Whistleblower Protection: Theory and Experimental Evidence[*]

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Abstract

Whistleblowing by employees plays a major role in uncovering corporate fraud. Recent laws and global policy recommendations aim at facilitating whistleblower protection to enhance the willingness to report and to increase deterrence. We study these issues in a theory-guided lab experiment. Whistleblower protection indeed leads to more reporting of misbehavior. However, our experimental findings suggest that non-meritorious claims are an issue, as they reduce prosecutors' incentive to investigate, which hampers the intended improvement of deterrence.

JEL-Code: C91, D83, D73, K42, M59.

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1 Introduction

1.1 Motivation

Corporate fraud is a major challenge in both developing and advanced economies, and employee whistleblowers play an important role in uncovering it. Indeed, the issue of protecting employee whistleblowers looms high on the international anti-corruption agenda of the G20 group, the Council of Europe, and the OECD, and some form of whistleblower protection legislation is already in existence in countries such as the U.S. or the UK. To the best of our knowledge, this is the first paper to study whistleblower protection regimes in a theory-guided lab experiment, where the decisions to commit fraud, to blow the whistle, to investigate reports, and to retaliate against whistleblowers are endogenous. Our results suggest that the effect of whistleblower protection on deterrence deserves particular attention.

The topicality of corporate fraud is exemplified by high-profile scandals at Volkswagen, Enron, or Worldcom. More systematic evidence is, for example, presented by Dyck, Morse, and Zingales (2014). Using a natural experiment, they estimate the average cost of both detected and undetected fraud in large U.S. corporations in the period 1996-2004 to be $360 billion per year.[1] This evidence suggests that uncovering existing fraud and deterring potential fraud should indeed be a high priority for legislators and policy makers.

In fact, in recent years, the importance of employee whistleblowers (who are not participating in the misbehavior) for uncovering fraud (in particular, fraud involving company insiders) has become evident, primarily because of their access to crucial information.[2] For example, Dyck, Morse, and Zingales (2010) consider all reported cases of fraud in large U.S. corporations between 1996 and 2004. They find that in 17% of the 216 cases they study, the fraud was uncovered by employee whistleblowers, thereby outnumbering other players such as the SEC, auditors, non-financial market regulators, or the media.[3] The importance of employee whistleblowers has lead to a broad consensus among scholars and practitioners alike that, in

[1] According to the Association of Certified Fraud Examiners (2014), the average loss of organizations due to fraud (which includes financial statement fraud, asset misappropriation, and corruption) is estimated to be 5% of annual revenues. Taken at face value, this number would extrapolate into a worldwide loss from fraud of up to $3.7 trillion. Furthermore, in the latest "Global Fraud Report" (Kroll, 2016), 75% of surveyed senior executives stated that their company had become a fraud victim in the previous year.

[2] Kroll (2016) finds that in 81% of all fraud cases where perpetrators were known at least one company insider was involved, and a substantial share of 36% of these perpetrators came from senior or middle management.

[3] In the notorious corporate fraud scandals of Enron and Worldcom, the misbehavior was uncovered by employee whistleblowers (see, e.g., Healy and Palepu, 2003). Miceli, Near, and Dworkin (2009) survey fraud cases unveiled by whistleblowers in more than 20 countries.

order to uncover and deter corporate fraud, fostering employee whistleblowing would be very desirable. While employees who do report fraud often feel a moral obligation to do so (see, e.g., Jos, Tompkins, and Hays, 1989; Miceli and Near, 1992; Alford, 2001), the fear of retaliation from co-workers or management is often a strong countervailing factor.[4] As a result, the overall willingness of employees to report misbehavior is often perceived as low. For example, Dyck, Morse, and Zingales (2010, p.2245) argue that "the surprising part is not that most employees do not talk, but that some talk at all."

As a consequence, the best-practice recommendations of international bodies, such as the G20 group, the Council of Europe, and the OECD (Council of Europe, 2014; OECD 2011, 2016), urge for comprehensive legal protection from retaliation for whistleblowers. Such legislation is already in place in the U.S., the UK, and a number of other countries, where examples include the Sarbanes-Oxley Act (SOX), the Dodd-Frank Act, and the Public Interest Disclosure Act (see, e.g., Thüsing and Forst, 2016). For instance, U.S. law aims to shield whistleblowers from tangible employment actions (such as dismissal or demotion) and other forms of retaliation.

There is no doubt that employee whistleblowers who uncover corporate fraud deserve strong protection. A number of scholars, practitioners, and enforcement agencies have at the same time voiced the concern that current whistleblower protection policies might also lead to dysfunctional responses in the form of non-meritorious claims. In particular, it has been argued that low-performing employees might have an incentive to lodge claims to seek shelter from unfavorable actions such as dismissal. For example, in their study of the New York City adminstration, Anechiarico and Jacobs (1996, p.69) state that "some disgruntled, incompetent, or otherwise poorly performing employees will file whistleblower claims in order to keep their jobs as long as possible or simply to harass their supervisors."[5] If such non-meritorious claims were indeed successful, the employee would either be retained, or would settle to the effect of receiving a severance payment in exchange for termination.[6]

[4] See e.g., Near and Miceli (1986) and Alford (2001). Gobert and Punch (2000, pp.33ff) provide a number of striking examples of whistleblowers suffering from various forms retaliation after coming forward.

[5] See als Gobert and Punch (2000, pp.32ff), Schmidt (2005, p.158), Bowen, Call, and Rajgopal (2010, p.1240), or Blount and Markel (2012, p.1042), who reiterate the arguments and cases of Anechiarico and Jacobs (1996, pp.67ff). Furthermore, a USA Today (2004) article on the practical consequences of SOX quotes practitioner statements such as "some of the more difficult problems I've had is whistleblowers who will raise issues in which we find some merit, but where they will raise them to gain personal protection for marginal performance".

[6] In a similar vein, it has been argued that monetary rewards for whistleblowers, as for example provided for in the Dodd-Frank Act, might also generate incentives to file non-meritorious claims, see e.g., Hartmann (2011, p.1303), Ebersole (2011, p.135), Blount and Markel (2012, p.1041), Hansberry (2012, p.196), or Rose (2014, p.1283).

Since such non-meritorious claims would be an unintended by-product in the quest for improving the protection of honest whistleblowers, this raises the question of their empirical relevance. In this respect, there might exist several reasons why such claims may not constitute some *quantité négligeable* with respect to both whistleblower behavior and fraud deterrence.

First, from the viewpoint of the responsible authorities, if the number of underlying non-meritorious claims were large, reports may in general be perceived to be less informative about the presence of underlying misbehavior. As it is costly to "separate the wheat from the chaff" (Fleischer and Schmolke, 2012, p.254), this might reduce the authorities' responsiveness to reports (see e.g., Ebersole, 2011, p.135 and Rose, 2014, p.1283).[7] In turn, this could reduce deterrence in the first place (see e.g., Casey and Niblett, 2014, pp.1208ff). If this channel is indeed empirically relevant, the deterrence of corporate fraud as one of the major aims of whistleblower legislation (apart from the primary aim of protecting whistleblowers) would be impaired.

Second, many existing whistleblower protection policies (such as SOX and Dodd-Frank) and the above-mentioned best practice recommendations do not seem to provide strong safeguards against non-meritorious claims. This is due to one important feature of these policies, according to which whistleblowers are deliberately not required to provide conclusive proof of their allegations. Instead, they need to demonstrate a *reasonable belief* with respect to the presence of fraud (for a discussion, see e.g., Kohn, Kohn and Colapinto, 2004, pp.92ff). The rationale behind the use of this judicial standard is to set the bar for protection not too high, thereby encouraging whistleblowers to come forward. However, since claims often involve complex inside information, a claim's real merit is often hard and costly to assess for a judge from an ex ante perspective (see e.g., Ebersole, 2011, p.135), and a non-meritorious allegation might hence appear reasonable (see e.g., Schmidt, 2005, p.158). Therefore, while the reasonable belief standard will certainly prevent obviously unsubstantiated claims, it potentially leaves scope for (ex post) non-meritorious claims to result in protection.[8]

Finally, existing policies do usually not sanction whistleblowers whose claims pass the reasonable belief threshold ex ante, but then turn out to be non-meritorious ex post. For example,

[7] For example, out of the 27921 cases determined by the U.S. Department of Labor's Occupational Safety and Health Administration (OSHA) over the time period 2006-2016, 56% were dismissed (see `https://www.whistleblowers.gov/factsheets_page/statistics`).

[8] See e.g., Rose (2014, p.1283), who also argues that unwarranted protection might in addition be aided by the vagueness of many legal provisions (see also Ebersole, 2001, p.135, Hansberry, 2012, pp.211ff, or Blount and Markel, 2012, p.1041). Claims that are easily recognizable as fraudulent could for example be punished with sufficiently high fines, and hence be deterred in the first place (Buccirossi, Immordino, and Spagnolo, 2017).

in their comparative study of whistleblower legislation in 23 countries, Thüsing and Forst (2016) find that, once obtained, protection often remains intact even if, in the end, it turns out that there was no misbehavior.[9] Furthermore, sanctions for claims that turn out to be unsubstantiated are in general either mild or ruled out altogether, as is for example the case for all claims administered by the U.S. Department of Labor (see e.g., Kohn, Kohn and Colapinto, 2004, p.34).

Given the global scale of corporate fraud and the importance of employee whistleblowers in uncovering it, the details of whistleblower protection policies might matter substantially for economic outcomes. However, we believe that the effects of improving the protection of employee whistleblowers who uncover corporate fraud on non-meritorious claims and deterrence are not yet sufficiently well understood. This paper is an attempt to provide some preliminary insights on these issues.

1.2 Research Question, Framework, and Results

The main goal of this paper is to study, in a unified framework, the effects of legal whistleblower protection on corporate misbehavior, employee whistleblowing, investigations, and retaliation by employers against whistleblowers. To this end, we conduct a theory-guided experiment where predictions are derived from a cheap-talk model in the spirit of Crawford and Sobel (1982). Our framework considers the interaction between an employer (who may misbehave), an employee (who may blow the whistle), and a prosecutor (who may act upon the employee's report). Moreover, the employer might retaliate against a non-protected whistleblower in the form of dismissal. In this paper, we focus on whistleblower protection in the form of employment protection (i.e., a protected employee cannot be dismissed), which is consistent with common legal practice as discussed above.[10]

We allow employees to be heterogenous with respect to their productivity. The incentive structure is such that the employer prefers to dismiss low-productivity employees, while high-productivity employees might face dismissal only if they blow the whistle. Hence, as discussed above, this might give low-productivity employees an incentive to file non-meritorious claims in order to become shielded from dismissal.

[9] For example, two such cases are discussed in Anechiarico and Jacobs (1996, pp.67ff).

[10] Employment protection is the most common remedy in whistleblower cases (see, e.g., Kohn, Kohn and Colapinto, 2004, pp.97ff). Thereby, the stated aim is to *make whole* the whistleblower, i.e., to re-establish the attained employment status before becoming a whistleblower (see, e.g., Kohn, Kohn and Colapinto, 2004, pp.102ff).

We implement a total of six experimental treatments, four main treatments and two robustness checks. In treatment *P-R*, protection is obtained by filing a report. This treatment is meant to capture in a stylized way real-world legal regimes (such as U.S. and UK law, and the G20 group's policy recommendation), where protection is granted when the employee can demonstrate a reasonable belief with respect to the presence of fraud. In this and all subsequent treatments we focus on the case where all whistleblower claims satisfy this reasonable-belief criterion, i.e., from the prosecutor's perspective they are not obviously unsubstantiated ex ante.

Treatment *P-R* is then compared to two benchmarks, one where whistleblower protection (i.e., employment protection) is not available (treatment *NoP*), and one where protection is only granted if, in addition to a report, the employer's misbehavior is indeed verified in the course of an investigation (treatment *P-RIM*). This latter treatment serves as a useful benchmark relative to *P-R*, as protection is available in both treatments, but in *P-RIM* there is no incentive to file non-meritorious claims. Finally, we also consider an intermediate setting where a report only leads to protection when it triggers an investigation (treatment *P-RI*).

Our theoretical predictions (developed in Appendix A) can be summarized as follows: First, in treatment *P-R*, all misbehavior is reported, but low-productivity employees also lodge non-meritorious claims. Second, in the benchmark *NoP* (where protection is not available), non-meritorious claims by employees do not arise, but not all employer misbehavior is reported. Moreover, in treatment *NoP* deterrence is weaker than in *P-R*. Third, the predictions for *P-R* and *P-RI* coincide.[11] Fourth, in treatment *P-RIM*, all misbehavior is reported (as in *P-R*), but non-meritorious claims do not arise and, as a consequence, deterrence is stronger in this benchmark treatment.

The main experimental findings are as follows: First, for treatments *NoP* and *P-R*, most of the theoretical predictions (with respect to dismissal, misbehavior, and the reporting behavior of the different productivity types) are broadly supported in the experiment, but there are also interesting deviations. For example, in treatment *P-R*, due to non-meritorious claims prosecutors exhibit a lower responsiveness to reports, as these are now less informative about underlying misbehavior. As a consequence, the predicted reduction of misbehavior in *P-R* relative to *NoP* does not materialize. Second, as predicted, the behavior in *P-R* and *P-RI* is very similar. Third, again as predicted, in *P-RIM*, there are substantially fewer non-meritorious

[11] This is driven by our focus on informative equilibria in which the prosecutor triggers an investigation if and only if there is a report by the employee.

claims than in *P-R*, and employer misbehavior is lower. Fourth, in all three treatments where protection is available, compared to the benchmark *NoP* without protection, the willingness to report misbehavior is higher, while the responsiveness of prosecutors to reports is lower.

From a methodological point of view, our lab experiment complements empirical research with field data on whistleblowing. For example, empirically observing an unaltered number of reports after the introduction of whistleblower protection might have at least two possible explanations. First, the scheme might simply be insufficient to trigger more reports. Alternatively, it might indeed increase the willingness to report as intended, which, in turn, deters misbehavior to such a degree that the number of observed reports remains constant. With field data, it is usually difficult to distinguish between these two explanations. Also, with field data one directly observes only those cases of misbehavior that come to light, but has to resort to estimation to gauge the extent of undetected misbehavior. By contrast, a lab experiment allows to directly observe crucial variables such as the underlying (and potentially undetected) level of misbehavior, the willingness to send both truthful and false reports, and the prosecutors' response to them.[12] Moreover, in the lab one can run "policy experiments"; thereby pre-testing various features of whistleblower protection programs before they are implemented.

The remainder of the paper is structured as follows: Section 2 discusses the related literature. Section 3 introduces the game played and the design of the experiment, while Section 4 presents the theoretical predictions and the underlying intuition. The experimental results are discussed in Section 5. Section 6 concludes. Appendix A contains the description and analysis of the model from which the theoretical predictions of Section 4 are derived. Appendix B contains translations of the experimental instructions. Appendix C provides an overview over the number of observations across decisions and treatments.

2 Related Literature

Our paper is the first one to systematically evaluate (both experimentally and theoretically) how the requirements for obtaining whistleblower protection affect outcomes. In doing so, we complement three strands of the literature on whistleblowing policies. First, there is a theoretical literature on whistleblowing that analyzes the optimal responsiveness of prosecutors to reports. In particular, in Chassang and Padró i Miquel (2016) whistleblowing is fostered

[12] These methodological advantages are similar to those advanced in the related experimental literature on leniency programs in antitrust, which is discussed below.

through investigation policies that generate "garbled" information. They show that, to shield a whistleblower from retaliation by his employer, the optimal investigation policy (to which the prosecutor can commit ex ante) must not be too responsive to reports. The reason is that a relatively responsive policy would reveal that whistleblowing has in fact occurred, which would then trigger retaliation. In turn, this would undermine the incentive to report in the first place.[13] Like the present paper, Chassang and Padró i Miquel (2016) analyze a cheap-talk game in which the decisions to misbehave, to report, and to investigate are endogenous. Hence, from a theoretical perspective, their setup is the one most closely related to ours, but there are a number of important differences: We compare the impact of different protection schemes on equilibrium behavior, and allow for heterogeneity of workers with respect to productivity. Moreover, we focus on pure-strategy equilibria where the prosecutor has no commitment power (and hence decides on whether or not to investigate only after a report has arrived). Finally, we also empirically test our model predictions in a lab experiment. Using a different modeling approach, Heyes and Kapur (2009) analyze how the optimal responsiveness of investigations depends on different behavioral motives for whistleblowing such as conscience cleansing, social welfare considerations, or disgruntlement. Our model captures the first of these motives by assuming that potential whistleblowers suffer a disutility from undetected misbehavior.

Second, there is a literature that analyzes the role of monetary rewards in fostering whistleblowing, as for example implemented in the False Claims Act and the Dodd-Frank Act. Dyck, Morse, and Zingales (2010) and Zingales (2004) stress the beneficial role of such rewards in uncovering fraud, while others discuss potentially adverse effects such as fostering non-meritorious claims.[14] There are also two recent experimental studies on financial rewards. Schmolke and Utikal (2016) compare financial rewards for whistleblowers and fines for non-reporting, while Butler, Serra, and Spagnolo (2017) analyze whether monetary rewards might lead to crowding-out of intrinsic motivation to report.[15] In our paper, we vary the requirements for obtaining (employment) protection (which shields the employee from a potential downside of whistleblow-

[13] Benoît and Dubra (2004) and Muehlheusser and Roider (2008) show that, even in the absence of a threat of direct retaliation, reporting might not occur due to the fear of enforcement errors or future non-cooperation.

