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Who Cares When Value (Mis)Reporting May Be Found Out?

An Acquiring-a-Company Experiment with Value Messages and Information Leaks

Abstract

We modify the Acquiring-a-Company game to study lying in ultimatum bargaining. Privately informed sellers send messages about the alleged value of their company to potential buyers. Via random information leaks, buyers can learn the true value before proposing a price which the seller finally accepts or not. Two-thirds of all sellers exaggerate the company's value to persuade buyers to offer more, especially when the true value is small. Surprisingly, a higher leak probability does not increase truthtelling. However, it decreases overreporting and increases underreporting. Buyers who found out value misreporting anchor their price proposals on the true value but do not explicitly discriminate against liars. Sellers are fully opportunistic and make their acceptances dependent on the resulting positive payoff. Even if morality concerns do not seem to matter much, probabilistic leaks enhance welfare. That suggests to politically facilitate and encourage e.g. whistle blowing.

JEL-Codes: C780, C910, D830, D910.

Keywords: acquiring-a-company experiments, information leaks, cheap talk (not) lying, ultimatum bargaining.

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1 Introduction

One often hesitates to misreport private information when there is a chance of its revelation through information leaks. However, it is unclear whether the possibility of truth revelation completely eliminates misreporting or merely reduces its extent when the likelihood of information leaks increases. Since selling at high prices is desirable, profit-maximizing sellers might exaggerate the value of what they offer for sale. But worse than selling too cheaply is not selling at all, e.g., due to being found out lying. We analyze the effects of lying in bargaining with privately value-informed sellers. This is a rather typical setting for many field situations and discussed in the literature of trade with private information since Akerlof (1978). Exploiting private information advantages can be questioned when so far uninformed buyers can learn the true values of sales items. In fact, this change in available information may alter the decision-making. Sellers would now have to consider that with overvalued offers, they risk buyers not buying in the first place. Like obliging second-hand car dealers to reveal known but not easily recognizable damages of their cars, sellers might be hold responsible for false statements or unrealistic promises if the buyers find out about their lies. In the field, however, sellers may claim unawareness about the truth themselves which may render intentional fraud not verifiable in court. Information leaks, e.g. due to whistle blowing, would instead alert potential buyers before dealing and could avoid legal regulation. One might even hope that the mere possibility of information leaks already prevents being exploited by privately informed sellers. If so, policy makers should encourage informational leaks. One may even reward whistle blowing.[1] This would boost efficiency enhancing exchange in case of asymmetric information.

To shed light on such market exchange situations we modify the rather complex Acquiring-a-Company (AaC) experiment in which a seller owns a company that is evaluated higher by a potential buyer (Bazerman and Samuelson, 1983, Samuelson and Bazerman, 1985). Evaluations are perfectly (and linearly) correlated. Like the standard AaC game, our experiment relies on stochastic ultimatum bargaining between these two.[2] We let the privately informed seller first send a numerical message regarding a

[1] Actually the metaphoric framing of "Prisoners' Dilemma" games is based on rewarding of "whistle blowing".

[2] In fact, it has been largely overlooked that it actually seems to be the first stochastic ultimatum experiment (see also Samuelson and Bazerman, 1985). This paradigm can be also used to analyze, for instance, buyer competition or loss aversion of buyers suffering losses even in case of equilibrium trade.

company's alleged value that can be true or false. The lie of a misreport can be in two directions. Either the seller lies upwards and exaggerates the value of the company by an overreport to sell it for as much as possible. Or the seller lies downwards and understates it by an underreport reducing the potential payoff but increasing the chances of trade. Another modification we introduce is that, with a commonly known probability, the seller's private value information is leaked to the buyer. Hence, the buyer becomes aware not only of the true value, but whether the seller has been misreporting. Being so informed or not the buyer proposes a price to acquire the company which the seller can accept (such that the company is sold) or reject. Like in the AaC-set up trade is welfare increasing since sellers proportionally underevaluate the company. Across rounds, we vary the commonly known proportional under-evaluation parameter for the seller and, most importantly, the probability of an information leak. Both, seller and buyer participants, are aware of both parameters when interacting across several successive rounds. Partners in the other role randomly change in order to discourage reputation effect. We refer to our modified Acquiring-a-Company experiment with information leak as *LAaC*.

With our experiment and the elicitation of stochastic and deterministic ultimatum bargaining in one overarching ultimatum experiment we try to answer the following research questions: What is the effect of a higher likelihood of information leaks on misreports by sellers? Does it increase the share of truthful reports? Does it reduce the size of the lies? Or does it affect the direction of lying, i.e. over- versus underreporting? What do uninformed buyers base their price proposals on and how do informed buyers react when they realize they have been lied to? Do they reduce the offered price? What in turn determines the sellers' acceptance of price proposals? Do they accept lower prices if they got caught lying? Finally, do information leaks lead to more trade overall and thus to an increase in welfare?

Our result are as follows. Most value messages are false (85.5%), exaggerating the company's value in more than two-thirds of all cases. In contrast, nearly one-third of all false value messages are underreports. Surprisingly, increasing the leak probability from 10% to 40% has only little effect on the frequency of truthful reports. What such a variation in probability does alter, however, is the size of the lies on the one hand and the structure of misreports on the other. A higher leak probability reduces the average size of the lie (i.e. the difference between the true and the reported value), leads to a decrease in overreporting and a simultaneous increase in underreporting

which can be considered evidence for sellers striving a positive social image as modest. Moreover, underreporting and truthtelling happen more often for higher values of the company which increases the chances of trade. Overreporting is mostly concentrated at small to medium company values. Price proposals of buyers unaware of the true value anchor on the value message and show a certain path dependency, while those who found out value misreporting, anchor on the true value. However, they do not explicitly discriminate against liars but rather exhibit a certain inertia in suspicion: interacting with an overreporting seller in the past makes them propose lower price offers in future rounds. In contrast, sellers are fully opportunistic and make their acceptance decision mainly dependent on whether the resulting payoff is positive. Thus, morality concerns do not seem to matter much. Altogether probabilistic leaks enhance trade and thereby also welfare. This suggests that policy makers should encourage such leaks and promote, e.g., whistle blowing.

