redefine the peer reporting dummy so that it takes the value 1 if the respondent would report the offense to a supervisor, another colleague, or someone else; and 0 if the respondent would only talk to the offender or not report the offense at all. This alternative definition of peer_report (labeled peer_report2) is more strict than the previous one, and we have peer_report2 = 1 for only 6 percent of the sample. All results presented so far could be affected by the new definition. The justifiability equation and the covariance structure of the errors are hardly

affected, and the new results are therefore not presented. However, the results for the peer reporting equation are affected and these are presented in Table 5.

Table 5: Regression results — peer reporting, alternative definition

	Exogeneity		Endogeneity	
vign_female	−0.037	(0.055)	−0.030	(0.050)
vign_43y	0.027	(0.067)	0.033	(0.061)
vign_55y	−0.048	(0.067)	−0.060	(0.061)
vign_boss	0.005	(0.055)	−0.054	(0.053)
vign_freq	0.135**	(0.057)	0.116**	(0.054)
female	−0.025	(0.074)	−0.026	(0.095)
age	−0.004	(0.003)	−0.004	(0.003)
hh_lincome	−0.016	(0.025)	−0.017	(0.032)
edu_middle	0.051	(0.091)	−0.074	(0.099)
edu_high	−0.034	(0.093)	−0.183*	(0.111)
urban_high	−0.224***	(0.082)	−0.255**	(0.106)
urban_middle	−0.247**	(0.101)	−0.289**	(0.129)
religion	0.014	(0.075)	0.014	(0.096)
vict_index	0.000	(0.022)	−0.001	(0.029)
trust_index	−0.012	(0.007)	−0.015	(0.009)
social_norm	−0.048	(0.033)	−0.100*	(0.056)
victim_small	0.134	(0.140)	0.134	(0.185)
victim_serious	0.014	(0.139)	0.019	(0.182)
takematerial	0.054	(0.083)	0.107	(0.107)
justifiability	−0.073***	(0.022)	−0.138***	(0.049)
Loglikelihood	−525.12		−5430.03	

Dependent variable is peer_report2; standard errors in parentheses.
*** = $\{p < 0.01\}$; ** = $\{0.01 \leq p < 0.05\}$; * = $\{0.05 \leq p < 0.10\}$.

Since peer_report2 is essentially different from peer_report, we expect the results in Table 5 to be different from those in Table 3. This is indeed the case, but the main finding is the same: the probability of peer reporting falls significantly with justifiability. In our preferred model allowing for endogeneity of the justifiability variable, the coefficient of justifiability in the peer reporting equation is very similar to the one in Table 3 (−0.138 versus −0.161). The standard error is larger, because of the small number of respondents with peer_report = 1. The effects of the vignette variables are also similar to those in Table 3. The only significant variable is the dummy indicating whether the offender has engaged in this type of incorrect behavior

before; if so, this raises the probability that the respondent would report the offense to someone else.

Some other parameter estimates are markedly different. The negative and significant difference between women and men vanishes. Apparently, keeping other variables constant, men talk to the offender more often than women, but there is no evidence that they also report the offense more often to someone else. The effects of education change sign, but remain only marginally significant. It seems that the higher educated are more inclined to talk to the offender than to someone else. The strongest result is found for the degree of urbanization: respondents in non-urbanized areas (the omitted category) are significantly more likely to talk about their peer's offense to someone else than to the offender. On the other hand, the associations with victimization, trust, and social norms all become insignificant. Respondents with stricter social norms concerning the perception of small crime and respondents who have been the victim of a crime in the past five years are more likely, when observing the small crime, to talk to the offender than to report the offense immediately to a supervisor or a colleague. The same applies to respondents who have never committed a similar offense (take_material = 0).

6 Concluding Remarks

In this paper we have considered one 'small crime', namely taking printing paper home from work for private use, and we asked in our survey whether or not a colleague would report this crime. Peer reporting is viewed as a behavioral response to the perception of fairness (i.e. justifiability) regarding employee theft, because it may be considered an additional task for the employee to help the management or to do justice (Victor et al., 1993). We learn about the perception of fairness from the vignette question in which the CentERpanel respondents were asked to rate the justifiability on a 10-point scale. We find that situational characteristics, such as the behavior of the offender's boss and the probability of getting caught, influence fairness perception. This perception is also influenced by characteristics of the respondent him/herself, such as the level of trust in others and whether or not the respondent committed employee theft him/herself. Fairness perception and peer reporting are not influenced by age or income. But taking action upon the offense does depend on education and gender. In particular, people with low education level and women are less likely to act by talking to the offender than higher educated people and men.