[14] See e.g., Givati (2016), Howse and Daniels (1995), Callahan and Dworkin (1992) and the references given in Footnote 6. At the moment, financial rewards are not yet very widespread across jurisdictions. For example, only 30% of the 27 countries surveyed in OECD (2016) have incentives for whistleblowers (such as financial rewards, expediency of the process, or follow-up mechanisms) in place. Likewise, in a world-wide survey, the Association of Certified Fraud Examiners (2014) finds that only 11% of organizations had a reward scheme in place.

[15] See Gneezy, Meier, and Rey-Biel (2011) for a survey of the crowding-out literature, and Benabou and Tirole (2003) for a theoretical treatment.

ing) in order to study how these requirements affect not only reporting, but also misbehavior, investigations, and retaliation. However, we abstract from financial rewards.

Third, there is a literature on leniency programs in anti-trust, which studies the self-reporting of cartel members (see, e.g., the surveys by Spagnolo, 2008, and Marvão and Spagnolo, 2014, and the recent experimental studies by Apesteguia, Dufwenberg, and Selten, 2007, Hinloopen and Soetevent, 2008, Bigoni, Fridolfsson, Le Coq, and Spagnolo, 2012, 2015, and Feltovich and Hamaguchi, 2016). This body of (theoretical, empirical, and experimental) research also analyzes how to foster the reporting of illegal activities. However, it considers settings of oligopolistic competition in which every party is involved in the illegal behavior, which is not the case for the whistleblowers in our setup.[16]

Finally, our paper relates to an empirical literature (in fields such as psychology, sociology, organizational behavior, and business ethics) analyzing the impact of situational and personal factors on the reporting decisions of whistleblowers. For example, such factors are the threat of retaliation, whether or not co-workers were harmed, the type of misbehavior and its severity, whether individuals are rather high-performers or low-performers, and the strength of behavioral motivations such as conscience cleansing, see, e.g., the overviews by Miceli and Near (1992), Miceli, Dworkin, and Near (2008), Mesmer-Magnus and Viswesvaran (2005) and Vadera, Aguilera, and Caza (2009), and the recent incentivized lab experiment by Bartuli, Djawadi, and Fahr (2016). In our paper, we investigate how the reporting decisions of employees are affected by their productivity and the underlying legal regime. In addition, we also elicit a number of personal characteristics and situational factors in the post-experimental questionnaire.

3 Experimental Design

This section explains the setup of the experiment. That is, we provide summary information and describe in detail the game played, the incentive structure, the session design and payments, the various treatments and their framing, as well as the post-experimental procedures.

Summary Information The experiment was conducted in the experimental lab of the University of Hamburg and programmed in z-Tree (Fischbacher, 2007). In total, we ran four main

[16] Cotten and Santore (2016) conduct an experiment to analyze the impact of transparency and amnesty rules in the context of corporate fraud by criminal teams.

treatments and two further treatments as robustness checks (see Table 1 below). We employed a between-subjects design, so that each subject participated in one treatment only. Sessions lasted for approximately 140 minutes, and participants earned 21 Euro on average (including a show-up fee of 12 Euro). For the recruitment of a total of 600 subjects, we used the software tool *hroot* (Bock, Baetge, and Nicklisch, 2014). Virtually all subjects were undergraduate or master students at the University of Hamburg from a variety of fields (40% majors or minors in economics, business, or a related field), and 51% were female.

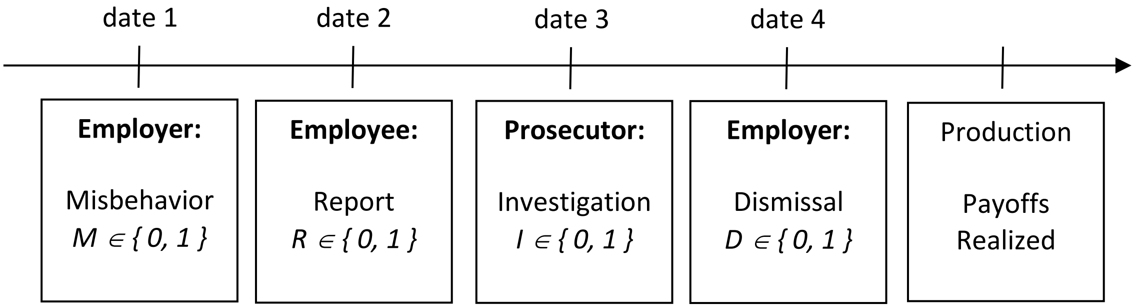
The Game Played in Each Period In each of 30 periods per session, subjects were randomly (re-)matched into groups of four (stranger-design). They were assigned a role as either *employer*, *employee*, *prosecutor*, or *third party*, where the role assignments across periods are explained in more detail below. Employees are heterogenous with respect to their (exogenously given) productivity, which is either high ("H-employee") or low ("L-employee"), drawn randomly anew with equal probability at the beginning of each period. The third party is a purely passive player without any decisions to make, who suffers a loss from employer misbehavior. The third party is included in the experiment to make it more salient that misbehavior causes harm to others. The remaining three players played the following game (see Figure 1), which is an implementation of the game analyzed in the theory part as laid out in Appendix A.

At date 1, the employer observes the productivity of his employee. She then chooses whether or not to misbehave. Misbehavior entails a gain, which is independent of her employee's productivity type, but is costly to others. At date 2, we use the strategy method to elicit the employee's binary reporting decision for both cases with and without employer misbehavior. Then, the employee observes the actual misbehavior decision of the employer. At date 3, the prosecutor observes whether or not a report is sent by the employee; but the prosecutor observes neither the underlying employer misbehavior decision nor the employee's productivity type.[17] The prosecutor then decides on triggering an investigation (which incurs a private cost for the prosecutor). An investigation perfectly reveals whether or not the employer has misbehaved.[18]

[17] Hence, we consider reports that are "external" in the sense of being directed towards the (outside) prosecutor. Some whistleblower laws stipulate that firms must establish internal reporting systems, and that whistleblowers must use these internal channels first, before resorting to outsiders. Incorporating this issue would require a richer framework, which might be an interesting topic for future research.

[18] The assumption that the prosecutor has discretion whether to initiate an investigation is in line with both the related literature (see, e.g., Chassang and Padró i Miquel, 2016; Givati, 2016; Heyes and Kapur, 2009) and legal practice (e.g., under SOX). The case where investigations do not perfectly reveal underlying misbehavior is discussed in Section 5.4 below.

Figure 1: The Game Played in Each Period



Moreover, if misbehavior is uncovered this benefits both the prosecutor and the third party, while the employer must pay an (exogenously given) fine. Finally, at date 4, the employer decides whether or not to dismiss the employee. In case of dismissal, the employee receives a payoff of zero and is replaced by a (computerized) outsider, who is more (less) productive than an L-employee (H-employee). However, dismissal is only feasible as long as the employee is not shielded by whistleblower protection. The observability of the employee's reporting decision to the employer is discussed below when we introduce the various treatments. At the end of each period, subjects learn their individual payoffs from the current period, and the decisions leading to these payoffs.

Incentive Structure: Monetary Incentives and Parameter Values In the experiment, the players' monetary payoff components (which were common knowledge ex ante) had the following properties:[19] Unless detected, an employer's monetary payoff is higher upon misbehavior. Moreover, the difference between the productivity and the wage of the L-employee (H-employee) is smaller (larger) compared to employing the replacement outsider. Hence, the employer's monetary payoff is higher when dismissing (retaining) the L-employee (H-employee). In contrast, the monetary payoff of each employee type is always higher when retained. The monetary payoff of the third party is highest under no misbehavior, followed by detected, and then undetected misbehavior.[20] Finally, despite the investigation costs, when there actually is misbehavior, the prosecutor's monetary payoff is higher when he investigates.[21] In contrast, without misbehavior, the prosecutor's monetary payoff is higher when he does not investigate.

[19] The payoff structure of the underlying model is summarized in Table 5 in Appendix A.

[20] The motivation for this payoff ranking is that detecting misbehavior might allow to (at least partly) curb the associated harm.

[21] Hence, given that there is misbehavior, an investigation is not only beneficial to the third party, but also to the prosecutor (which, in practice, might for example come in the form of a reputation gain).

We used the following parameter values throughout, where the numbers indicate experimental points: The productivities of H-employees, L-employees, and the outside replacement are given by 80, 30, and 70, respectively. Employees who are not dismissed receive a fixed wage of 40. The employer's (gross) payoff from misbehavior is 50, and, in case of detection, she faces a fine of 60. When there is no misbehavior, the prosecutor's payoff is -20 (0) if he investigates (does not investigate). When there is misbehavior, his payoff is -10 (-20) if he investigates (does not investigate). The fine does not accrue to the prosecutor. Finally, the third party suffers a loss of 50 (70) from detected (undetected) misbehavior. In order to avoid negative payoffs at the end of the experiment, only prosecutors and third parties (who otherwise would face only negative payoff consequences) received per-period endowments of 60 and 40, respectively.

Incentive Structure: Potential Behavioral Motivations As discussed below, our experimental design is intentionally not fully neutral, and we do provide subjects with some information about the context in which they operate. Consequently, in addition to the monetary payoff components, there might also exist moral and psychological motivations that shape subjects' behavior (which were not incentivized in the experiment): First, employees do not receive a direct monetary reward when reporting misbehavior, and we rely on their potential moral motivation to report misbehavior instead. As discussed above, the literature has identified conscience cleansing as a main motive of whistleblowers to come forward. Second, it is well documented that whistleblowers are often no longer well-liked at their workplace. That is, employers might feel tempted to retaliate in the form of dismissal, even though this might reduce the employers' profit due to a loss of productivity (i.e., when matched with an H-employee). Third, employers might have moral reservations such that their "net benefit" from misbehavior differs from their pure monetary gain. In the theoretical analysis in Appendix A, on which the predictions of Section 4 are based, we allow for heterogeneity with respect to the intensity of these moral and psychological motives (i.e., employees' dislike of undetected misbehavior, employers' dislike of employing whistleblowers,[22] and employers' aversion against misbehavior). Apart from that, the theoretical predictions rely on the assumption that subjects have standard preferences.

[22] The existence of such heterogeneity on the employers' side is consistent with empirical findings on the relevance of retaliation. For example, Near and Miceli (1996, pp.517ff) find retaliation rates ranging from 6% to 38%, suggesting that employers do differ with respect to their attitude towards whistleblowing (see also the National Business Ethics Survey of 2013 available at https://www.ibe.org.uk/userassets/surveys/nbes2013.pdf).

Session Design and Payments In each session, the design of the experiment was common knowledge, and all subjects received the same instructions. Sessions consisted of 30 periods and usually had 24 participants (see Table 1). In addition to the (random) re-matching of groups in each period, also the role assignments varied across periods as follows: Each subject who was assigned the role of employer in the first period retained this role throughout all 30 periods. All other subjects randomly switched roles across periods, either between employees and third parties or between prosecutors and third parties. This was communicated in the instructions, where we also stated that role assignments were independent of subjects' behavior. The aim of this re-shuffling was to make the negative consequences of misbehavior more salient; in particular to the employee and the prosecutor, whose decisions might (directly or indirectly) curb the harm inflicted by the employer on the third party.

In addition, in order to ensure that subjects indeed understood the game, after going through the instructions, subjects had to answer a series of control questions, and we discussed any wrong answers with them in private before finally launching the experiment. Finally, to determine each subject's payment, three out of the 30 periods were randomly selected, and the subject's total points earned in these three periods were converted at the rate of 1 Euro per 15 points. Together with the show-up fee, this was paid out (in private) in cash at the end of the session.

Treatments We consider six treatments, four main treatments and two robustness checks (see Table 1). The main treatments differ with respect to the conditions under which protection is obtained (where a protected employee cannot be dismissed at date 4). In all treatments, each role – employer, employee, prosecutor, and third party – is played by a real subject. Treatment *NoP* corresponds to a benchmark setting in which employment protection is not available. In addition, there are three treatments where protection is available. In treatment *P-R*, protection is obtained by sending a report (i.e., when $R = 1$). As discussed above, this treatment is meant to capture real-world legal regimes, where protection is granted when the employee can demonstrate a reasonable belief with respect to the presence of misbehavior. In this and all subsequent treatments, we assume that each whistleblower's report does satisfy this reasonable-belief criterion, i.e., from the perspective of the prosecutor, reports are not obviously unsubstantiated. Moreover, because of the binary reporting decision, by design any report $R = 1$ looks the same to the prosecutor (independent of underlying misbehavior).

Table 1: Treatments

Conditions for Protection	Never	Report Only	Report + Investigation	Report + Investigation + Detected Misbehavior
Main Treatments	*NoP* (5;120)	*P-R* (5;120)	*P-RI* (4;88)	*P-RIM* (4;96)
Robustness Checks			*P-RI-LOSS* (Reputation Loss) (4;88)	*P-RIM-ERROR* (Investigation Errors) (4;88)

Notes: Below each treatment label, the first and the second number indicate the number of sessions played and the total number of subjects participating in the treatment, respectively. In three out of the 26 sessions, the number of participants was 16 (instead of 24) because of no-shows.

The assumption that a report suffices for protection is relaxed in a treatment *P-RI*, where in addition, the report needs to trigger an investigation by the prosecutor (i.e., $R = I = 1$). This treatment was also conducted to ensure a stepwise progression towards a further treatment *P-RIM*, where protection is only granted if, in addition to the requirements of *P-RI*, the investigation indeed reveals misbehavior by the employer (i.e., $R = I = M = 1$). As will become clear below, *P-RIM* is a useful second benchmark relative to *P-R*, as protection is available in both treatments, but in *P-RIM* there is no incentive to file non-meritorious claims.

Finally, as discussed in more detail in Section 5, as robustness checks we ran two further treatments *P-RI-LOSS* and *P-RIM-ERROR*, in which employers face a (reputation) loss whenever an investigation occurs and in which there are investigation errors, respectively.

As can be shown, the theoretical predictions for none of the treatments depend on whether the reporting decision of the employee is observed by the prosecutor only or by both the prosecutor and the employer.[23] Intuitively, this is driven by the fact that the employer can observe the investigation decision and by our focus on informative equilibria where the prosecutor investigates if and only if a report occurs. In the experiment, the prosecutor's behavior might deviate from this prediction, so that it might be more difficult for the employer to correctly infer the reporting decision from observing the investigation decision only. Hence, as we wanted to rule out the possibility of erroneous updating by the employer as a potential driver for dis-

[23] While many whistleblower protection laws require firms to establish anonymous reporting channels, Chassang and Padró i Miquel (2016) argue that the protection offered by a formal requirement of anonymity might be limited in practice as in many cases the set of people informed about misbehavior will be small to begin with (and hence, the identity of the whistleblower can be conjectured).

missal decisions, in treatments *NoP* and *P-R*, both the prosecutor and the employer learn the reporting decision. In treatments *P-RI* and *P-RIM*, where a report alone is not sufficient for obtaining protection, the employer learns the reporting decision if there is an investigation.[24]

Framing In the experiment, we gave subjects some information about the context in which their behavior was placed, e.g., we framed the game as an employer-employee relationship, where the employee could file a report to a prosecutor.[25] However, in the experimental instructions (see Appendix B), we avoided the use of strongly judgemental terms such as "misbehavior", "illegal" or "whistleblowing". For example, in the experiment, we referred to an employer's misbehavior decision as a choice between two alternatives CIRCLE (i.e., no misbehavior) and TRIANGLE (i.e., misbehavior). However, all subjects were informed that "a (fictitious) law for the protection of the third party says that TRIANGLE should not be chosen as it harms the third party" (see Appendix B). Moreover, the employee's reporting decision was not referred to as "whistleblowing", but as "asking the prosecutor to trigger an investigation".

Post-Experimental Procedures At the end of the respective session, subjects completed a (non-incentivized) questionnaire in which we elicited socio-demographic information (e.g., age, gender, and field of study), risk preferences (via the "100.000 Euro question" of Dohmen, Falk, Huffman, Sunde, Schupp, and Wagner, 2011), and cognitive abilities (via the "Cognitive Reflection Test" of Frederick, 2005), and their attitudes towards revealing misbehavior (measured on a five-level Likert scale). In addition, we elicited subjects' "Dutifulness" (i.e., their sense of duty and obligation) as a sub-factor of the Big Five personality trait "Conscientiousness" (where the respective questions were taken from the "NEO Personality Inventory", see Costa and McCrae, 1992; Berth and Goldschmidt, 2006). As to make these issues not too salient, the above questions were interspersed with some unrelated questions. We also elicited information about subjects' social preferences by letting them play an incentivized standard one-shot dic-

[24] Hence, the comparisons of treatments *NoP* and *P-R*, and *P-RI* and *P-RIM*, respectively, follow a one-change-at-a-time principle. While this is not the case for the comparison between treatments *P-R* and *P-RI* (where both the requirements for obtaining protection and the observability of reports change), the theoretical predictions for these two treatments are identical (see *Prediction P-RI* below), and this is also borne out in the experiment (see Section 5.3).