The remainder of the paper is organized as follows. Section 2 reviews the related literature. Section 3 explains our modified Acquiring-a-Company game with information leaks. Section 4 presents the experimental protocol and states the effects we want to test with our design. The experimental results are presented in Section 5. Section 6 concludes.[3]

2 Related Literature

Morally it may already be questionable to not tell others that one privately knows something relevant, as studied by Dana et al. (2007) whose design employs a non-commonly known setup. Our research instead relies on a commonly known game form, namely a stochastic ultimatum bargaining setup with incomplete information. Strategic lying is mainly explored in modified ultimatum experiments by letting privately informed proposers lie about the pie size via pie-size messages (Mitzkewitz and Nagel, 1993). These could inform when to expect a more or less known share of truthful proposers and whether this in turn renders it worthwhile for opportunistic proposers to lie by overstating the pie size (Besancenot et al., 2013). Actually, pie-size messages become more deceptive the larger the pie (Vesely, 2014). Proposer messages can also concern the responder's outside option which should be respected via increased offers (Boles et al., 2000, Croson et al., 2003). Alternatively, responders may send

[3]Appendix B contains the translated version of the experimental instructions.

messages about a (non-)favorable ECU-euro conversion rate[4] to induce higher offers by proposers (Koning et al., 2011). All these studies confirm substantial untruthfulness of messages but less deception when information is only indirectly transmitted via possibly information-revealing actions (Kriss et al., 2013).

In theory, pure cheap talk is ineffective (Kim, 1996) although it may matter behaviorally in experimental bargaining (Croson et al., 2003). However, when lies may be verifiable, messages are no longer cheap talk (Dato et al., 2019). Therefore, it is particularly interesting to investigate how probabilistic lying detection affects individual inclinations to send (un)truthful messages in bargaining and the interpersonal heterogeneity of such behaviors. So far the evidence indicates that proposers lie less in case of 50%-detection probability, compared to no detection at all (Anbarcı et al., 2015); lowering the probability of detection weakens the effect, for instance, a detection probability of even 25% does not prevent proposers from understating the pie size (Chavanne and Ferreira, 2017).

From a broader perspective, our analysis on the perceived (im)morality of lying when bargaining in asymmetric information settings also contributes to the literature on the so-called "dark side" of human nature, particularly lying on the one hand, and detecting lies e.g. through whistle blowing on the other. The rapidly growing literature on lying behavior is mainly concerned with lies in which upward deviations from the truth occur in order to increase a player's payoff. In the well-known dice rolling experiments (Fischbacher and Föllmi-Heusi, 2013), for example, stating a number of 5 usually leads to the highest payoff. Players who rolled a smaller number consequently have a monetary incentive to give a false higher indication. In contrast, lying behavior, in which lying is done in a downward deviation from the truth and therefore potentially reduces a player's payoff, still seems puzzling. Such downward lies, as Abeler et al. (2019) has coined them, are not yet part of recent theoretical models of lying costs (Abeler et al., 2019; Gneezy et al., 2018; Khalmetski and Sliwka, 2019) but first papers analyze possible motives for this. They argue that subjects may lie downward when a lower indication translates into a better reputation and signals higher honesty (Barron, 2019, Geraldes et al., 2021, Utikal and Fischbacher, 2013). Our setting provides a framework in which we can observe both lying for one's own maximum advantage (sellers overreporting the company value) and lies that result in payoffs lower than truthful statements (sellers underreporting the value). However, the motive

[4]ECU standing for *e*xperimental *c*urrency *u*nit.

for such downward lies is more complex in our case than in a standard die role task. While the payoff in the latter follows deterministically from player's indication, in our LAaC experiment there is uncertainty about the seller's payoff. Thus, in addition to reputational concerns such as the desire to appear honest in order to maintain an honest self and social image, there is also an ambivalent monetary component because payoffs depend on whether trade occurs or not. On the one hand, high misrepresentations of the company's value would lead to a higher payoff in the event of trade. On the other hand, high reports of the company value can also make a potential buyer skeptical, as it is to be feared that they are exaggerated. In this case, a buyer may prefer not to buy at all. A truly high company value then poses a dilemma. Even an honest report (and even more so an exaggerated one) could appear as a lie to the buyer and consequently reduce the chances of trading. Against this background, a downward lie with regard to the company value can seem quite rational. For the seller, it lowers the payoff relative to a truthful report, but conversely, it increases the likelihood of trade. A detailed consideration of these aspects is new in the literature on lying.

Our work also contributes to the literature that deals with the detection of lies. This can be done, for example, through whistle blowing, which is an effective mechanism to stop wrongful behavior in the first place. Whistle blowing has become recently investigated in experimental economics to the aim to assess its underlying intrinsic motivations (Reuben and Stephenson, 2013): how and through which channels do fines, leniency or rewards for reporting illicit activities affect cartel formation (Bigoni et al., 2012, Bigoni et al., 2015) and how effective are rewards for self-reporting bribery in the public sector (Serra, 2012, Abbink and Wu, 2017)? Differences in the social valuation of whistle blowers are equally important, as is the extent of harm caused by the misconduct (e.g. Butler et al., 2020). Our setting adds to this literature in terms of the positive effect of a reduction of asymmetric information. Reducing the advantages of lying, may benefit a society implementing compliance and enhancing trade.