The most important aspect triggering peer reporting is the internal attitude towards incorrect behavior. Other important aspects are fairness per-

ception, trust in others, and the potential reporter's own behavior in a comparable situation of employee theft. New in the literature of peer reporting is that we look at the reporter's past victimization. We consider victimization of incorrect behavior in general, and also victimization of a serious crime. We find that the first type of victimization is mainly an attitude variable towards misdemeanors in daily life. The range of misdemeanors a person could possibly have been a victim of in the past five years is so wide that it would seem impossible to find a person that never encountered such a situation. However, only one quarter of the respondents reported being a victim of incorrect behavior, from which we conclude that this group contains people with a greater awareness or sensitivity to social norms. We also find evidence that serious crime victimization changes a person's willingness to act after noticing an offense, although this effect is smaller than the effect of small crime victimization.

We also looked at reasons for people not to report a misdemeanor. The most important reason for respondents not to report is that the misdemeanor is not important enough to worry about. The loss to a company as a result of stealing a bundle of printing paper is considered to be very small. This is a well-known result: in general, people consider theft from a victim with larger assets (in this case a company) easier to excuse (Greenberg and Scott, 1996).

We mention four possible extensions. First, one could consider group dynamics such as group norms and role responsibility. Such aspects have been found to have an important impact on peer reporting (Victor et al., 1993), but they are difficult to implement in the context of vignette questions, because the description of the hypothetical situation would become too long and too complex. Second, one could look at more serious types of employee theft (in terms of monetary losses to the employer), and ask whether peer reporting happens more often in large than in small organizations or vice versa. Third, it may be the case that organizations with an established ethics program have lower employee theft than organizations without such a program (Greenberg, 2002). Possibly, an ethics program stimulates awareness to social norms in a company and creates a more open environment for allowing employees to report. Fourth, while taking printing paper home for private use would generally be considered as a very minor crime, two-thirds of respondents would report it on average. Our current questionnaire does not enable us to answer the question how this behavior changes with the severity of offenses, since we observe peer reporting behavior only for one situation. Still, this question is of interest and it would also help in differentiating with justifiability.

Appendix: Respondent and vignette variables

Table A.1: Binary vignette variables with explanation

vign_female	1 if vignette person (vp) is a woman
vign_27y	1 if vp is 27 years old
vign_43y	1 if vp is 43 years old
vign_55y	1 if vp is 55 years old
vign_boss	1 if the boss of the vp behaves correctly
vign_freq	1 if small crime has been committed more often before
vign_catch	1 if the probability of getting caught is 50% (0 if very small)
vign_wage	1 if vp has a high wage
vign_wage_low	1 if vp receives low wage for type of work, given vign_wage = 0
vign_wage_high	1 if vp receives high wage for type of work, given vign_wage = 1

Table A.2: Respondent variables with explanation

Non-binary variables	
age	age of respondent (in years)
hh_lincome	log of gross monthly household income
vict_index	severity of crime respondent has been victim of (0 if no victim)
trust_index	degree of trust in other people (0 if no trust)
social_norm	average of answers to short questions on severity of 18 small crimes on a scale from 1 (not severe at all) to 10 (very severe)
justifiability	1 = crime is never justifiable, 10 = — always justifiable
Binary variables	
female	1 if respondent is a woman
edu_middle	1 if respondent's highest education level is higher general secondary school or intermediate vocational training
edu_high	1 if — higher vocational training or university
urban_high	1 if respondent lives in an urbanized area
urban_middle	1 if — in an area with intermediate urban character
religion	1 if respondent has a religion
victim_small	1 if respondent was victim of incorrect behavior
victim_serious	1 if — of a serious crime
takematerial	1 if respondent took material from the workplace
peer_report	1 if respondent would peer report

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