[25] In experimental economics, there is a discussion about the conditions under which a neutral or a loaded framing is more appropriate, see e.g., Eckel and Grossman (1996) and Alekseev, Charness, and Gneezy (2017). In experimental studies on whistleblowing in organizations, a loaded framing is used in Bartuli, Djawadi, and Fahr (2016) and Cotten and Santore (2016), while Schmolke and Utikal (2016) choose a neutral design. Framing is also discussed in other contexts involving misbehavior, e.g., in experiments on corruption (Abbink and Hennig-Schmidt, 2006; Barr and Serra, 2009) and tort litigation (Loewenstein, Issacharoff, Camerer, and Babcock, 1993; Babcock, Loewenstein, Issacharoff, and Camerer, 1995).

tator game in which they had to decide on how to split 100 points between themselves and a receiver. We used the strategy method so that subjects had to make their choice before they knew whether they were actually (randomly) assigned the role of dictator or receiver. We then converted their resulting points at the rate of 1 Euro per 20 points and added this to the monetary payoff they received at the end of the experiment. The post-experimental questionnaire is available upon request.

4 Theoretical Predictions

The theoretical predictions for our main treatments *NoP*, *P-R*, *P-RI*, and *P-RIM* are derived from the pure-strategy Perfect Bayesian Equilibria of the game described in Section 3, which is formally spelled out and analyzed in Appendix A (see Propositions 1-4). We focus on *informative equilibria* in the sense that the prosecutor triggers an investigation if and only if the employee sends a report. This directly leads to

Prediction I (Investigation): *In all treatments, prosecutors trigger (do not trigger) an investigation upon receiving (not receiving) a report by the employee.*

Also, the prediction for the employer's dismissal decision is straightforward. Intuitively, the employer prefers to dismiss an L-employee whenever this is feasible because the (expected) productivity of the outside replacement is higher. In contrast, an H-employee will only be dismissed upon reporting, and only if the employer's dislike of employing a whistleblower exceeds the H-employee's productivity advantage. This leads to

Prediction D (Dismissal): *In all treatments: (i) unless protected, L-employees are dismissed. (ii) H-employees are retained when sending no report, while they are dismissed with positive probability when sending a report and not being protected.*

The predictions for the reporting and misbehavior decisions are treatment-specific: We start with the comparison of treatments *NoP* and *P-R*, and then discuss treatments *P-RI* and *P-RIM*.

Prediction R (Reporting in *NoP* and *P-R*): *The reporting behavior in treatments* NoP *and* P-R *is summarized in Table 2. In particular: (i) In both treatments, misbehavior leads to a (weakly) higher willingness to report for either productivity type. (ii) For either misbehavior* *decision, L-employees exhibit a (weakly) higher willingness to report than H-employees. (iii) For either misbehavior decision, both productivity types exhibit a (weakly) higher willingness to report in treatment* P-R. *(iv) Non-meritorious claims are sent by L-employees only, and they occur in treatment* P-R *only.*

Table 2: Theoretical Prediction: Fraction of Employees Sending a Report

Treatment	***NoP***		***P-R***		***P-RIM***	
Employee Type	Low	High	Low	High	Low	High
Misbehavior	1	$\in [0,1]$	1	1	1	1
No Misbehavior	0	0	1	0	0	0

Note: The prediction for treatment *P-RI* is the same as for treatment *P-R*.

Intuitively, recall that in our model employees are assumed to suffer a disutility from undetected misbehavior, so that either productivity type tends to be more willing to report when misbehavior actually occurs. However, in anticipation of the subsequent investigation and dismissal decisions, the reporting behavior differs across types as L-employees expect to be dismissed whenever feasible, while H-employees are less vulnerable due to their higher productivity. This gives the former a higher incentive to send both truthful and false reports: When misbehavior actually occurs, H-employees are facing a trade-off between any disutility from undetected misbehavior under no reporting and the higher risk of dismissal when doing so. Moreover, in treatment *P-R*, L-employees have an incentive to report even when there is no misbehavior, as this protects them from dismissal. With respect to misbehavior, we have:

Prediction M (Misbehavior in *NoP* and *P-R*): *Misbehavior in treatments* NoP *and* P-R *is summarized in Table 3. In particular: (i) When the employer is matched with an L-employee, the frequency of misbehavior is the same in* NoP *and* P-R. *(ii) When the employer is matched with an H-employee, the frequency of misbehavior is strictly lower in* P-R *than in* NoP.

Intuitively, misbehavior of employers with L-employees does not vary across the two treatments as the decision whether or not to misbehave has no effect on the dismissal of L-employees: This productivity type is always dismissed in treatment *NoP* (irrespective of any earlier decisions), and he is always shielded from dismissal in treatment *P-R* (as L-employees always report,

Table 3: Theoretical Prediction: Fraction of Employers Misbehaving

Treatment	***NoP***		***P-R***		***P-RIM***
L-employee	m_L^{No}	$=$	m_L^R	$>$	m_L^{RIM}
	$\wedge\!\!\vee$		$\vee$		$\wedge$
H-employee	m_H^{No}	$>$	m_H^R	$=$	m_H^{RIM}

Notes: The prediction for treatment *P-RI* is the same as for treatment *P-R*. m_θ^{No}, m_θ^R, and m_θ^{RIM} denote the frequency of misbehavior by an employer matched with an employee of productivity $\theta = L, H$ in treatment *NoP*, *P-R*, and *P-RIM*, respectively.

again irrespective of their employer's earlier misbehavior decision). Because H-employees report any misbehavior in treatment *P-R*, the incentive to misbehave is smaller in this treatment.

With respect to treatment *P-RI*, our focus on informative equilibria implies that the theoretical predictions coincide with those of treatment *P-R*. The reason is that the only case in which the two treatments would have different implications does not occur on the equilibrium path, i.e., the employee sends a report, but the prosecutor does not investigate, which would lead to protection in *P-R*, but not in *P-RI*. This implies

Prediction P-RI: *The predictions for treatment* P-RI *coincide with those for* P-R*.*

Predictions change, however, in treatment *P-RIM*, in which protection is only granted upon a report followed by an investigation and discovery of actual misbehavior by the employer:

Prediction P-RIM: *In treatment* P-RIM*, (i) misbehavior is always reported and (ii) non-meritorious claims do not occur. (iii) The frequency of misbehavior in* P-RIM *is strictly lower than in* NoP *(for employers with either employee type) and lower than in* P-R *(strictly for employers with L-employees and weakly for employers with H-employees).*

The results for treatment *P-RIM* are also displayed in Tables 2 and 3. Intuitively, in *P-RIM*, by conditioning protection on actual misbehavior, all incentives for non-meritorious claims are removed. With respect to truthful claims, the incentives for L-employees (H-employees) are as in treatment *NoP* (*P-R*), and hence any misbehavior is reported. The incentive to misbehave is (weakly) decreasing from *NoP* to *P-R* to *P-RIM*. The reason is that in treatment *P-RIM*, through her misbehavior decision, the employer can directly affect the employee's access to protection. As protection is potentially costly for the employer (because of constraining her dismissal decision), this makes the employer more reluctant to misbehave. Comparing treatments *P-R* and *P-RIM*, whistleblower protection is available in both, but in the benchmark treatment *P-RIM* the incentive for non-meritorious claims is removed, leading to higher deterrence.

5 Experimental Results

For the empirical analysis, we employ non-parametric tests, where for within-treatment comparisons, we use Wilcoxon Signed-Rank (WSR) tests, while comparisons across treatments are based on Mann-Whitney-U (MWU) tests. As for the units of observation, recall that in each session of the experiment, each subject played 30 periods in a given treatment, but possibly in different roles and conditions. Hence, as we observe each subject more than once, our units of observation in these tests are averages of a subject's behavior in each role and condition in which the subject is observed.[26] As detailed at the end of Section 5.1 below, we also verify the robustness of our results by taking averages on the session-role level. Moreover, we also consider averages taken over the periods 1-10, 11-20, and 21-30, respectively.

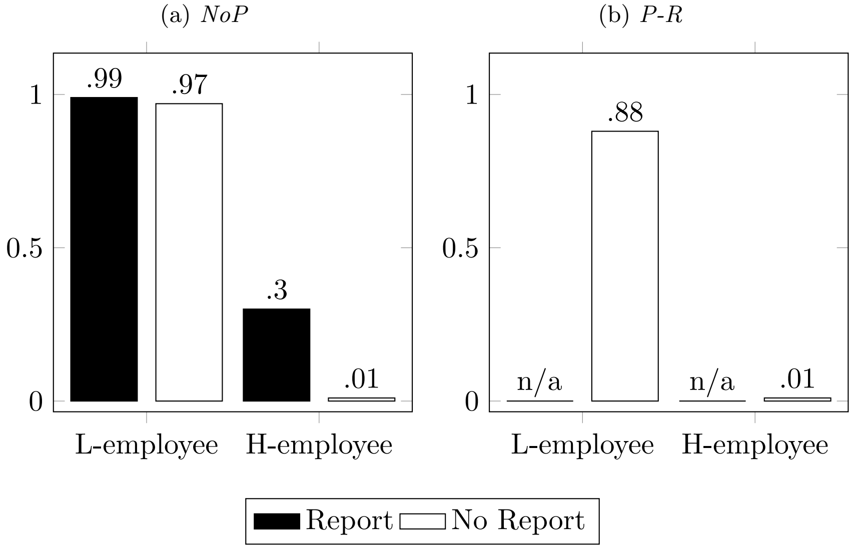
We start by comparing the results of treatment *P-R* with the benchmark *NoP*, where protection is not available.

5.1 Comparing Treatments *NoP* and *P-R*

Employers' Dismissal Decisions: Testing Prediction D Figure 2 displays the fractions of employers dismissing their employee in treatments *NoP* and *P-R*, depending on the employee's productivity type and reporting behavior (where the non-feasibility of dismissal upon reporting in treatment *P-R* is indicated by "n/a"). The results are fully supportive of *Prediction D.* In particular, in treatment *NoP*, employers virtually always dismiss their L-employee. In *P-R* (where a dismissal is only feasible when there is no report), the fraction of dismissed L-employees is somewhat lower but still at 0.88, and the difference to 0.97 is not statistically significant according to a MWU test. Moreover in both treatments, employers almost always retain H-employees who do not report. In contrast, and again in line with *Prediction D*, in treat-

[26] For example, as for the dismissal decision of employers, in each treatment there are four conditions under which employers are (repeatedly) observed: with either an L- or an H-employee, who either has or has not reported. For each of these four conditions we take averages for each employer's behavior in the role of employer, and these averages then form the unit of observation in the reported non-parametric tests. We proceed analogously in all other non-parametric tests (i.e., when analyzing the behavior of employers, employees, and prosecutors). The resulting numbers of observations are stated in Appendix C.

Figure 2: Fraction of Employers Dismissing Their Employee

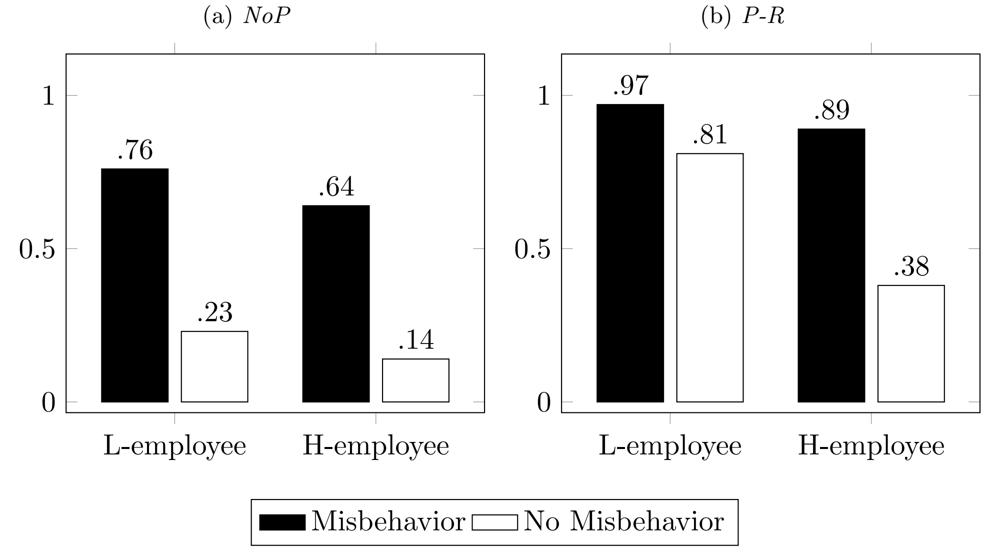


ment *NoP* around 30% of H-employees who do report are dismissed. This is significantly more compared to the dismissal of non-reporting H-employees (0.30 versus 0.01, WSR, $p < 0.001$) and significantly less compared to the dismissal of L-employees who do report (0.99 versus 0.30, $p < 0.001$, WSR). The fact that employers dismiss a considerable fraction of H-employee whistleblowers is in line with *Prediction D*. This is based on our model feature that employers might want to retaliate in the form of dismissal (thereby forgoing a higher productivity) in order to avoid their assumed utility loss associated with retaining a whistleblower.

Employees' Reporting Decisions: Testing Prediction R Figure 3 illustrates our results concerning the reporting behavior of employees in treatments *NoP* and *P-R*. It turns out that *Prediction R* is broadly supported as summarized in Table 2. In particular, as for *Prediction R(i)*, the reporting rates of both types are higher when there is misbehavior. These differences are all statistically significant (all with $p < 0.001$, WSR) and hence, with only one exception, also in line with the prediction. The exception is the significant difference in reporting rates of L-employees in treatment *P-R* (0.97 versus 0.81), for which our theory predicts no difference. In this treatment, at least some L-employees do condition their reporting behavior on whether or not there is misbehavior.

As for *Prediction R(ii)*, in both treatments the reporting rates of L-employees are higher

Figure 3: Fraction of Employees Sending a Report



than those of H-employees, irrespective of whether or not misbehavior actually occurred (see, again, Figure 3). Again, all of these four differences are statistically significant. For three of these four differences, this is in line with *Prediction R(ii)*, the exception being the reporting of misbehavior in treatment *P-R*, where misbehavior should always be reported by either productivity type (see Table 2). For this latter case (i.e., comparing fractions 0.97 and 0.89 in Figure 3), a WSR test yields $p < 0.028$. For the other three cases, we have 0.81 versus 0.38 ($p < 0.001$), 0.76 versus 0.64 ($p < 0.019$), and 0.23 versus 0.14 ($p < 0.013$).

Also *Prediction R(iii)* is broadly supported: Comparing the reporting behavior across treatments for each type of employee reveals that reporting is generally higher in treatment *P-R*. Again, all of these treatment differences are statistically significant (all with $p < 0.0001$, MWU), although for truthful reports of L-employees (fractions 0.76 in *P-R* and 0.97 in *NoP*) and non-meritorious reports of H-employees (fractions 0.14 in *P-R* and 0.38 in *NoP*), the absence of a treatment difference was predicted (see Table 2).

Overall, it can be seen that a whistleblower protection scheme such as *P-R* leads to a pronounced increase of reporting rates of misbehavior for both productivity types. The downside is that also the fraction of non-meritorious claims rises in treatment *P-R*, in particular by L-employees, which is in line with *Prediction R(iv)*. However, we also observe an (unpredicted) increase in the fraction of non-meritorious claims by H-employees. This issue and its potential implications are discussed in Section 5.2 below.

Prosecutors' Investigation Decisions: Testing Prediction I Recall that when deciding on whether or not to investigate, the prosecutor only observes whether or not a report was sent by the employee, but neither the employee's productivity type nor the underlying misbehavior decision. Figure 4(a) illustrates the experimental results for the investigation decisions in treatments *NoP* and *P-R*. First, in both treatments, prosecutors indeed seem to perceive an employee's report as an informative signal about the presence of misbehavior, and the number of investigations is significantly higher when a report occurs (0.93 versus 0.19, and 0.65 versus 0.18, both with $p < 0.001$, WSR).

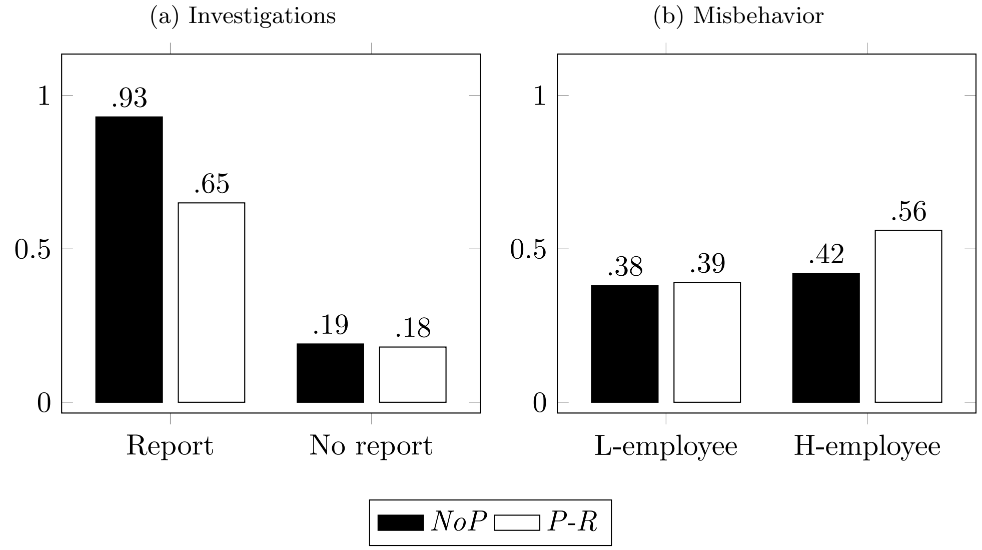
Moreover, the point predictions of *Prediction I* are broadly confirmed in treatment *NoP*, where the fraction of investigations following a report is 0.93, and hence indeed close to one as predicted. When there is no report, the fraction of investigations is 0.19, and hence somewhat further away from the predicted level of zero.