3 The Acquiring-a-Company game with information leaks (LAaC)

The only potential buyer B, when owning seller S's company, would evaluate it by $v \in (0, 1)$. However, only seller S is aware of v whereas for buyer B the value v is

uncertain and expected to be uniformly distributed in $(0,1)$, denoted by $v \in U(0,1]$. The seller, aware of B's expectations, evaluates the company via qv where the parameter q with $0 < q < 1$ is commonly known. Seller S can send a value message $\hat{v} \in [0,1]$ to B which might be revealing, i.e., $\hat{v}(v) = v$ for all v, but also false, i.e. $\hat{v}(v) \neq v$ for $v \in (0,1)$. The total surplus from trade equals $(1-q)v$ and is always positive. Therefore, trade is always welfare enhancing.

The innovation of our setup is that private value information can be leaked and learned by B. With probability $w \in (0,1)$ buyer B, after receiving the value message $\hat{v}$ from the seller S but before proposing the price $p \in [0,1]$, may also learn the true valuation v, respectively qv. So with probability w the buyer would offer a price $p \in [0,1]$ to seller S, aware of both, the value message $\hat{v}$ and the true value v. This is denoted by $p = p(\hat{v}, v) \in [0,1]$. With the complementary probability $1-w$ buyer B only knows $\hat{v}$, the value message of seller S, when offering a price, denoted via $p = p(\hat{v}) \in [0,1]$. Finally seller S accepts or rejects the proposed price p.

For each $v \in (0,1)$ and given q with $0 < q < 1$, seller S earns $\delta(p)(p - qv)$ and B earns $\delta(p)(v - p)$. Apparently both parties can lose; S when accepting a price smaller than qv and B when a price proposal $p > v$ is accepted by S.

The benchmark solution for common(ly known) risk and loss neutrality and opportunism (in the sense of maximizing the own monetary payoff expectation) can be derived via backward induction. Optimal acceptance requires $\delta(p) = 1$ for $p \geq qv$ and $\delta(p) = 0$ otherwise. Anticipating this we first focus on the no-leak event. Here B expects to earn:

$$\int_{\frac{p}{q} \geq v > 0} (v - p)dv = \frac{p^2}{2q^2}(1 - 2q)$$

So the optimal price is $p^* = 0$ for $q > \frac{1}{2}$ and $p^* = q$ otherwise since $p^* = q$ is the lowest price guaranteeing trade for all $v \in (0,1]$. Our experiment considers both, $q > \frac{1}{2}$ implying no-trade prediction like Akerlof (1978) and $q < \frac{1}{2}$ which implies welfare enhancing trade with positive surplus $(1-q)v$ due to $v > 0$ and $q < 1$.

In case of the leak event with probability w buyer B, aware of q, $\hat{v}$ and v, should offer prices $p^*(\hat{v}, v) = qv$ as a function of value v, i.e., $p^*(\hat{v}, v) = qv$ for all $v \in (0,1]$ where we abstract from the technicality that, in case of $p^*(\hat{v}, v) = qv$, seller S is indifferent between accepting and rejecting. So with leak probability w the no trade result for all $v \in (0,1]$ and parameter $q > \frac{1}{2}$ is avoided. Like in non-embedded deterministic ultimatum games, there exist also other equilibria in weakly dominated response strategies but not in line with sequential rationality (Selten, 1975).

The LAac-game allows to assess behavior by both market sides. For sellers, we can study how $\hat{v}$ depends on v, how acceptance of price proposals p depends on $\hat{v}$ and v, and how both seller decisions are affected by the commonly known parameters q and w. Buyers confront two information conditions. First, one where v and $\hat{v}(v)$ letting the buyer recognize the sign and size of possible misreporting.[5] Second, the other where v is not revealed to the buyer and both, seller and buyer, should theoretically behave similar as in the AaC-setup.

4 Experimental protocol

Overview. The experiment is a parametrized version of the game explained in the previous section. Before the first round half of all participants are randomly assigned to the role of a buyer while the others become sellers. Participants keep their roles throughout the 16 rounds of the experiment. At the beginning of each round, each buyer is randomly matched with one seller with whom to bargain about buying or not the seller's company.[6] Participants learned about their individual payoff at the end of each round. After the last round, everyone also had to answer a socio-economic questionnaire, which included a measure of self-reported risk propensity (see Dohmen et al., 2011).

Experimental task. A buyer and seller bargain whether to trade or not, i.e., whether the buyer acquires the company owned by the seller. The experiment lets the value v vary from 5 to 95 in increments of 5. First the computer randomly determines v and informs only the seller about v. However, the seller evaluates the company only by qv, where the seller's commonly known underevaluation parameter q is either 0.25 or 0.55.

The parameter q is crucial whether theoretically trade is predicted or excluded where the latter is related to Akerlof (1978). To illustrate this in more detail consider first of all the 0-probability of leak. This features the classic Aac game with cheap-talk value messages which theoretically do not matter. If both, seller and buyer, are known to be risk neutral, what we also induce experimentally, the theoretical prediction is "always trade", i.e., for all positive values at the price of q if q does not exceed 1/2,

[5] That actually features deterministic ultimatum subgames with commonly known pie size $(1-q)v$, the surplus from trade.

[6] We used random matching groups with six participants each, for a total of 17 such groups. Participants were not aware of such restricted matching.

respectively "no trade at all", i.e., zero prices, if q is larger than 1/2. If instead a leak occurs, what results are ultimatum (sub) games with common value information in which the buyer acts as proposer and exploits the seller by offering the prices qv by which (s)he acquires -theoretically - all the surplus from trade. From this it follows that after the no-leak random event the resulting subgame is isomorphic to the classic Aac-game with common risk neutrality. So theoretically there is always trade with exploitative price offers after the leak random event and after the no-leak random event only when q does not exceed 1/2 at the price q which is always acceptable for the seller, irrespective of the value. Behaviorally we neither expect exploitative price offers after the leak random event nor no trade at all after $q > 1/2$, possibly related to the winner's curse (see, for instance, Bazerman and Samuelson, 1983), and neither always trade for $q \leq 1/2$ and, if there is trade, always prices of q (see, for instance, Di Cagno et al., 2017).

In each round both, seller and buyer, know whether q is high or low, where both are equally probable. Then the seller, aware of v, sends a value message $\hat{v}$ to the buyer which may or may not reveal v to B. This value message is only subject to the same integer constraint as for v, i.e., the seller freely decides what to report. It is the only information of the buyer with probability $1 - w$. However, and that is the innovation of the paper, with probability w (>0), the buyer also learns the true v. The leak probability is either $w = 0.1$ or $w = 0.4$ and it is randomly selected across rounds. Knowing either only $\hat{v}$ or also v, the buyer then proposes a price p between 0 and 60 for the company which the seller can reject or accept. Payoffs are finally calculated and privately communicated to buyer and seller, respectively. In case of acceptance, the buyer earns the difference between the value of the company and the price, i.e., $v - p$, while the seller earns the difference between the price and the own evaluation of the company, i.e., $p - qv$. In case of a rejection, both earn zero. Table 1 summarizes the timing of events in one round.

Table 1: Sequence of events in one round

1	Random pair formation (random strangers in independent matching groups)
2	Parameters w, q and v are randomly determined (within subjects)
3	S learns about v
4	S sends message $\hat{v}$ to B
5	(No) information leak according to w $\rightarrow$ B is (not) informed about v $\rightarrow$ S is informed whether B does (not) know v
6	B proposes price p
7	S accepts or rejects the offer
8	Feedback: individual payoff

Payoffs. After the experiment one round was randomly selected. A participant's earnings in this round were converted to probability points for gaining either EUR 4 or EUR 14 in a lottery. This lottery was played out on the participant's computer screen. Obviously such binary lottery incentives induce risk neutrality (see for an early study Roth and Malouf, 1979, and for an often misinterpreted criticism Selten et al., 1999).[7] Subjects earned an average of EUR 8.02 from the binary lottery plus a flat participation fee of EUR 6.

Implementation. Due to the constraints imposed by the COVID-19 pandemics, we conducted the experiment in a digital lab-like environment with payments administered immediately after the experiment via Prolific and Paypal.[8] A total of 102 subjects participated in 7 sessions with an average length of 105 minutes, including the time needed for connecting to the virtual cubicles, reading the instructions, the administration of the final questionnaire and feedback on earnings. The experiment was programmed in oTree (Chen et al., 2016) and carried out between July and October 2020 with the student participants of LUISS Cesare Lab recruited via ORSEE (Greiner, 2015). Students were from different fields of studies, predominantly from economics,

[7]Specifically, even the lowest payoff does not rule out winning the larger reward, EUR 14, with positive probability and even the highest payoff does not guarantee this with 100 % probability. So even when the buyer exploits the seller by offering $p(v) = qv$ after the w probability event, this would not deprive the seller of all chances to earn EUR 14. Similarly, even the largest possible loss will let the buyer earn the high reward EUR 14 with positive probability. What Selten et al. (1999) show is only that participants do not behave in line with expected utility theory even when rendering them risk neutral.

[8]For a description of the lab-like methodology see Buso et al. (2020).

law and political science with an average age of 23.51 and 52 % of them being female. No one participated in more than one session.[9]

Participants had one minute to take each of the three decisions throughout the experiment, i.e., value message, price proposal and acceptance, while between-decision feedback screens (e.g., feedback about leaks and earnings) lasted 30 seconds at most. In case a decision was not made in time, the computer selected a random decision in lieu of the participant and this was clearly stated in the instructions.[10] Moreover, a timer was shown in each of the decision screen. This protocol was adopted in order to avoid losing a full experimental session in case one of the participants would have dropped for the session (in which case a single matching group data would have been lost). The number of randomly-drawn choices was very small: 2 for the value message, 5 for the price proposal and 1 for acceptance, on a total of 1,632 choices (816 for each role). We removed these choices, and the corresponding interactions, from our data, which leaves us with 1,616 observations (808 for each role). Lastly, participants had the instructions available during the whole experiment, therefore they could re-read them at any moment, and they had the possibility to privately ask clarifications to the experimenters at any time.

Behavioral considerations. Due to the leak probability w being positive the LAaC-setup comprises crucially stochastic ultimatum bargaining.[11] Whereas deterministic ultimatum experiments are known for altruistic punishment - a major and influential finding of deterministic ultimatum experiments where responders reject positive but still unfair offers - and often render equal pie splitting modal, the crucial stochasticity of the AaC-setup essentially crowds out altruistic punishing and rewarding of buyers by sellers (Bazerman and Samuelson, 1983, Samuelson and Bazerman, 1985 and relatedly Angelovski et al., 2020): sellers nearly always accept price offers when this is optimal and reject otherwise. The reason seems to be that in crucially stochastic environments random interpersonal payoff comparisons are rather cumbersome.[12]

[9]Summary statistics of the sample characteristics are reported in Table 1 in Appendix A.