In treatment *P-R*, we find very similar results for the case of no report (0.18). However, compared to treatment *NoP*, the willingness to investigate conditional on a report is significantly lower in *P-R* (0.65 versus 0.93, $p < 0.001$, MWU). This difference might be driven by the observed reporting behavior. In particular, non-meritorious claims reduce the informativeness of reports, and hence might dilute the incentive of prosecutors to trigger costly investigations. This issue will be discussed in more detail in Section 5.2 below.

Employers' Decisions to Misbehave: Testing Prediction M Figure 4(b) displays the fractions of employers who chose to misbehave in treatments *NoP* and *P-R*. As can be seen, *Prediction M(i)* is strongly supported: The fractions of misbehaving employers with L-employees are basically identical in the two treatments (0.38 versus 0.39, where the difference is not statistically significant). *Prediction M(ii)* is not borne out by the data: For employers matched with H-employees, there is no statistically significant difference in misbehavior between treatments *NoP* and *P-R* (0.42 and 0.56, respectively). If anything, there is more, rather than less, misbehavior in *P-R* compared to the case without whistleblower protection.

To summarize, many of the theoretical predictions for treatments *NoP* and *P-R* are supported by the experimental results, and in the next section we discuss the deviations (in particular in treatment *P-R*) in more detail. We conclude this section by briefly discussing the robustness of our results with respect to the unit of observation: Recall that so far, in all

Figure 4: Fractions of Investigations and Misbehavior


(a) Investigations

(b) Misbehavior

non-parametric tests the unit of observation was formed from the subjects' average behavior in the different roles and conditions in which they are observed. We have also considered two alternative procedures: First, instead of taking averages over all 30 periods, we have considered the subsets of periods 1-10, 11-20, and 21-30, respectively. In treatment *NoP*, behavior does not vary across these period blocks. In treatment *P-R*, the number of non-meritorious claims by L-employees increases towards the end of the experiment (0.77, 0.78, and 0.90), while there is no effect on non-meritorious claims by H-employees (0.37, 0.40, and 0.38). Moreover, in treatment *P-R* the frequency of investigations conditional on a report decreases somewhat (0.73, 0.65, and 0.57). As for misbehavior, in each of the three subsets of periods, (i) for employers matched with L-employees, there is no difference between treatments *NoP* and *P-R*, while (ii) employers matched with H-employees exhibit more misbehavior in *P-R* compared to *NoP*.

Second, we have also run all non-parametric tests with averages taken on the session-role level as the unit of observation. While this substantially reduces the number of observations (see Table 1), our results are remarkably robust: All previously statistically significant across-treatment comparisons remain significant at the 1% level (investigations, reporting behavior of both employee types for $M = 0$, and of L-employees for $M = 1$) or the 4% level (reporting of H-employees for $M = 1$). Also, the previously statistically significant within-treatment comparisons remain significant at the 7% level.

5.2 Treatment *P-R*: A Closer Look at Deviations From the Predictions

Relative to the theoretical predictions for treatment *P-R*, we observe (i) non-meritorious claims by H-employees, (ii) a lower responsiveness of prosecutors to reports, and (iii) no reduction in the level of misbehavior relative to treatment *NoP*. In this subsection, we first show that the latter two findings can be rationalized given the assumption that prosecutors and employers correctly anticipate the *actual* behavior in the experiment, rather than the theoretically predicted one. Furthermore, as for the first finding, we investigate potential drivers for sending non-meritorious claims, using the post-experimental questionnaire.

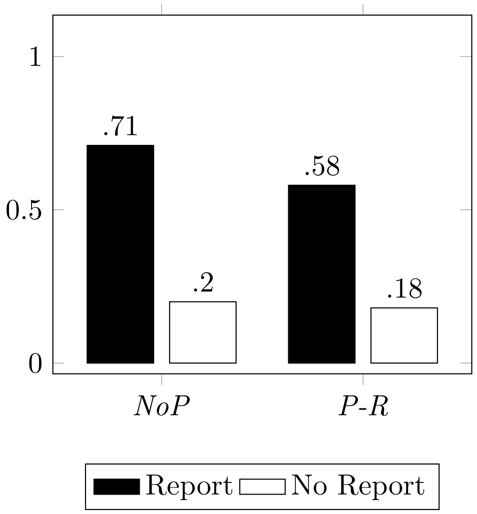
Investigation Decisions and the Informativeness of Reports Recall from *Prediction R* that both employee types should exhibit a higher overall willingness to report misbehavior in treatment *P-R* compared to *NoP*. However, there is also an incentive for L-employees to send non-meritorious claims. Hence, even from a theoretical perspective, the treatment comparison for the fraction of *truthful reporting decisions* (i.e., sending a report when there is misbehavior, and not sending a report when there is no misbehavior) is ambiguous. Actual play in the experiment reveals that the fraction of truthful reporting decisions is actually lower in treatment *P-R* than in *NoP* (0.66 versus 0.76). As a result, in *P-R*, reports are less informative about underlying misbehavior: in particular, if there is a report, the empirical frequency of underlying misbehavior is 0.71 in treatment *NoP*, but only 0.58 in treatment *P-R* (see Figure 5). In contrast, the empirical frequencies are basically identical when there is no report.

In a next step, using the information in Figure 5, we derive the optimal investigation decisions of prosecutors under the assumption that they correctly take into account the actual empirical relationship between reporting and underlying misbehavior. In addition, we also allow for the possibility that prosecutors internalize the harm from misbehavior inflicted on the third party (with weight $\alpha \in [0, 1]$). Hence, for $\alpha = 0$, the prosecutor only cares about his own payoff, while for $\alpha = 1$, he fully internalizes the third party's harm.[27]

Under these assumptions, it is optimal for the prosecutor (i) to refrain from investigating in treatments *NoP* and *P-R* if no report is sent (irrespective of α), (ii) to investigate in treatment *NoP* whenever a report is sent (irrespective of α), and (iii) to investigate in treatment *P-R* when

[27] Note that the theoretical predictions of Section 4 are based on $\alpha = 0$. However, assuming that prosecutors exhibit (the same) $\alpha > 0$ would not necessitate an extension of the model. The reason is that $\alpha > 0$ would simply correspond to an increase in the cost of not detecting actual misbehavior as incurred by the prosecutor.

Figure 5: For Given Reporting Decisions: Fractions of Underlying Misbehavior



a report is sent and at the same time $\alpha > 0.22$ holds.[28] Hence, under these assumptions, in treatment *P-R* it would not necessarily be optimal for the prosecutor to trigger an investigation upon receiving a report. All in all, this modified prediction for *P-R* is well in line with the lower number of investigations in this treatment as reported in Figure 4(a).

In the following, we proxy α by the offer in the (incentivized) dictator game, which was played at the end of the experiment (where the offer to the other party was an integer between 0 and 100). Table 4 reports the results of a linear probability model for treatment *P-R*. In line with Figure 4(a), a crucial driver for the investigation decision is indeed whether or not a report arrives.[29] Moreover, a higher offer (i.e., a higher α) increases the probability of investigation only in the case in which a report is sent. Again, this is in line with our modified prediction.[30] Finally, the effect of social preferences seems to be considerable: For example, for a prosecutor who dictates an equitable outcome (which corresponds to an offer of 50, and which was chosen

[28] To see this, recall that prosecutors receive an endowment of 60 points, their investigation cost is 20 points, and their payoff is reduced by 20 (10) points in the case of undetected (detected) misbehavior. Moreover, third parties receive an endowment of 40, which is reduced by 50 (70) points in case of detected (undetected) misbehavior. For example, based on the information in Figure 5 in treatment *NoP* and conditional on receiving a report, the prosecutor's expected payoff when choosing $I = 1$ is $0.71 \cdot (50 - 10\alpha) + 0.29 \cdot (40 + 40\alpha)$. Analogously, when choosing $I = 0$ instead, the prosecutor expects a payoff of $0.71 \cdot (40 - 30\alpha) + 0.29 \cdot (60 + 40\alpha)$, which leads to a payoff difference of $1.3 + 14.2\alpha > 0$. Hence, the prosecutor would optimally trigger an investigation independent of α. For all the other cases, the calculations are analogous.

[29] We do not report the regression results for treatment *NoP* as the likelihood of investigations is strongly determined by whether or not a report is sent (which is fully in line with Figure 4(a)), and the behavior in the dictator game has no effect.

[30] The coefficients for *Offer* and the interaction term are also jointly significant (F-test, $p < 0.001$).

Table 4: Regression Analysis: Investigation Decisions in Treatment *P-R*

	Investigate
Report	0.344***
	(0.000)
Offer	-0.00236
	(0.177)
Report x Offer	0.00780**
	(0.003)
Constant	0.292
	(0.481)
Observations	860
Adjusted R^2	0.242

Notes: The table reports the results from a linear probability model with the investigation decision as the dependent variable. p-values are reported in parentheses. Standard errors are clustered at the subject-role level, where *, **, and *** indicate statistical significance at the 5%, 1%, and .1% level, respectively. Further controls included are: age, gender, proxies for (i) risk aversion, (ii) cognitive reflection, (iii) attitude towards revealing misbehavior, (iv) dutifulness, and (v) a dummy for a major or minor in a field related to economics or business. The coefficients of these controls are all insignificant, and hence are not reported.

by around 20% of subjects) the likelihood of an investigation is 27 percentage points larger compared to a prosecutor who keeps everything to himself (which corresponds to $\alpha = 0$).[31]

Employer Misbehavior According to *Prediction M*, there should be no treatment effect on misbehavior for employers with L-employees (which is supported by the data), while, for employers with H-employees, misbehavior should be lower in treatment *P-R* than in *NoP* (which is not borne out in the data). We find that, similar to above, the observed relative frequencies of misbehavior across treatments and employee types (see Figure 4(b)) might be rationalized given the assumption that employers correctly anticipate the *actual* payoff consequences of their misbehavior decision. To illustrate, in a first step we determine the difference of the employer's average payoff when choosing $M = 1$ and $M = 0$, respectively, from the experimental data. We

[31] In *P-R*, the condition for existence of the informative equilibrium (on which the prediction that every report triggers an investigation is based) is more likely to be satisfied when the cost of undetected misbehavior as incurred by the prosecutor is sufficiently large (for details see Lemma 8 in Appendix A). Moreover, as discussed in footnote 27 above, any $\alpha > 0$ can simply be interpreted as an increase in this cost, so that the informative equilibrium is more (less) likely to exist when α is high (low). It can be shown that there always exists a babbling equilibrium in which the L-employee (H-employee) always (never) sends a report irrespective of actual misbehavior, and the prosecutor never investigates. However, in treatment *P-R* reports do trigger a substantial number of investigations (the fraction is 0.65, see Figure 4(a)). This suggests that, in the experiment, prosecutors are indeed heterogenous with respect to their willingness to investigate.

do this separately for each treatment and for each productivity type of the employee with whom the employer might be matched. For treatment *NoP*, these payoff differences are 4.32 when the employer is matched with an L-employee, and 7.37 when the employer is matched with an H-employee. Proceeding analogously for treatment *P-R*, we get 7.66 and 13.18. Note that the ranking of these four payoff differences (4.32, 7.37, 7.66, and 13.18) is the same as the ranking of the corresponding misbehavior frequencies observed in the experiment (0.38, 0.39, 0.42, and 0.56) and as reported in Figure 4(b). Hence, large (small) payoff differences correspond to high (low) levels of misbehavior. While the monetary payoff differences are all positive, an employer will prefer not to misbehave when his (moral) aversion towards misbehavior is sufficiently large. This is more likely to occur the smaller the monetary payoff is in the first place.[32]

Non-Meritorious Claims As argued above, in treatment *P-R* the higher than predicted number of non-meritorious claims can rationalize the decisions not to investigate and, in turn, also the decisions to misbehave. That is, prosecutors and employers seem to understand that in treatment *P-R* (where protection is obtained upon reporting) non-meritorious claims are an issue which they (directly or indirectly) seem to take into account.

We now study in more detail potential drivers for non-meritorious claims, in particular by H-employees, by looking at the characteristics of the subjects who lodge them. In total, there are 44 distinct subjects in treatment *P-R* who played the role of an H-employee and whose employer did not misbehave. Out of these 44 subjects, 16 behaved exactly in line with *Prediction R(iv)*, i.e., they never sent a non-meritorious claim. This is also the modal behavior. However, there is also a substantial fraction of 10 subjects who always sent non-meritorious claims. It turns out that, on average, these subjects exhibit a degree of risk aversion (which, recall, we elicited in the post-experimental questionnaire) that is 0.5 standard deviations higher compared to those 16 subjects who never report. While, in the experiment, the frequency of dismissal of non-reporting H-employees is negligible (see Figure 2), these risk-averse subjects might nevertheless prefer to insure themselves against this risk.[33] This is straightforward to achieve in treatment *P-R*. Below, we will contrast this with treatments *P-RI* and *P-RIM* where

[32] An (unreported) regression akin to the one of Table 4 reveals that the propensity to misbehave is negatively related to employers' risk aversion (which is line with a similar finding by Minor, 2015) and to the intensity of social preferences (again proxied by the amount offered in the dictator game), where $p = 0.013$ and $p = 0.067$, respectively.

[33] As discussed at the end of Section 5.1, there are no period effects on the frequency of non-meritorious claims by H-employees. Hence, it is not the case that H-employees (erroneously) file such claims in early periods, while, after experiencing that they are not dismissed when remaining silent, they refrain from reporting in later periods.

a report no longer suffices to obtain protection.

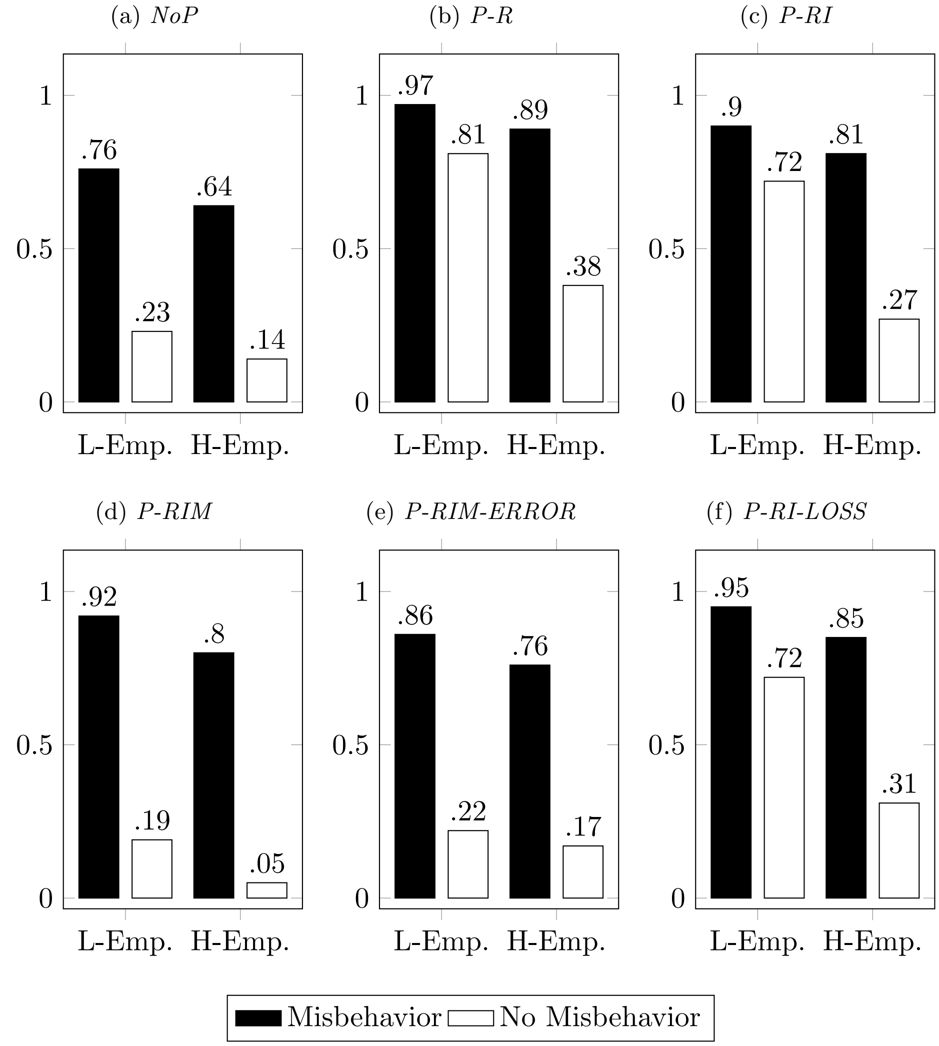
5.3 Testing the Robustness of Treatment *P-R*

The results from treatment *P-R* suggest that, when the requirements for protection are relatively low, non-meritorious claims might indeed be problematic: They seem to dilute the responsiveness of prosecutors to reports, as reports are no longer good indicators for underlying misbehavior. In turn, this seems to reduce the deterrence effect of the whistleblower protection scheme. Of course, at the present stage, it would be premature to derive sound policy conclusions from the admittedly stylized treatment *P-R*. For example, it is assumed that (i) a mere (yet ex ante reasonable) report suffices to obtain protection (independent of whether or not an investigation is actually triggered) and that (ii) lodging a non-meritorious claim is morally cheap for the employee, as it does not impose any additional cost on the employer. In this section, we consider two further treatments, which address these issues in turn (see Table 1 in Section 3): First, in treatment *P-RI* a whistleblower obtains protection if and only if his report also triggers an investigation by the prosecutor. Second, in treatment *P-RI-LOSS* any report that triggers an investigation (whether truthful or not) leads to a reputation loss for the employer. In what follows, we focus on the reporting, investigation, and misbehavior decisions. As for dismissals, the results remain strongly in line with *Prediction D*, and hence are not reported here.[34]

Treatment *P-RI* The only difference between treatments *P-R* and *P-RI* is that in the latter the employee only obtains protection when his report also triggers an investigation. As discussed in Section 4, the theoretical predictions for both of these treatments coincide. In fact, this is also borne out in the experiment. The results for treatment *P-RI* are illustrated in Figures 6 and 7 where, for the sake of comparability, we repeat the results for treatments *NoP* and *P-R*. It turns out that there are no statistically significant differences compared to treatment *P-R* with respect to either reporting or misbehavior. In particular, the number of non-meritorious claims does not drop significantly compared to *P-R*. That is, none of the pair-wise tests (MWU) for differences in reporting behavior between treatment *P-R* $(0.97, 0.81, 0.89, 0.38)$ and *P-RI* $(0.9, 0.72, 0.81, 0.27)$ is statistically significant (see Figure 6(b) and (c)). The tests for treatment differences with respect to misbehavior and investigations (see Figure 7) are performed

[34] For example, conditional on dismissal being feasible, the fraction of dismissed L-employees (H-employees) is 0.93 (0.00) in treatment *P-RI*.

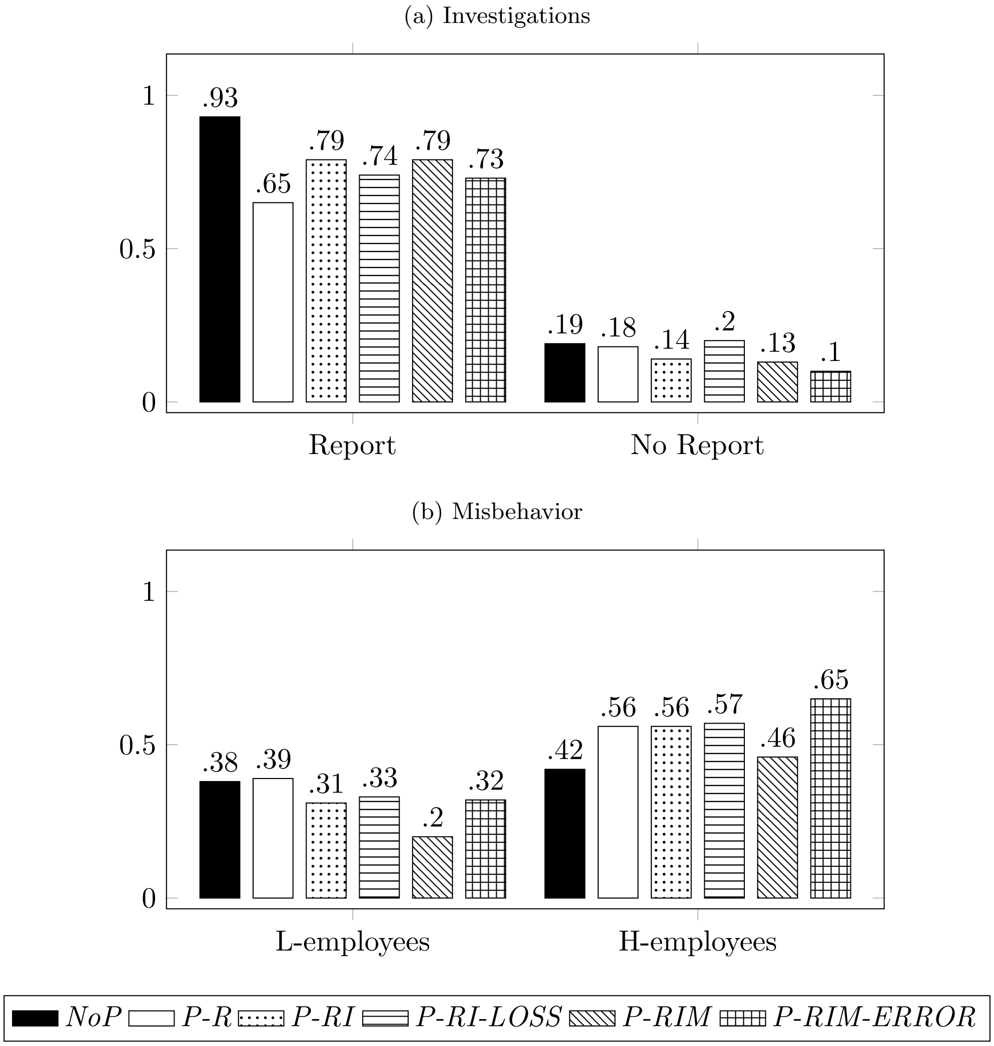
Figure 6: Varying the Requirements for Protection: Fraction of Employees Sending a Report



analogously. Here, the only significant difference occurs with respect to the frequency of investigations conditional on a report, which is higher in treatment *P-RI* (0.79 versus 0.65, $p = 0.02$, MWU).

Treatment *P-RI-LOSS* Recent findings from the experimental literature on lying (see, e.g., Gneezy, 2005; Gneezy, Rockenbach, and Serra-Garcia, 2013; Fischbacher and Föllmi-Heusi, 2013) suggest that many individuals are subject to lying aversion. Moreover, as shown in Gneezy (2005), this aversion seems to be the stronger the bigger the harm imposed on others through a lie. It is therefore interesting to see whether the non-meritorious claims in treatments

Figure 7: Varying the Requirements for Protection: Fraction of Investigations and Misbehavior



(a) Investigations

(b) Misbehavior

P-R and *P-RI* are (partially) driven by the fact that, apart from the feature that a protected whistleblower cannot be dismissed, filing a non-meritorious claim does not impose any further cost on the employer. In practice, such an additional cost might, for example, come in the form of a reputation loss triggered by an investigation. Hence, as a robustness check, we ran treatment *P-RI-LOSS*, which differs from *P-RI* only by the fact that the employer's payoff is reduced by 10 points whenever an investigation occurs. We find, however, that this does not affect behavior. In particular, all pair-wise tests for treatment differences between *P-RI-LOSS* and *P-RI* (with respect to reporting, investigations, and misbehavior) are not significant (for an illustration, see Figures 6 and 7).

In summary, in all treatments considered so far where whistleblower protection is available, there is a sizeable number of non-meritorious claims. Moreover, while protecting honest whistleblowers, the predicted improvement in deterrence does not materialize in these treatments. To investigate in more detail the interplay of non-meritorious claims and deterrence in the presence of whistleblower protection, we now consider a further benchmark treatment *P-RIM*, where protection is available, but where all incentives for non-meritorious claims are removed.

5.4 Disincentivizing Non-Meritorious Claims

Treatment *P-RIM* To obtain protection in the benchmark treatment *P-RIM*, in addition to a report and an investigation (as in *P-RI*), actual misbehavior is also required. As stated in *Prediction P-RIM*(i) and (ii) above, relative to *P-R*, this change should not affect the truthful reporting of misbehavior, but the incentives for non-meritorious claims are eliminated. Indeed, this prediction is strongly supported by the experimental data (see Figure 6(d)): Note first that the truthful reporting of misbehavior (black bars) remains at high levels and there is no statistically significant difference to either treatment *P-R* or *P-RI* (again using pair-wise comparisons). In fact, in all treatments with whistleblower protection, the willingness to report misbehavior is significantly higher (at the 1% or 5% level, MWU tests) compared to *NoP*.

In *P-RIM*, non-meritorious claims (white bars) indeed go down strongly for both productivity types, and they are significantly lower than in any other treatment with whistleblower protection. For example, compared to *P-RI*, they are virtually fully eliminated for H-employees (a drop from 27% to 5%), and, for L-employees, we also observe a substantial decrease of more than 50 percentage points (both effects with $p < 0.001$, MWU). The fractions of non-meritorious claims are also lower in treatment *P-RIM* compared to *NoP*, but these differences (0.19 versus 0.23, and 0.05 versus 0.14) are not statistically significant (MWU).

Furthermore, as can be seen in Figure 7(a), in treatment *P-RIM* the frequency of investigations upon receiving a report is significantly higher compared to *P-R* ($p < 0.01$, MWU) This finding is in line with the above reasoning: the low number of non-meritorious claims in *P-RIM* seems to lead to a higher responsiveness of prosecutors to reports. However, in all treatments with whistleblower protection, the frequency of investigations conditional on receiving a report is significantly lower compared to *NoP* (in all cases, $p < 0.05$, MWU). In contrast, when reporting does not occur, we find no significant difference in any pair-wise comparison.

Together, this suggests that prosecutors seem to have more doubts about the truthfulness of reports when a whistleblower protection scheme is in place.

Consider next the frequency of employer misbehavior in *P-RIM* (see *Prediction R-RIM3* (iii) and Table 3). As displayed in Figure 7(b), for employers with L-employees, the frequency of misbehavior in *P-RIM* (0.2) is significantly lower than in *P-R* (0.39; $p < 0.01$, MWU), which is in line with the prediction. However, the difference to *NoP* (0.38) is not significant ($p = 0.16$, MWU). For employers with H-employees, as predicted there is no statistically significant treatment difference between *P-RIM* and *P-R*. As discussed above, between *P-R* and *NoP* there is no treatment difference for employers matched with H-employees. It is therefore not surprising that the same holds true for the comparison of *P-RIM* and *NoP*.

To summarize, treatment *P-RIM* is effective in bringing down non-meritorious claims without decreasing truthful reporting, and it also fares well with respect to deterrence. It serves as a benchmark to analyze how non-meritorious claims and whistleblower protection affect prosecutor behavior (and hence, deterrence). Treatment *P-RIM* is not meant as a policy recommendation, because it abstracts from a number of important real-world aspects. For example, in treatment *P-RIM* the merit of a claim is revealed immediately in the course of an investigation. In practice, however, in constituencies where protection is only granted after the presence of misbehavior has been established in court, this often leads to painfully long waiting times for whistleblowers.[35] Moreover, even if there was no such time lag, whenever the court finding misbehavior is a necessary condition for protection, whistleblowers will worry about investigation errors, as protection is not granted if their case is erroneously rejected. This issue is addressed in a further treatment.

Treatment *P-RIM-ERROR* In all treatments considered so far, an investigation perfectly revealed whether or not there was misbehavior. As a robustness check, this assumption is relaxed in treatment *P-RIM-ERROR*. In particular, this treatment modifies *P-RIM* by assuming that investigations are prone to type-1 error, i.e., an investigation detects misbehavior only with probability 0.7. Hence, even a truthful report no longer necessarily ensures protection, while exposing the employee as a whistleblower. As can be seen in Figure 6, in treatment *P-RIM-ERROR* there are indeed fewer truthful reports compared to *P-RIM*, but these differences are

[35] For example, this is highlighted by the *Heinisch v. Germany* case, where several German courts had refused to reverse the dismissal of a whistleblower (a geriatric nurse who had (correctly) reported misbehavior by her employer) before protection was eventually affirmed by the European Court of Human Rights (see for example the discussion in Thüsing and Forst, 2016, pp. 12).

not statistically significant. Moreover, as shown in Figure 7(b), compared to treatment *P-RIM*, misbehavior is higher in *P-RIM-ERROR* for employers matched with either L- or H-employees ($p = 0.058$ and $p = 0.045$, respectively, MWU).

6 Conclusion

In this paper, we have studied employee whistleblowing as an instrument to fight corporate fraud. To this end, we have considered, experimentally and theoretically, a setting where employees (as potential whistleblowers) interact with employers (as potential wrong-doers) and prosecutors (who may investigate the allegations of whistleblowers against their employers).

Our main goal was to study the effects of whistleblower protection on reporting behavior (both truthful and non-meritorious) and deterrence. To this end, we have analyzed a treatment *P-R* which is meant to capture a stylized version of current whistleblower laws, where these laws also serve as models for recommendations by the OECD and the G20 group. We have compared this scheme with two benchmark treatments, one where protection is not available (*NoP*), and one where protection is conditional on whether the whistleblower's claim turns out to be true in the course of an investigation (*P-RIM*).

We find that whistleblower protection indeed has the intended effect of enhancing the truthful reporting of existing misbehavior. We also investigate the concern of practitioners and legal scholars that non-meritorious claims may arise as an unintended side effect when a whistleblower protection policy provides incentives to lodge them. Our experimental results are consistent with this concern as, relative to all of our treatments, the number of non-meritorious claims is highest in treatment *P-R*. We also find that in all treatments with whistleblower protection (and hence, even in *P-RIM*), compared to *NoP* prosecutors investigate less often when receiving a report. This effect is most pronounced in treatment *P-R* where the informativeness of reports about underlying misbehavior is limited. In turn, this seems to dampen deterrence. As a result, despite the higher number of truthful reports, the predicted reduction in misbehavior in *P-R* does not materialize. This effect is ameliorated in our benchmark treatment *P-RIM* where the incentives to file non-meritorious claims are eliminated.

In summary, employee whistleblowers play an important role in the fight against corporate fraud. In addition to shielding whistleblowers from retaliation, whistleblower protection laws aim at uncovering existing fraud ex post and deterring potential fraud ex ante. In this paper, we find supportive evidence with respect to the first aim. However, as for the second aim, our results suggest that the issue of non-meritorious claims as well as potential indirect effects on deterrence should be taken seriously in discussions on the design of whistleblower protection laws.

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Appendix (For Online Publication)

A Theory

This Appendix is structured as follows: In Section A.1, the model is presented, and in Section A.2, we derive the equilibrium outcome for each treatment. We focus on pure-strategy Perfect Bayesian Equilibria that are *informative equilibria* in the sense that the prosecutor triggers an investigation if and only if the employee sends a report. Hence, we do not consider babbling equilibria throughout. The theoretical predictions of Section 4 follow immediately from Propositions 1 - 4. The comparisons of the fractions of employers who misbehave (as stated in Table 3) are derived at the end of Section A.2.

A.1 Model

The Game Played We consider a game played by three players, an employer, an employee, and a prosecutor (see also Figure 1 in the main text).[36] The employer (she) is matched with an employee of type θ whose productivity x_θ the employer appropriates. In addition, the employer decides whether or not to misbehave denoted by $M \in \{0, 1\}$ (where $M = 0$ indicates no misbehavior), which is observed by the employee, but not by the prosecutor.

The employee has productivity x_θ, $\theta = L, H$, which is either high ($\theta = H$: H-employee) or low ($\theta = L$: L-employee, where $x_H > x_L$). The employee's productivity is known to the employer but not to the prosecutor who only knows that there is a share $h \in (0, 1)$ of H-employees in the population. The employee's only choice is whether or not to send a report $R \in \{0, 1\}$ to the prosecutor indicating that the employer engaged in misbehavior, where $R = 1$ indicates that the employee sends a report. As a tie-breaking rule, we assume that employees refrain from reporting when being indifferent between reporting and not reporting.[37] The prosecutor always observes whether or not a report is sent. In treatments *NoP* and *P-R*, this is also observed by the employer. In treatments *P-RI* and *P-RIM*, the employer learns the reporting decision in the course of an investigation (see also the discussion in Section 3 above).

After the employee's reporting decision, the prosecutor decides on initiating an investigation, $I \in \{0, 1\}$, where $I = 1$ indicates an investigation. Upon investigating the prosecutor learns

[36] As discussed in Section 5.2, in the experiment we have added a "third party", which is a purely passive player without any decisions to take. In the experiment, it is only included to make it more salient that misbehavior causes harm to others.

[37] Our results would also hold in a model where employees face an arbitrarily small reporting cost.

whether or not the employer indeed has misbehaved. Whether or not an investigation is initiated and whether or not the employer is found to be guilty is publicly observable.

Finally, before production eventually takes place, the employer decides whether or not to dismiss the employee, $D \in \{0, 1\}$, where $D = 1$ indicates a dismissal. A dismissed employee is replaced by an outsider of some intermediate productivity $\overline{x}$, with $x_L < \overline{x} < x_H$. In this case, the employer appropriates the outsider's productivity.