[10]Moreover, if failing to communicate the value message or the price proposals, participants would have their probability of winning the high price reduced by 5 % in case that specific round would have been selected for final payment.

[11]Like Güth et al. (ming) we refrain from clearly defining when stochasticity is "crucial" what should be attempted only in view of richer data. What is meant by "crucial" is that we do not claim crowding out altruistic sanctioning when stochastic effects are minor e.g. due to just binary random events.

[12]Furthermore, "bang-bang" pricing, i.e., buyers offering $p^* = 0$ or $p^* = q$, is hardly ever observed. In AaC-experiments optimal prices $p^* = q$ for $q \leq \frac{1}{2}$ and $p^* = 0$ for $q > \frac{1}{2}$ are not even modal. Güth

From a behavioral perspective it is interesting to elicit stochastic and deterministic ultimatum bargaining in one overarching ultimatum experiment confronting participants with both privately and commonly known values v, each with positive probability. Do proposers - buyers in LAaC - want to be consistent across both conditions in whether or not to exploit ultimatum power? Or would they refrain from too much exploitation only in case of deterministic ultimatum bargaining, i.e., after the w-event?[13] Overreporting sellers, aware of whether the buyer has found out their overreporting, may aim at smaller positive profits for the sake of more likely acceptance when the truth is revealed. Even more crucial, in our view, is whether leaking value information suffices to let some sellers become categorically truth reporting, possibly due to not wanting to be found out lying. Buyers may indeed believe in sellers' truth reporting and reward them by proposing (nearly) equal surplus sharing prices around

$$p(\hat{v}) = q\hat{v} + (1-q)/2\hat{v} = (1+q)/2\hat{v} \; for \; \hat{v} \in (0,1).$$

Sellers with truth revealing messages should readily accept such $p(\hat{v})$-price offers, at least when $p(\hat{v}) \geq qv$.

Taken together, we want to explore the following potential effects:

1. *Leak Effects on Reporting (LEOR)*: Information leaks may lead to (i) a higher share of truthful reports, (ii) a reduced size of the lies, i.e. $\hat{v}(v) - v$ decreases.

2. *Underreporting (UR)*: On the whole, participants probably tend to overreport. However, the share and extent of underreporting, i.e., $\hat{v}(v) - v < 0$, can be substantial. Sellers are likely to underreport when v is high, to prevent buyers from not trading for fear of a lie of an exaggerated company value.

3. *Seller Opportunism (SO)*: Previous literature hardly found any altruistic sanctioning or rewarding of buyers by sellers. We too expect opportunistic sellers who nearly always accept when $p > qv$, but mostly reject when $p < qv$.

4. *Path Dependence (PD)*: The misreporting behavior of the sellers and the price offers of the buyers are likely to be path dependent. In contrast, sellers' acceptance behavior is not path dependent due to *SO*.

et al. (ming) confirm the optimal offer as modal but question optimality via the strong intra- and inter-personal heterogeneity of offers.

[13] In the AaC-game (or after the $1-w$ event in LAaC) optimal ultimatum offers for low q-parameters in the range $q \leq \frac{1}{2}$ are q-dependent, p^*=$p^*(q)$, and rather moderate for lower q than $\frac{1}{2}$: only for $q = \frac{1}{2}$ the optimal price $p^* = q$ would let the buyer expect only 0-profits.

5. *Welfare Increase through Leaks (WITL)*: Information leaks may on the one hand deter misreporting and on the other hand, remove asymmetric information which, thus, increases the likelihood of trade what, in turn, is welfare improving.

5 Experimental Results

In this section we analyze the sellers' (mis)reporting behavior and the variables that determine the market outcome such as buyers' price proposals and sellers' decision to accept or reject the proposals. In each case, we first present descriptives before performing regression analyses.

5.1 (Mis)reporting behavior

5.1.1 Descriptives

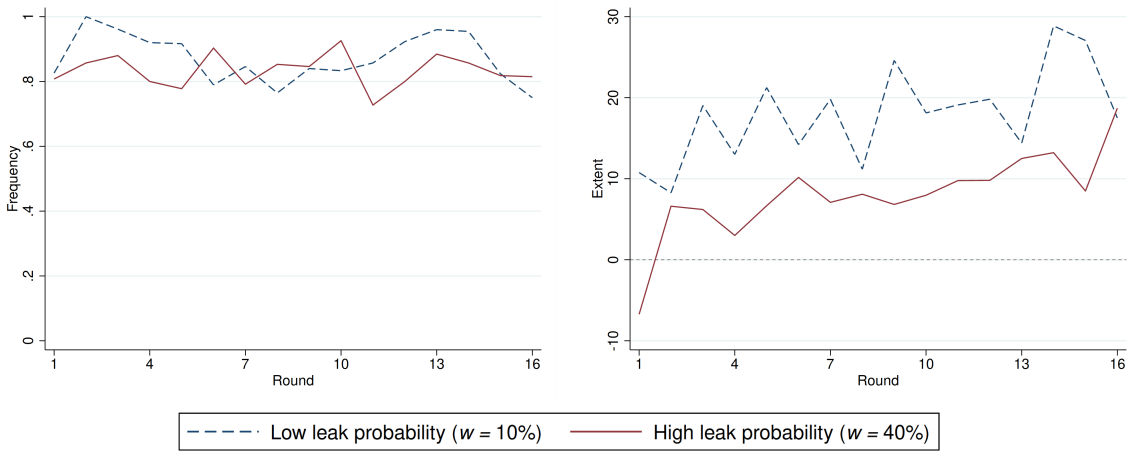
Overview & Dynamics. Truthful value messages are rare (14.5%) since most sellers lie and misreport their company's value (85.5%). The average size of a lie (measured as $\hat{v} - v$) is 12.67 (standard deviation: 27.13).[14]

Figure 1 shows the dynamics. The frequency of misreporting is rather time invariant on a comparably high level and does not depend on the leak probability (left panel).[15] This is somewhat at odds with the *LEOR(i)*. However, the size of sellers' lies increases substantially across rounds (right panel). More interestingly, there is a stable gap in the size of the lies (apart from the very last round): the average difference between the reported and the true value of the company is smaller when the leak probability is high. This is a first piece of evidence for the *LEOR(ii)*. In sum, more probable leaks do not lead to fewer dishonest reports, but to less severe ones.

[14] We did not impose additional social norms of truthtelling in the instructions which could have resulted in lower overall lying rates. However, the effect of the parameter constellation that we are examining here would be independent of this.

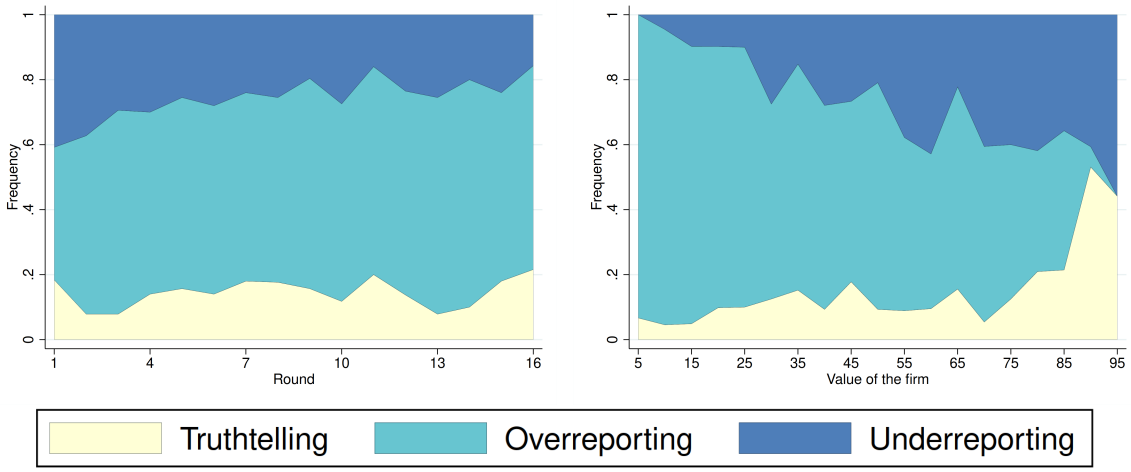
[15] A paired t test run on independent matching-group level frequencies of misreporing by w confirms a non significant difference ($p - value = 0.164$).

Figure 1: Dynamics of misreporting behavior: misreporting frequency (left panel) and size of lie (right panel)



Around 70% (69.9% to be precise) of all untruthful reports result from sellers overreporting v, with a maximum lie of 90. Interestingly, in the case of the remaining almost third (30.1%), the reported value, $\hat{v}$, is lower than the real v with a minimum of -65. Thus, a large number of sellers actually underreport. Figure 2 (left panel) illustrates the frequency and dynamics of under- and overreporting (along with truthtelling) across rounds. Despite the clear and increasing dominance of overreporting, both underreporting and truthtelling still occur to a significant extent in later rounds. Underreporting decreases after the first three rounds, meaning that some participants are learning in which direction it is more convenient to lie.

Figure 2: Truthtelling, over- and underreporting frequencies by round (left panel) and by company value (right panel)



Value of the company. To investigate the reasons behind these different types of misreporting, Figure 2 (right panel) illustrates their dependence on the company value v rather than time. Underreporting and truthtelling increase with value v. Overreporting is mostly concentrated at small to medium size values v. We summarize our findings which provide evidence for *UR* in

Result 1:

Misreporting value messages is massive (about 86%) and dominated by nearly 60% overreporting, especially in the lower value range of v. However, under- and truthfully reporting are substantial, too.