Treatments We capture the following four regimes, which correspond to the four main treatments in the experiment (see Table 1 in the main text): In treatment *NoP*, the employer is free to dismiss the employee. In treatment *P-R*, a dismissal is prohibited if and only if $R = 1$. In treatment *P-RI*, a dismissal is prohibited if and only if $R = I = 1$. Finally, in treatment *P-RIM*, a dismissal is prohibited if and only if $R = I = M = 1$.

Payoffs All payoffs (monetary and non-monetary) are summarized in Table 5. First, the payoff of the employer depends on whether or not she misbehaves, whether or not there is an investigation, and whether or not she employs a whistle-blower. The employer's potential net gain y from misbehavior consists of a monetary payoff z minus some disutility from misbehavior ζ (which might reflect moral reservations of the employer). We assume that ζ is randomly distributed (and the realization is private information of the employer), and hence this is also the case for y. In particular, we assume that y is distributed according to $H(\cdot)$, with full support, and mean $\overline{y}$. If the prosecutor investigates and there is misbehavior, the employer faces an (exogenously given) fine $f > 0$. The employer receives the employee's or the outside replacement's productivity (i.e., x_L, x_H, or $\overline{x}$) and pays a fixed wage ω. Last, but not least, the employer dislikes employing a whistle-blower, and the respective disutility is denoted by $\tau > 0$. It is drawn from a distribution $G(.)$, and it is the employer's private information. The employer forms a belief $\beta \in [0, 1]$ that her employee has sent a report.

Second, the employee gets a fixed wage ω if he is not dismissed by the employer, and zero otherwise. In addition, misbehavior that remains undetected by the prosecutor imposes a disutility $\delta > 0$ on the employee, which could reflect a preference for conscience cleaning as discussed in the main text, and which is the employee's private information. From the viewpoint of the other players, δ is drawn from a distribution $F(\delta)$. We assume $F(\omega) < 1$ which ensures that there exist values of δ for which the respective disutility outweighs the

Table 5: Payoffs

(a) *NoP*, *P-R*, *P-RI*, *P-RIM*: Payoffs When There is No Protection

Misbehavior	Investigation	Dismissal	Employee	Prosecutor	Employer
0	0	0	ω	0	$(x_i - \omega) - \beta \cdot \tau$
0	0	1	0	0	$(\overline{x} - \omega)$
0	1	0	ω	$-K_1$	$(x_i - \omega) - \beta \cdot \tau$
0	1	1	0	$-K_1$	$(\overline{x} - \omega)$
1	1	1	0	$-K_1 - K_2$	$(\overline{x} - \omega) + y - f$
1	1	0	ω	$-K_1 - K_2$	$(x_i - \omega) + y - f - \beta \cdot \tau$
1	0	1	$-\delta$	$-K_2 - K_3$	$(\overline{x} - \omega) + y$
1	0	0	$\omega - \delta$	$-K_2 - K_3$	$(x_i - \omega) + y - \beta \cdot \tau$

(b) *P-R*: Payoffs When There is Protection

Misbehavior	Investigation	Dismissal	Employee	Prosecutor	Employer
0	0	n/a	ω	0	$(x_i - \omega) - \beta \cdot \tau$
0	1	n/a	ω	$-K_1$	$(x_i - \omega) - \beta \cdot \tau$
1	1	n/a	ω	$-K_1 - K_2$	$(x_i - \omega) + y - f - \beta \cdot \tau$
1	0	n/a	$\omega - \delta$	$-K_2 - K_3$	$(x_i - \omega) + y - \beta \cdot \tau$

(c) *P-RI*: Payoffs When There is Protection

Misbehavior	Investigation	Dismissal	Employee	Prosecutor	Employer
0	1	n/a	ω	$-K_1$	$(x_i - \omega) - \beta \cdot \tau$
1	1	n/a	ω	$-K_1 - K_2$	$(x_i - \omega) + y - f - \beta \cdot \tau$

(d) *P-RIM*: Payoffs When There is Protection

Misbehavior	Investigation	Dismissal	Employee	Prosecutor	Employer
1	1	n/a	ω	$-K_1 - K_2$	$(x_i - \omega) + y - f - \beta \cdot \tau$

Notes: The table depicts the players' payoffs as a function of the employer's misbehavior and dismissal decisions and the prosecutor's investigation decision. As the employee's reporting decision (R) has no *direct* effect on the payoff of neither player, we omit a separate column for the sake of readability. The payoffs in Panel (a) apply whenever the employee is *not* shielded from dismissal, and hence (i) always in treatment *NoP*, (ii) in treatment *P-R* if $R = 0$ holds, (iii) in treatment *P-RI* either if $R = 0$ holds or if both $R = 1$ and $I = 0$ hold, and (iv) in treatment *P-RIM* if $R = I = M = 1$ does not hold. The payoffs in Panel (b) apply in treatment *P-R* if the employee is protected from dismissal (i.e., if $R = 1$). The payoffs in Panel (c) apply in treatment *P-RI* if the employee is protected from dismissal (i.e., if $R = I = 1$). The payoffs in Panel (c) apply in treatment *P-RIM* if the employee is protected from dismissal (i.e., if $R = I = M = 1$).

(H-employee's) fear of dismissal. Moreover, in case of undetected misbehavior, δ accrues to the employee independently of whether or not he is dismissed.

Finally, the payoff of the prosecutor depends on whether there is misbehavior and whether an investigation takes place. When there is no misbehavior, the prosecutor's payoff is $-K_1$ (0) if he investigates (does not investigate). Hence, $K_1 > 0$ can be considered as investigation costs. When there is misbehavior, his payoff is $-K_1 - K_2$ if he investigates and $-K_2 - K_3$ if he does not investigate, where we assume $K_3 > K_1$.[38] Hence, when there is (no) misbehavior, the prosecutor's payoff is higher if he conducts (does not conduct) an investigation.

A.2 Equilibrium Analysis

A.2.1 Preliminaries

When deriving our predictions, we focus on Perfect Bayesian Equilibria (PBE) in pure strategies (i.e., all players choose best responses given their beliefs and given the strategies of the other players, where beliefs are formed in accordance with Bayes' Rule whenever possible), that are informative in the sense that the prosecutor's investigation decision varies with the employee's report:

Definition 1. *A Perfect Bayesian Equilibrium is called* ***informative equilibrium*** *if the prosecutor's equilibrium strategy is given by $I(R) = R$ for all $R \in \{0, 1\}$.*

In the following, we provide conditions for the existence of an informative equilibrium under each treatment, and we assume that it is always played given that it exists. To derive our predictions, we proceed as follows: First, under the assumption that the prosecutor plays his equilibrium strategy $I^*(R) = R$, we characterize optimal behavior with respect to misbehavior, reporting, and dismissal, denoted by $M^*(\cdot)$, $R^*(\cdot)$, and $D^*(\cdot)$, respectively. Note that in informative equilibrium, the employer's belief that the employee has sent a report satisfies $\beta^* \in \{0, 1\}$. Second, we derive conditions under which $I^*(R) = R$ is in fact optimal for the prosecutor (i.e., for each treatment, we provide conditions that ensure existence of informative equilibrium). Third, this leads to the equilibrium outcome, which depends on the realizations of the random variables δ, τ, and y (where these realizations are unknown to the experimenter). Taking into account the prior distributions of these random variables, the predictions of Section 4 are then based on the *expected equilibrium outcomes* (see Propositions 1 - 4).

[38] The experimental payoffs of the prosecutor as reported in the main text are obtained when setting $K_2 = -10$ and $K_3 = 30$.

A.2.2 Treatment *NoP*: Equilibrium Outcome

In the following, we assume that the report is observed by both the prosecutor and the employer (as in the experiment), and we solve the game backwards, starting with the employer's dismissal decision at date 4 (see Figure 1 in the main text). In doing so, we write $D^*(\cdot)$ as a function of I rather than R, because $I = R$ for all $R \in \{0, 1\}$ in the informative equilibrium:

Lemma 1 (***NoP*: Dismissal**). *In the informative equilibrium, the following holds: The L-employee is always dismissed. The H-employee is dismissed only if both a report occurs and the employer's disutility from retaining a known whistle-blower is sufficiently large. That is,*

$$D^*(x_\theta, I, \tau) = \begin{cases} 1 & \textit{if } x_\theta = x_L, \\ 1 & \textit{if } x_\theta = x_H, \textit{ and } R = 1 \textit{ and } \tau > \overline{\tau}, \textit{ and} \\ 0 & \textit{else.} \end{cases}$$

where $\overline{\tau} := x_H - \overline{x}$.

Proof. First, when $R = I = 0$, the employer gets x_θ if retaining the employee, and $\overline{x}$ if dismissing him. Since $x_L < \overline{x} < x_H$, in this case, the L-employee (H-employee) is dismissed (retained). Second, when $R = I = 1$, the employer gets $x_\theta - \tau - M \cdot f$ if retaining the employee and $\overline{x} - M \cdot f$ if dismissing him. Hence, the L-employee is again dismissed, while the H-employee is dismissed only if τ is sufficiently large, i.e., for $\tau > \overline{\tau} := x_H - \overline{x}$. □

In the informative equilibrium, the employee's optimal reporting behavior at date 2 can be characterized as follows:

Lemma 2 (***NoP*: Reporting**). *In the informative equilibrium, the following holds: The L-employee reports if and only if the employer misbehaves. The H-employee reports if and only if there is both misbehavior and his disutility δ from undetected misbehavior is sufficiently large. That is,*

$$R^*(x_\theta, M, \delta) = \begin{cases} 1 & \textit{if } M = 1 \textit{ and } x_\theta = x_L, \\ 1 & \textit{if } M = 1, \ x_\theta = x_H \textit{ and } \delta > \overline{\delta}, \textit{ and} \\ 0 & \textit{else,} \end{cases}$$

where $\overline{\delta} := (1 - G(\overline{\tau})) \cdot \omega$.

Proof. The L-employee is always dismissed independent of his reporting decision (see Lemma 1). Hence, the L-employee's payoff is $-\delta \cdot M$ if he does not report and 0 if he reports. Again from Lemma 1, when not reporting, the H-employee is not dismissed, and hence gets $\omega - \delta \cdot M$. Upon reporting, he is retained with probability $G(\overline{\tau})$, and hence his payoff is $G(\overline{\tau}) \cdot \omega$. □

Next, consider the employer's misbehavior decision at date 1:

Lemma 3 (*NoP*: Misbehavior). *In the informative equilibrium, the employer's misbehavior decision is given by:*

$$M^*(x_\theta, y, \tau) = \begin{cases} 1 & \text{if } x_\theta = x_L \text{ and } y > f, \\ 1 & \text{if } x_\theta = x_H \text{ and } \tau < \overline{\tau} \text{ and } y > y_1, \\ 1 & \text{if } x_\theta = x_H \text{ and } \tau > \overline{\tau} \text{ and } y > y_2, \text{ and} \\ 0 & \text{else,} \end{cases}$$

where $y_1 := (1 - F(\overline{\delta}))(f + \tau)$ *and* $y_2 := (1 - F(\overline{\delta}))(x_H - \overline{x} + f)$.

Proof. First, suppose the employer faces an L-employee. In this case, Lemmas 1 and 2 imply that the employer's payoff is $\overline{x}+y-\omega-f$ if she misbehaves, and $\overline{x}-\omega$ if she does not misbehave. Hence, misbehavior is optimal if $y > f$. Second, consider the situation where the employer is facing an H-employee. When the employer chooses $M = 0$, then Lemmas 1 and 2 imply that her payoff is $x_H - \omega$. When choosing $M = 1$ instead, then the employer's payoff also depends on the subsequent dismissal decision, and hence it also depends on τ. Case (i): $\tau < \overline{\tau}$ (no subsequent dismissal). From Lemma 2, it follows that the employer's expected payoff when choosing $M = 1$ is $x_H + y - \omega - \left(1 - F(\overline{\delta})\right)(f + \tau)$. In this case, the employer optimally misbehaves if $y > y_1 := (1 - F(\overline{\delta}))(f + \tau)$. Case (ii): $\tau > \overline{\tau}$ (subsequent dismissal). Here, the expected payoff from choosing $M = 1$ is $y - \omega + F(\overline{\delta})x_H + \left(1 - F(\overline{\delta})\right)(\overline{x} - f)$. In this case, the employer optimally misbehaves if $y > y_2 := (1 - F(\overline{\delta}))(x_H - \overline{x} + f)$. □

Finally, consider the prosecutor's investigation decision, and recall that the prosecutor does not observe the employee's productivity. Define the prosecutor's equilibrium belief with respect to misbehavior conditional on R as $B_0 := \Pr\{M = 1 \mid R = 0\}$ and $B_1 := \Pr\{M = 1 \mid R = 1\}$. Given Lemmas 1 - 3, in equilibrium this leads to $B_1 = 1$ (as there are no non-meritorious claims) and $B_0 < 1$ (as misbehavior is not always reported). In particular,

$$B_0 = \frac{h \cdot p_H^0 \cdot F\left(\overline{\delta}\right)}{h \cdot \left(p_H^0 \cdot F\left(\overline{\delta}\right) + 1 - p_H^0\right) + (1-h) \cdot H(f)}, \tag{1}$$

where

$$p_H^0 := G\left(\overline{\tau}\right) E_\tau\left[1 - H\left(y_1\right) \mid \tau < \overline{\tau}\right] + \left(1 - G\left(\overline{\tau}\right)\right)\left(1 - H\left(y_2\right)\right) \tag{2}$$

and where in (2) expectations are formed over τ (as y_1 is a function of τ). Intuitively, in (1) the numerator states the probability of unreported misbehavior (recall that this occurs with

H-employees only), and the denominator states the overall probability that no report is sent.

Lemma 4 (***NoP*: Investigation**). *Given the behavior of the other players as described in Lemmas 1 - 3, if $B_0 \leq \frac{K_1}{K_3}$ holds, then choosing $I^*(R) = R$ is optimal for the prosecutor.*

Proof. First, if $R = 0$, upon choosing $I = 0$, the prosecutor's expected payoff is $-B_0 \cdot (K_3 + K_2)$. When choosing $I = 1$ instead, he gets $-K_1 - B_0 \cdot K_2$. Hence, given $R = 0$, $I = 0$ is optimal iff $B_0 \leq \frac{K_1}{K_3}$. Second, if $R = 1$, when choosing $I = 0$, the prosecutor's expected payoff is $-B_1 \cdot (K_3 + K_2)$. When choosing $I = 1$ instead, he gets $-K_1 - B_1 \cdot K_2$. Hence, given $R = 1$, $I = 1$ is optimal iff $B_1 > \frac{K_1}{K_3}$. Since in equilibrium $B_1 = 1$, this is always satisfied (recall that $K_1 < K_3$ by assumption). □

Lemmas 1 to 4 characterize behavior in informative equilibrium. As this also depends on the random variables τ, δ and y (which are unobservable to the experimenter), we now state the *expected* equilibrium outcome given the prior distributions of these random variables. This expected equilibrium outcome is the basis for the predictions in Section 4:

Proposition 1 (***NoP*: Expected Equilibrium Outcome**). *The informative equilibrium in treatment* NoP *has the following expected equilibrium outcome: (i) L-employees always (never) report if there is (no) misbehavior. (ii) L-employees are always dismissed. (iii) Given misbehavior, the probability of observing a report by an H-employee is $E_\delta[R^*(x_H, 1, \delta)] = 1 - F(\overline{\delta})$, and, in the absence of misbehavior, H-employees never send a report. (iv) Given that an H-employee sends a report, the probability of observing his dismissal is $E_\tau[D^*(x_H, 1, \tau)] = 1 - G(\overline{\tau})$, while when sending no report, he is never dismissed. (v) The probability of observing misbehavior by the employer when matched with an L-employee is $m_L^{No} := E_{y,\tau}[M^*(x_L, y, \tau)] = 1 - H(f)$. (vi) The probability of observing misbehavior by the employer when matched with an H-employee is $m_H^{No} := E_{y,\tau}[M^*(x_H, y, \tau)] = p_H^0$ as defined in (2). (vii) When (not) receiving a report, prosecutors always (never) trigger an investigation.*

A.2.3 Equilibrium Outcome in Treatment *P-R*

Again, we assume that the report is observed by both the prosecutor and the employer (as in the experiment), and we solve the game backwards:

Lemma 5 (***P-R*: Dismissal**). *In the informative equilibrium, the following holds: The L-employee is dismissed whenever this is feasible (i.e., if $R = 0$). The H-employee is never* *dismissed. That is,*

$$D^*(x_\theta, I, \tau) = \begin{cases} 1 & \textit{if } x_\theta = x_L \textit{ and } R = 0, \textit{ and} \\ 0 & \textit{else.} \end{cases}$$

Proof. In treatment *P-R*, a dismissal is only feasible when $R = 0$. Analogously to Lemma 1, the L-employee is always dismissed (when feasible). Moreover, the employer might only want to dismiss the H-employee, if the latter sends a report (in which case a dismissal is, however, not feasible). □

In informative equilibrium, the employee's optimal reporting behavior at date 2 can be characterized as follows:

Lemma 6 (***P-R*****: Reporting**)**.** *In the informative equilibrium, the following holds: The L-employee always sends a report, irrespective of whether or not there is misbehavior. In contrast, the H-employee sends a report if and only if there is misbehavior. That is,*

$$R^*(x_\theta, M, \delta) = \begin{cases} 1 & \textit{if } x_\theta = x_L, \\ 1 & \textit{if } x_\theta = x_H \textit{ and } M = 1, \textit{ and} \\ 0 & \textit{else.} \end{cases}$$

Proof. From Lemma 5, the L-employee anticipates that he will be dismissed unless sending a report (thereby obtaining protection). For $M = 1$, his payoff upon choosing $R = 1$ is ω (since the report triggers an investigation), while he would get only $-\delta$ when choosing $R = 0$ instead. For $M = 0$, the L-employee still gets ω upon choosing $R = 1$, but would get zero upon choosing $R = 0$. Hence, always sending a report is optimal for the L-employee. An H-employee who observes $M = 1$ gets ω when choosing $R = 1$, and $\omega - \delta$ when choosing $R = 0$. If $M = 0$, he gets ω regardless of his reporting decision. Since we assume no reporting in case of indifference, the optimal response to $M = 0$ is $R = 0$. □

Next, consider the employer's misbehavior decision at date 1.