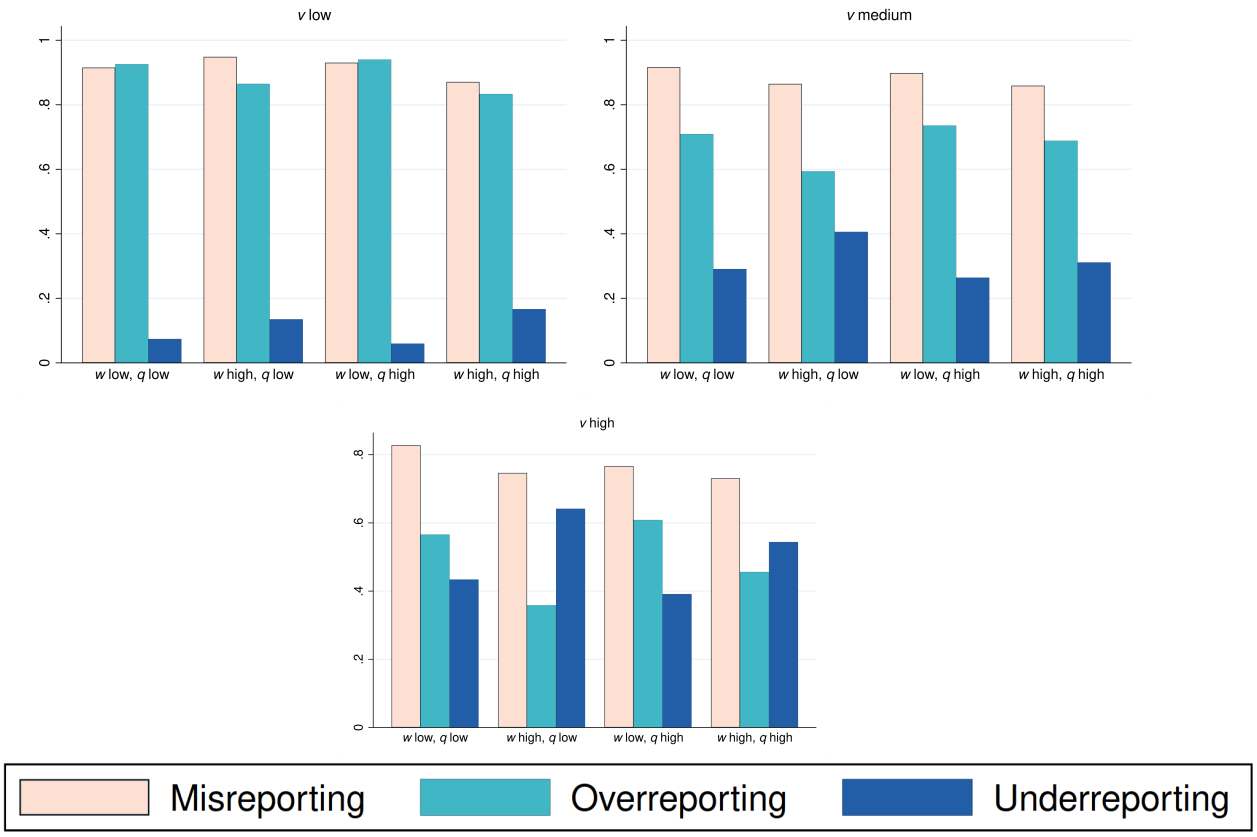
Parameter constellations. Next we investigate if and how (mis)reporting behavior changes with parameter constellations. In order to take into account the role of the value of the company, we split the distribution of v in three categories: *low* if $v \in \{5, 10, 15, 20, 25, 30\}$, *medium* if $v \in \{35, 40, 45, 50, 55, 60\}$ and *high* if $v \in \{65, 70, 75, 80, 85, 90, 95\}$.

Figure 3 attempts to visualize the joint effects of the parameter constellation for the leak probability, w, and the extent of the underevaluation of the company, q, as well as of the value of the company, v. With respect to the latter, the data corroborates our previous findings: the frequency of underreporting increases as v increases whereas the frequency of overreporting decreases. Surprisingly, the proportion of untruthful versus truthful reports remains rather stable for every combination of parameters, and

an increase in w by factor 4 only leads to a small increase of truthful reports. What does change drastically, however, is the structure of the misreports. Subjects seem to substitute overreporting with underreporting, instead of truthtelling. To be more precise, a higher leak probability always leads to a decrease in overreporting and a simultaneous increase in underreporting (compare the first to the second pillars, and the third to the fourth pillars, respectively). Such behavior can be seen as evidence that sellers strive for a positive social image as modest in sharing the pie which only materializes with a high leak probability. They seem to want to achieve this by understating the value of the company and thus enabling the buyer to make a particularly favorable acquisition. The fact that sellers attach a monetary value to their social image is revealed by the fact that they are willing to accept a lower sales price and, thus, payoff, than would have resulted from a value message with the true value of the company. The increase in underreporting for a higher leak probability is stronger, the higher the value v. This reveals a second motive for downward lying: the already known danger of scaring off the buyer with honest (and even more so exaggerated) value messages and thus not achieving a trade.

In contrast, the effects for the extent of the underevaluation of the company, q, are less pronounced. Only for medium and high values v and a high leak probability, we observe a mild increase in overreporting along a corresponding decrease in underreporting (compare the first to the third pillars, and the second to the fourth pillars, respectively).

Figure 3: Frequency of misreporting and percentage of over and underreporting by parameter constellations



5.1.2 Regression Analysis

Our findings from the descriptive data are supported by regression analysis. We apply a three-level, random intercept model with observations nested at the individual and matching group levels. Table 2 shows the results where the dependent variable is the sellers' (mis)reporting extent, i.e. $\hat{v} - v$.

Our set of explanatory variables includes the percentage extent of misreporting in the previous round (measured as the difference between the reported and the real company value relative to the real one), a dummy variable regarding the detection of a lie in the previous round and a dummy variable regarding the acceptance of the proposed price and thus the conclusion of the trade. Furthermore, we use the three-way division of the company value explained above (a medium v is the reference category), and dummy variables for the parameters q and w, which are each 1 if the parameter

values are high (i.e. 0.55 and 0.4, respectively). We also control for the subjects' risk propensity. The set of controls is complemented by round dummies and demographic controls, which include the gender of the subjects, their age, whether they are studying economics, whether they are experienced in participating in experiments and from which Italian macro-area they come from (i.e. dummy for center of Italy, where the university is located). Table 1 in Appendix A reports the summary statistics of such demographic controls.