Lemma 7 (***P-R*****: Misbehavior**)**.** *In the informative equilibrium, the employer's misbehavior decision is given by:*

$$M^*(x_\theta, y, \tau) = \begin{cases} 1 & \textit{if } x_\theta = x_L \textit{ and } y > f, \\ 1 & \textit{if } x_\theta = x_H \textit{ and } y > f + \tau, \textit{ and} \\ 0 & \textit{else.} \end{cases}$$

Proof. Given Lemmas 5 and 6, when matched with an L-employee, the employer anticipates that the employee always reports, and hence always triggers an investigation. Therefore, when choosing $M = 1$, the employer gets $x_L - \omega + y - f - \tau$. Upon choosing $M = 0$, she gets $x_L - \omega - \tau$. By contrast, when matched with an H-employee, the employer anticipates that a report is sent if and only if $M = 1$ is chosen. Hence, upon choosing $M = 1$ she gets $x_H - \omega + y - f - \tau$, and $x_H - \omega$ upon choosing $M = 0$. □

Finally, consider the prosecutor's investigation decision. Given Lemmas 5 - 7, his equilibrium beliefs with respect to misbehavior conditional on R are given by $B_0 = 0$ (in equilibrium, any misbehavior is reported) and

$$B_1 = \frac{h \cdot p_H^1 + (1-h) \cdot (1 - H(f))}{h \cdot p_H^1 + (1-h)} \in (0,1)\,, \tag{3}$$

where

$$p_H^1 := E_\tau \left[1 - H\left(f + \tau\right)\right]. \tag{4}$$

Lemma 8 (***P-R*: Investigation**). *Given the behavior of the other players as described in Lemmas 5 - 7, if $\frac{K_1}{K_3} \leq B_1$ holds, then choosing $I^*(R) = R$ is optimal for the prosecutor.*

Proof. First, if $R = 0$, then, when choosing $I = 0$, the prosecutor's expected payoff is $-B_0 \cdot (K_3 + K_2) = 0$ due to $B_0 = 0$. When choosing $I = 1$ instead, the prosecutor gets $-K_1 - B_0 \cdot K_2 < 0$, which is strictly worse. Second, if $R = 1$, when choosing $I = 0$, the prosecutor's expected payoff is $-B_1 \cdot (K_3 + K_2)$. When choosing $I = 1$ instead, he gets $-K_1 - B_1 \cdot K_2$. Hence, given $R = 1$, $I = 1$ is optimal iff $\frac{K_1}{K_3} \leq B_1$. □

Note that the condition $\frac{K_1}{K_3} \leq B_1$ in Lemma 8 can be reformulated as follows (inserting for B_1): $\frac{K_1}{K_3} \leq \frac{1}{1+\frac{1}{1-H(f)}}$ Furthermore, note that $\frac{1}{1-H(f)}$ represents the fraction of the reporting frequency of L-employees (which is 1) and the frequency of misbehavior of employers matched with L-employees (which is $1 - H(f)$). This fraction is nothing else than the inverse of the measure of informativeness of the reports sent by L-employees: If it is 1, these reports are perfectly informative; but for higher values, they are less informative. If the percentage of non-meritorious claims among reports sent by L-employees converges to 100%, i.e., if the frequency of misbehavior of employers matched with L-employees converges to zero, the measure of informativeness converges to zero, too; its inverse converges to infinity, and thus, B_1 converges to zero. Hence, for $\frac{K_1}{K_3}$ bounded away from zero, the condition for existence of the informative equilibrium is violated for a sufficiently high percentage of non-meritorious claims among reports sent by L-employees. For now, we assume that the condition is not violated. We come back to the possibility of violation below.

Lemmas 5 - 8 characterize behavior in informative equilibrium. As this also depends on the random variables τ, δ and y (which are unobservable to the experimenter), we now state the *expected* equilibrium outcome given the prior distributions of these random variables. This expected equilibrium outcome is the basis for the predictions in Section 4:

Proposition 2 (*P-R*: Expected Equilibrium Outcome). *The informative equilibrium in treatment* P-R *has the following expected equilibrium outcome: (i) L-employees send a report regardless of whether or not there is misbehavior. (ii) L-employees are never dismissed. (iii) H-employees always (never) report if there is (no) misbehavior. (iv) H-employees are never dismissed. (v) The probability of observing misbehavior by the employer when matched with an L-employee is* $m_L^R := E_{y,\tau}[M^*(x_L, y, \tau)] = 1 - H(f)$*. (vi) The probability of observing misbehavior by the employer when matched with an H-employee is* $m_H^R := E_{y,\tau}[M^*(x_H, y, \tau)] = p_H^1$ *as defined in (4). (vii) When (not) receiving a report, prosecutors always (never) trigger an investigation.*

A.2.4 Equilibrium Outcome in Treatment *P-RI*

Note that the only difference between treatments *P-R* and *P-RI* is that in the latter, an investigation must be triggered if the employee is to obtain protection after sending a report. Since in an informative equilibrium we have $I = R$, reporting (no reporting) always results in (no) protection, as in treatment *P-R*. It follows that the respective equilibrium outcomes are the same in both treatments:

Proposition 3 (*P-RI*: Expected Equilibrium Outcome). *In treatments* P-RI *and* P-R*, the expected equilibrium outcomes coincide.*

A.2.5 Equilibrium Outcome in Treatment *P-RIM*

In treatment *P-RIM*, the reporting decision is not directly observed by the employer, but since $I = R$ holds in an informative equilibrium, the employer can perfectly infer the reporting decision from observing whether or not an investigation occurs. We solve the game backwards starting with the employer's equilibrium dismissal decision at date 4:

Lemma 9 (***P-RIM*****: Dismissal**)**.** *In the informative equilibrium, the following holds: The L-employee is always dismissed whenever this is feasible. The H-employee is dismissed if $I = 1$, $M = 0$, and τ sufficiently large. That is,*

$$D^*(x_\theta, I, \tau) = \begin{cases} 1 & \text{if } x_\theta = x_L \text{ holds and } R = I = M = 1 \text{ does not hold,} \\ 1 & \text{if } x_\theta = x_H,\ M = 0,\ I = 1, \text{ and } \tau > \overline{\tau}, \\ 0 & \text{else.} \end{cases}$$

where $\overline{\tau} = x_H - \overline{x}$ as defined in Lemma 1.

Proof. In treatment *P-RIM*, the employee is protected from dismissal when $R = I = M = 1$. Since $I = R$ in the informative equilibrium, dismissal is, hence, feasible if either $I = 0$ holds (irrespective of M) or if both $I = 1$ and $M = 0$. If $I = 0$, the employer always dismisses the L-employee and always retains the H-employee (because $x_L < \overline{x} < x_H$). If $I = 1$ and $M = 0$, the L-employee is dismissed (because $x_L - \tau < \overline{x}$), while the H-employee is dismissed if $x_H - \tau < \overline{x}$, i.e., for $\tau > \overline{\tau}$. □

In informative equilibrium, the employee's optimal reporting behavior at date 2 can be characterized as follows:

Lemma 10 (***P-RIM*****: Reporting**)**.** *In the informative equilibrium, both the L- and the H-employee send a report if and only if there is misbehavior. That is,*

$$R^*(x_\theta, M, \delta) = \begin{cases} 1 & \text{if } M = 1, \text{ and} \\ 0 & \text{else.} \end{cases}$$

Proof. The L-employee anticipates that he will be dismissed unless obtaining protection. For $M = 1$, his payoff upon choosing $R = 1$ is ω, while he would get only $-\delta$ when choosing $R = 0$. Hence, he reports. For $M = 0$, the L-employee gets zero in any case, and thus no reporting is a best response. To summarize, for the L-employee we have $R = M$ for all M. Next, consider the H-employee: For $M = 1$, when choosing $R = 1$, the H-employee gets ω and $\omega - \delta$ otherwise. Hence, he reports. If $M = 0$, when choosing $R = 1$, he is retained with probability $G(\overline{\tau})$ and hence gets $G\left(\overline{\tau}\right)\omega$. When choosing $R = 0$, he gets ω, which is strictly larger. To summarize, also for the H-employee, we have $R = M$ for all M. □

Next, consider the employer's misbehavior decision at date 1:

Lemma 11 (***P-RIM*: Misbehavior**). *In the informative equilibrium, the employer's misbehavior decision is given by:*

$$M^*(x_\theta, y, \tau) = \begin{cases} 1 & \textit{if } x_\theta = x_L \textit{ and } y > f + \tau - x_L + \overline{x}, \\ 1 & \textit{if } x_\theta = x_H \textit{ and } y > f + \tau, \textit{ and} \\ 0 & \textit{else.} \end{cases}$$

Proof. Given Lemmas 9 and 10, the employer anticipates that both employee types will report if and only if $M = 1$, which then leads to protection. When matched with an L-employee, when choosing $M = 1$ the employer gets $x_L - \omega + y - f - \tau$. When choosing $M = 0$, he gets $\overline{x} - \omega$. Hence, $M = 1$ is preferred if $y > f + \tau - x_L + \overline{x}$. When matched with an H-employee, when choosing $M = 1$ the employer get $x_H - \omega + y - f - \tau$. When choosing $M = 0$, he gets $x_H - \omega$. Hence, $M = 1$ is preferred if $y > f + \tau$. □

Finally, consider the investigation decision of the prosecutor. It follows from Lemma 10 that $B_0 = 0$ and $B_1 = 1$. Since $K_1 < K_3$, the condition $B_0 \leq \frac{K_1}{K_3} < B_1$ (see the proofs of Lemmas 4 and 8) is always satisfied.

Lemma 12 (***P-RIM*: Investigation**). *Given the behavior of the other players as described in Lemmas 9 - 11, choosing $I^*(R) = R$ is optimal for the prosecutor.*

Lemmas 9 - 12 characterize behavior in informative equilibrium. As this also depends on the random variables τ, δ and y (which are unobservable to the experimenter), we now state the *expected* equilibrium outcome given the prior distributions of these random variables. This expected equilibrium outcome is the basis for the predictions in Section 4:

Proposition 4 (***P-RIM***). *The informative equilibrium in treatment* P-RIM *has the following expected equilibrium outcome: (i) Employees of either productivity type send a report if and only if there is misbehavior. (ii) L-employees are always dismissed whenever this is feasible. (iii) H-employees are never dismissed. (iv) The probability of observing misbehavior by the employer when matched with an L-employee is $m_L^{RIM} := E_{y,\tau}[M^*(x_L, y, \tau)] = p_L^3$, where $p_L^3 = E_\tau[1 - H(f + \tau - x_L + \overline{x})]$. (v) The probability of observing misbehavior by the employer when matched with an H-employee is $m_H^{RIM} := E_{y,\tau}[M^*(x_H, y, \tau)] = p_H^1$ as defined in (4). (vi) When (not) receiving a report, prosecutors always (never) trigger an investigation.*

A.2.6 Comparing Employer Misbehavior

Propositions 1 - 4 directly lead to the predictions concerning investigations, dismissals, and reporting as presented in Section 4. The comparison of employer misbehavior across treatments and employee productivity types (see Table 3) requires some further elaboration: From Lemmas 3, 7, and 11, for a given productivity type of the employee, the employer misbehaves if y exceeds a certain threshold. First, when the employer is matched with an L-employee, Lemmas 3 and 7 imply that both in treatment *NoP* and *P-R*, the employer misbehaves if $y > f$, while Lemma 11 implies that in treatment *P-RIM* the employer misbehaves if $y > f + \tau - x_L + \overline{x}$, where $\tau - x_L + \overline{x} > 0$. Hence, $m_L^{No} = m_L^R > m_L^{RIM}$. Second, when the employer is matched with an H-employee, Lemmas 7 and 11 imply that both in treatment *P-R* and *P-RIM*, the employer misbehaves if $y > f + \tau$, and hence $m_H^R = m_H^{RIM}$. Moreover, the discussion of the threshold levels above immediately implies $m_L^R > m_H^R = m_H^{RIM} > m_L^{RIM}$. It remains to show that $m_H^{No} > m_H^R$ holds. From Lemma 7, the threshold for y that determines m_H^R is $f + \tau$. From Lemma 3, the threshold for y that determines m_H^{No} depends on τ: First, if $\tau < \overline{\tau}$, the threshold is $(1 - F(\overline{\delta}))(f + \tau) < (f + \tau)$. Second, if $\tau > \overline{\tau}$, the threshold is $(1 - F(\overline{\delta}))(x_H - \overline{x} + f) = (1 - F(\overline{\delta}))(f + \overline{\tau}) < (f + \tau)$ because $\overline{\tau} = x_H - \overline{x}$ and we are in the case $\tau > \overline{\tau}$.

B Instructions

Note: We report here a translation of the instructions (originally in German) for treatments *NoP* and *P-R*, where all changes in *P-R* are indicated in square brackets as follow: [In *P-R* only: ...]. The respective modifications for the other treatments were made accordingly and are available upon request.

Welcome to today's experiment!

You are taking part in a decision situation, where you can earn some money. How much you will earn depends on your decisions and on the decisions of the other participants that are allocated to you. Moreover, your earnings depend on the role that is randomly assigned to you. The experiment consists of **two parts**. You now receive the instructions for the first part. After having finished the first part, you will get the instructions for the second part. What happens in the first part of the experiment will not have any influence on the amount of money that you might earn in the second part of the experiment. And vice versa. After having completed both parts, you will also have to answer a short questionnaire.

Please note that from now on until the end of the experiment it is **not allowed to communicate!** If you have any questions, please raise your hand out of your cubicle. One of the experimenters will come to you. Throughout the experiment, it is forbidden to use mobile phones, smartphones, tablets, or alike. Participants intentionally violating the rules may be asked to leave the experiment and may not be paid. All decisions are made anonymously, i.e., none of the participants will learn about the identity of the others. The payment for both parts of the experiment will also be made anonymously at the end of the experiment.

Instructions for the first part of the experiment

Please notice that if subsequently we refer to the "experiment", this relates to the **first part** of the experiment.

1. What it is about - A short overview

This experiment is about making decisions in a **group of four people** that consists of an **employer**, an **employee**, a **third party**, and a **prosecutor**, where these decisions may affect the payoffs of all members of the group. All decisions are made by the employer, the employee, and the prosecutor; the affected person cannot make any decisions. The employer chooses between two alternatives, **CIRCLE** and **TRIANGLE**. A (fictitious) **law for the protection of the third party** says that TRIANGLE should not be chosen as it harms the third party. Nevertheless, if an employer chooses TRIANGLE, he goes **completely unpunished** and even earns a higher profit - **provided that the prosecutor does not initiate an investigation**. The employer's decision between the two alternatives can only be observed by the employee. **The employee - and only him - can (but does not have to) ask the prosecutor to initiate an investigation.** The prosecutor may initiate an investigation even if the employee has not asked him to do so. The employer learns whether an investigation is initiated or not. He also learns whether the employee asked the prosecutor to initiate an investigation or not. At the end of a given round (of which there will be several) **the employer decides on whether the employee is dismissed or not**. [In *P-R* only: If, however, the employee has asked the prosecutor to conduct an investigation, **a dismissal of the employee is not possible**. This applies regardless of whether the employer chose CIRCLE or TRIANGLE and regardless of whether the prosecutor initiated an investigation or not.] In the following, the experiment will be explained more in detail.

2. The assignment of roles

At the beginning of the experiment, the computer randomly assigns every participant a role either as employer, employee, third party or prosecutor. **Employers will stay employers throughout the whole experiment**. However, over the course of the experiment, prosecutors and employees will sometimes also take the role of third party; and third parties will sometimes take the role of either employee or prosecutor. **Prosecutors will never take the role of employer, and employees will never take the role of prosecutor.** The change of roles occurs randomly, and is consequently not affected by current or prior decisions. The change of roles only takes place between rounds. During a given round of the experiment, each member of the group remains in his or her role. In each round, the computer randomly matches the participants into groups of four consisting of an employer, an employee, a third party, and a prosecutor. The employee is also randomly assigned **a productivity level (high or low)**.

Both productivity levels are equally likely, and the productivity level is **independent across rounds**, i.e., the productivity level of an employee might change from round to round. In the following, the course of events in a given round will be described. The experiment consists of **30 rounds**.

3. The sequence of events in a given round

3.1. The sequence of events in a given round from the perspective of the employer

The employer **does not receive an initial endowment**; i.e., his earnings depend exclusively on his decisions and the decisions of the other group members. First, the employer learns whether the **productivity level of his employee is high or low**. A **high-productivity employee**, who does not get dismissed, will earn the employer **80 points** for the current round; a **low-productivity employee**, who does not get dismissed, is worth **30 points**. If the employer dismisses his employee at the end of the round [In *P-R* only: (which is only possible if the employee did **not** ask the prosecutor to conduct an investigation)], he will get a **new employee** whose productivity will earn him **70 points**. Each employee who is **not dismissed** (and also any new employee replacing a dismissed employee) **earns a wage of 40 points**. An employee who got dismissed does not earn a wage in the current round.

Before the employer decides on whether to dismiss the employee or not, he has to take another decision: He has to choose between two alternatives, **CIRCLE and TRIANGLE**. This decision is observed by the employee only.

<u>If CIRCLE is chosen</u>

If the employer chooses **CIRCLE, he will not receive any extra earnings**, and **he will not cause any financial loss for the third party**. In this case, his earnings in the current round only result from the productivity of the employee (80, 30, or 70 points, depending on the productivity of the initial employee and depending on whether the initial employee is replaced by a new one) minus the employee's salary (40 points).

- An **employer with a high-productivity employee**, who chooses **CIRCLE**, gets 80 - 40 = **40 points** if he keeps the employee. If the employee gets replaced by a new one, the employer receives 70 - 40 = **30 points**.

- An **employer with a low-productivity employee** who chooses option **CIRCLE** gets 30 - 40 = **-10 points** if he keeps the employee. If the initial employee is replaced by a new one, the employer receives 70 - 40 = **30 points**.
- These payments are **irrespective of the prosecutor's decision for conducting an investigation or not**.

<u>If TRIANGLE is chosen</u>

If the employer chooses **TRIANGLE**, there are two [In *P-R*: four] distinct cases, depending on [In *P-R* only: whether the employee asked the prosecutor to investigate or not, and on] whether the prosecutor conducts an investigation or not.
In any of these cases if the employer chooses TRIANGLE, then he receives **an extra payment of 50 points in addition to the productivity of his employee**. In the case of **no investigation**, the employer goes unpunished and does not have to pay a fine, while in the case of an investigation, he has to pay a **fine of 60 points**, which, hence, exceeds the extra payment resulting from the choice of TRIANGLE. [In *P-R* only: Furthermore, the employee can **only** be dismissed if he did not ask the prosecutor to conduct an investigation, i.e., if he **kept silent**.]

- If the prosecutor does **not conduct an investigation**, and the employer consequently remains unpunished, the following holds:
  - An **employer with a high-productivity employee** who chooses **TRIANGLE** gets 80 + 50 - 40 = **90 points** if he keeps the employee. If the employee is replaced by a new one [In *P-R* only: (which is only possible if the employee kept silent)], the employer receives 70 + 50 - 40 = **80 points**.
  - An **employer with a low-productivity employee** who chooses **TRIANGLE** gets 30 + 50 - 40 = **40 points** if he keeps the employee. If the old employee is replaced by a new one [In *P-R* only: (which is only possible if the employee kept silent)], the employer receives 70 + 50 - 40 = **80 points**.
- If the prosecutor **conducts an investigation**, the following holds:

- An **employer with a highproductivity employee** who chooses **TRIANGLE** gets 80 + 50 - 60 - 40 = **30 points** if he keeps the employee. If the employee gets replaced by a new one [In *P-R* only: (which is only possible if the employee kept silent)], the employer receives 70 + 50 - 60 - 40 = **20 points**.
- An **employer with a low-productivity employee** who chooses **TRIANGLE** gets 30 + 50 - 60 - 40 = **-20 points** if he keeps the employee. If the old employee is replaced by a new one [In *P-R* only: (which is only possible if the employee kept silent)], the employer receives 70 + 50 - 60 - 40 = **20 points**.

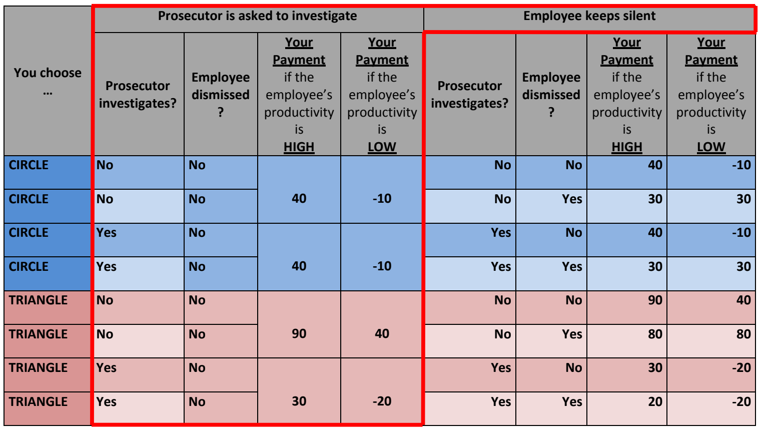
The potential fine is higher than the extra payment the employer receives when choosing TRIANGLE. Thus, it depends on the prosecutor's decision to conduct an investigation or not whether the employer earns more when choosing TRIANGLE or when choosing CIRCLE.

However, the employer choosing TRIANGLE implies a **loss of 70 points for the third party**. As the third party has an initial endowment of **40 points**, if the employer chooses TRIANGLE, the third party **loses 30 points** in the current round. However, this only applies if the prosecutor does not conduct an investigation, because choosing TRIANGLE violates the (fictitious) **law for the protection of the third party**. If the prosecutor conducts an investigation (potentially because he was asked to do so by the employee), the third party receives a partial refund of his damage in the form of a **compensation of 20 points**. In the role of third party, it is thus possible to complete the first part of the experiment with a loss. However, no participant will finish the entire experiment with a loss.

The total payoff (for the current round) of the employer (depending on the productivity of his employee as well as on his own decisions and the decision of the prosecutor) is summarized in the below table. In the experiment, this table is shown on the employer's decision screen. [In treatment *P-R*, the part of the table marked by the red bold frame is displayed in addition to the remainder of the table.]

The employer should keep in mind that the employee observes his choice between the two alternatives and may ask the prosecutor to initiate an investigation. [In *P-R* only: In this case, a dismissal of the employee is not possible.]

3.2 The sequence of events in a given round from the perspective of the employee

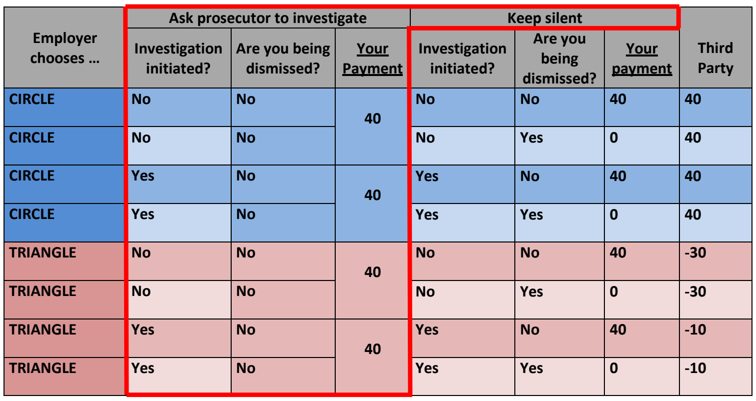


You choose …	Prosecutor is asked to investigate				Employee keeps silent			
	Prosecutor investigates?	Employee dismissed ?	**Your Payment** if the employee's productivity is **HIGH**	**Your Payment** if the employee's productivity is **LOW**	Prosecutor investigates?	Employee dismissed ?	**Your Payment** if the employee's productivity is **HIGH**	**Your Payment** if the employee's productivity is **LOW**
CIRCLE	No	No	40	-10	No	No	40	-10
CIRCLE	No	No			No	Yes	30	30
CIRCLE	Yes	No	40	-10	Yes	No	40	-10
CIRCLE	Yes	No			Yes	Yes	30	30
TRIANGLE	No	No	90	40	No	No	90	40
TRIANGLE	No	No			No	Yes	80	80
TRIANGLE	Yes	No	30	-20	Yes	No	30	-20
TRIANGLE	Yes	No			Yes	Yes	20	-20

The employee does **not receive an initial endowment**, i.e., his earnings depend exclusively on his decisions and the decisions of the others. First, the employee is informed about whether his **productivity level is high or low**. Both productivity levels are equally likely. At the end of the round, the employer can dismiss the employee. [In *P-R* only: However, a dismissal is only possible, if the employee did **not** ask the prosecutor to conduct an investigation, i.e., if he kept silent.] If the employee gets **dismissed**, he earns **0 points** in the current round. If the employee **does not get dismissed**, he receives a **wage of 40 points** from the employer.

The employee observes whether the employer chose **CIRCLE** or **TRIANGLE**. He then decides on whether to ask the prosecutor to conduct an investigation. This decision is taken as follows: The employee indicates both whether he wants to ask the prosecutor to conduct an investigation in case that the employer chose CIRCLE and also whether he wants to ask the prosecutor to conduct an investigation in case that the employer chose TRIANGLE. The computer then effectuates the decision (depending on the actual decision of the employer). Also the **employer** observes whether or not the employee decides to ask the prosecutor to conduct an investigation. If the **prosecutor conducts an investigation**, the following applies: If the employer chose CIRCLE, nothing happens. If, however, the employer chose TRIANGLE, the employer has to **pay a fine of 60 points**, while the **third party receives a compensation payment of 20 points**.

The total payoff (for the current round) of the **employee and the third party**, respectively, (depending on his own decision as well as on the decisions of the employer and the prosecutor) are summarized in the below table. In the experiment, this table is shown on the employee's decision screen. [In treatment *P-R*, the part of the table marked by the red bold frame is displayed in addition to the remainder of the table.]



Employer chooses …	Ask prosecutor to investigate			Keep silent			Third Party
	Investigation initiated?	Are you being dismissed?	Your Payment	Investigation initiated?	Are you being dismissed?	Your payment	
CIRCLE	No	No	40	No	No	40	40
CIRCLE	No	No		No	Yes	0	40
CIRCLE	Yes	No	40	Yes	No	40	40
CIRCLE	Yes	No		Yes	Yes	0	40
TRIANGLE	No	No	40	No	No	40	-30
TRIANGLE	No	No		No	Yes	0	-30
TRIANGLE	Yes	No	40	Yes	No	40	-10
TRIANGLE	Yes	No		Yes	Yes	0	-10

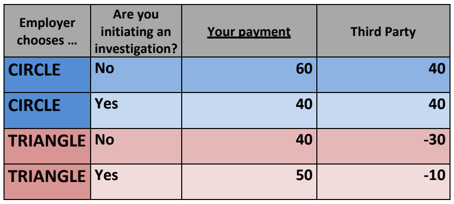
The employee should keep in mind two things. Firstly, if the employer chooses TRIANGLE, the employee may ask the prosecutor to conduct an investigation, and, if the prosecutor acts on his request, thereby reduce the loss of the affected person. Secondly, the employer can observe whether the employee asks the prosecutor to conduct an investigation or not.

3.3 The sequence of events in a given round from the perspective of the prosecutor

The prosecutor receives an **initial endowment of 60 points** at the beginning of each round. His task is to decide on whether to investigate the employer or not. If he conducts an **investigation**, he has **costs of 20 points**. If he does **not conduct an investigation** and the employer chose **CIRCLE**, the prosecutor keeps his initial endowments.

If the employer chose **TRIANGLE**, the **prosecutor loses 20 points** if he does not conduct an investigation. If he investigates (and in spite of the investigation cost of 20 points), he only has to bear a (smaller) loss of **10 points**. When deciding on whether to investigate or not, the prosecutor can observe whether the employee asked him to investigate or not.

The total payoff (for the current round) of the **prosecutor and the third party**, respectively, (depending on his own decision and the decisions of the employer and employee) are summarized in the below table. In the experiment, this table is shown on the prosecutor's decision screen.

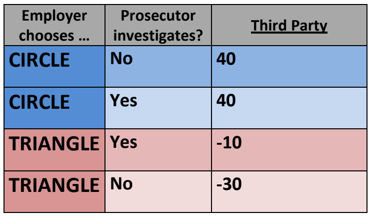


Employer chooses …	Are you initiating an investigation?	Your payment	Third Party
CIRCLE	No	60	40
CIRCLE	Yes	40	40
TRIANGLE	No	40	-30
TRIANGLE	Yes	50	-10

The prosecutor should keep in mind two things: If the employer chose TRIANGLE, the prosecutor is the only one who can reduce both his own loss and the loss faced by the third party. If the employer chose CIRCLE, an investigation only leads to expenses. Thus, it is important for the prosecutor to think about how informative the employee's request (or lack of a request) to conduct an investigation is.

3.4 The sequence of events in a given round from the perspective of the third party

The third party gets an **initial endowment of 40 points** and does not have any own decisions to make. If the employer chooses **CIRCLE**, the third party can **keep its initial endowment**, irrespective of what the employee and the prosecutor do. If the employer chooses **TRIANGLE** and the prosecutor does **not conduct an investigation**, the third party **loses 70 points**, so that its payoff in the current round is **-30 points**. If the employer chooses **TRIANGLE** and the prosecutor **does conduct an investigation**, the third party again **loses 70 points**. However, in this case the third party also receives a **compensation payment of 20 points** so that its earnings in the current round are **-10 points**. In the experiment, this table is shown on the third party's decision screen.



Employer chooses …	Prosecutor investigates?	Third Party
CIRCLE	No	40
CIRCLE	Yes	40
TRIANGLE	Yes	-10
TRIANGLE	No	-30

4. Summary of the sequence of events in a given round

- Each participant learns his or her role.

- The employer and the employee learn the productivity level of the employee (high or low).
- The employer chooses between two alternatives: CIRCLE and TRIANGLE
- The employee decides whether he wants to ask the prosecutor to conduct an investigation in case that the employer chooses CIRCLE, and also whether he wants to ask the prosecutor to conduct an investigation in case that the employer chooses TRIANGLE.
- The prosecutor learns whether the employee asks him to conduct an investigation or not. The prosecutor then decides on whether to conduct an investigation or not.
- The employer learns whether the employee asked the prosecutor to conduct an investigation or not. The employer decides whether he dismisses the employee or not. [In *P-R* only: However, dismissal is only possible in case that the employee did not ask the prosecutor to conduct an investigation.]
- All participants learn their individual payoffs from the current round, and the decisions leading to these payoffs.
- Behavior in a given round does not affect earnings in upcoming rounds.

5. Total earnings for the first part of the experiment

At the end of both parts of the experiment, three rounds out of the total of 30 rounds will be selected randomly and independently from each other. The points that you have earned in these three rounds will be summed up and exchanged into EURO. The exchange rate is 1 EURO = 15 points. The resulting payoff plus the show-up fee of 12 EURO plus your earnings from the second part of the experiment will then constitute your overall payoff from the experiment.

C Overview: Number of Observations

Table 6: Number of Observations Across Treatments and Conditions

(a) Number of Observations in Figure 2 (Dismissal)

	NoP	***P-R***	***P-RI***	***P-RIM***	***P-RI-LOSS***	***P-RIM-ERROR***
L-employee + Report	30	30	22	24	22	22
L-employee + No Report	30	26	20	24	19	21
H-employee + Report	29	30	22	23	22	21
H-employee + No Report	30	29	21	23	22	21

(b) Number of Observations in Figure 6 (Reporting)

	NoP	***P-R***	***P-RI***	***P-RIM***	***P-RI-LOSS***	***P-RIM-ERROR***
L-employee	45	45	33	36	33	33
H-employee	45	45	33	36	33	33

(c) Number of Observations in Figure 7(a) (Investigations)

	NoP	***P-R***	***P-RI***	***P-RIM***	***P-RI-LOSS***	***P-RIM-ERROR***
Report	45	45	33	36	33	33
No Report	45	45	33	36	31	33

(d) Number of Observations in Figure 7(b) (Misbehavior)

	NoP	***P-R***	***P-RI***	***P-RIM***	***P-RI-LOSS***	***P-RIM-ERROR***
L-employee	30	30	22	24	22	22
H-employee	30	30	22	24	22	22

Notes: As discussed in Section 5 above, in each session of the experiment, each subject played 30 periods in a given treatment, but possibly in different roles. Hence, our unit of observation are averages on the subject-role level. Therefore, the number of observations in each treatment also depends on role assignments. As for panel (a), Figure 2 only exhibits treatments *NoP* and *P-R*. For the other treatments, obtaining protection no longer depends on the reporting decision only. As discussed in Section 5.3, the results remain strongly in line with *Prediction D* and hence are not reported in the main text. In panel (b), since we used the strategy method to elicit the employees' reporting decision, the number of observations in Figure 6 does not vary across misbehavior decisions. The number of observations for Figures 3 and 4 are not reported here separately, as these two figures re-appear in Figures 6 and 7, and hence are already included in panels (b) to (d).