Overall, misreporting is path dependent as the extent of a lie in the previous round has a robust (across specifications) explanatory power. In contrast, whether or not the seller was caught lying in the previous round due to the leak event has no effect on the seller's current misreporting behavior. Interestingly, a seller who had accepted the proposed price previously, is likely to misreport higher in the current round. As expected, the value size v plays a predominant role: sellers overreport when v is small, and underreport when v is large. However, this is, at least in part, structural because the range of possible overreporting $\hat{v}$ is small if v is already high, and likewise it is also small for underreporting $\hat{v}$ if v is small. Importantly, and as already revealed by the descriptive statistics, the high leak probability decreases the extent of misreporting. This supports the idea of the *LEOR(ii)*. In turn, a higher extent of underevaluation, q, increases the extent of misreporting, as sellers anticipate they will have lower profits in this case.

To further explore the role of w, model (2) investigates the effect of a 'change in scenario', i.e. whether the leak probability which is randomly determined in every round has increased or decreased (or remained the same), compared to the previous round. Compared to a low w in both rounds, high w triggers lower misreporting extent, independently of its value before, while a decrease in w encourages it.

Table 2: Determinants of sellers' (mis) reporting

Depvar: extent of misreporting, $\hat{v} - v$			
	(1)	(2)	(3)
$\frac{\hat{v}-v}{v}$ at ($t-1$)	0.579**	0.613**	0.583**
	(0.250)	(0.251)	(0.249)
Lie detected ($t-1$)	-0.678	-1.546	-0.875
	(1.460)	(1.536)	(1.458)
Accepted ($t-1$)	3.674**	3.907***	3.673**
	(1.485)	(1.483)	(1.480)
Baseline: medium v			
Low v	19.919***	19.899***	19.886***
	(1.506)	(1.501)	(1.501)
High v	-17.554***	-17.551***	-17.399***
	(1.489)	(1.486)	(1.486)
q is high	4.074***	3.938***	4.032***
	(1.209)	(1.207)	(1.205)
w is high	-9.855***		-18.054***
	(1.232)		(4.183)
Baseline: no change in w (low)			
w was high, now low		4.333**	
		(1.851)	
w was low, now high		-7.496***	
		(1.788)	
No change (high)		-7.225***	
		(1.895)	
Risk propensity	3.319***	3.263***	2.652**
	(0.998)	(0.999)	(1.056)
Interaction w high $*$risk prop.			1.213*
			(0.645)
Demographics	✓	✓	✓
Round dummies	✓	✓	✓
Observations	759	759	759
Number of (matching) groups	17	17	17

Notes: standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Estimates from three-level hierarchical model with random effects, with observations nested at the individual and matching group levels. All specifications include round dummies and demographic controls (gender, age, geographic origins (with students coming from the central regions of Italy as a baseline), a dummy for students in economics and the level of experience in lab experiments).

Despite experimentally induced common(ly known) risk neutrality, the post-experimentally self-assessed risk propensity (the higher the value, the more risk loving the subject is) could play a role.[16] More risk loving participants misreport more and the interaction of risk propensity with leak probability in model (3) is weakly significant.[17] This, of course, shows that uncertainty inclinations reflect much more general disposition than narrowly captured by cardinal utility theory and the expected utility hypothesis of expected utility maximization.[18]

Finally, to complement the analysis on misreporting, Table 2 in Appendix A reports the results of a random-effects multinomial logit regression where reporting behavior is categorized as overreporting, truthtelling and underreporting. Besides confirming what we already observed in Table 2, the estimates corroborate the visual impression of Figure 3. A higher leak probability increases truthtelling, but especially underreporting while, in turn, overreporting decreases. Underreporting and truthtelling are also more frequent for higher company values. Taken together, this may indicate that sellers seem to strive for a positive social image as modest and are eager to increase chances of trade.

We summarize our findings which provide evidence for the *LEOR(ii)*, *UR* and *PD*, in

Result 2:

An increase in the leak probability reduces the size of the lies and changes the structure of misreports with underreporting partially crowding out overreporting. Furthermore, the extent of misreporting is partly path dependent due to inertia in misreporting. In turn, a higher extent of underevaluation, q, increases the extent of misreporting.

[16] It is important to note that the commonly used question for risk assessment, 'Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?' does not mention probabilities or monetary rewards, therefore it is more general than the neoclassical definition of risk aversion.

[17] The demographic controls do not exhibit significant effects in predicting lying. Coefficients for demographics and round dummies are available upon request.

[18] Note that this questions expected utility theory and not that, according to expected utility theory, binary-lottery incentives induce risk neutrality.

5.2 Market Outcomes

5.2.1 Descriptives

Table 3 reports summary statistics for buyers' behavior in the bargaining process, overall and differentiated according to whether v was private knowledge (upper part a) or public knowledge due to an information leak (lower part b). In the latter case, we additionally distinguish whether a lie has been detected. Together with average price proposals p, we show the implied share of the value (hereafter shv) and of the surplus (hereafter shs, with $s = v - qv$) stemming from such proposals. In particular, shv is defined as $\frac{v-p}{v}$ when there is an information leak and v is known; when there is no leak, its equivalent is $sh\bar{v} = \frac{\hat{v}-p}{\hat{v}}$. Similarly, the proposed sharing of the surplus, shs, is defined as $\frac{v-p}{(1-q)v}$ when there is an information leak and v is known and $\frac{\hat{v}-p}{(1-q)\hat{v}}$ when there is no leak.[19]

Proposed prices are slightly higher when v is not leaked (a) compared to when there is an information leak (b), and the difference is only weakly statistically significant according to two-sample t test run on matching-group average observations, with $p = 0.0504$. What is consistently different, however are the requested shares of value. In the first case buyers aim at earning 47% of the (hypothetical, as they rely on $\hat{v}$) pie size while in the latter when they are informed they lower their requested shv to only 30%. With such low requests, buyers seem to want to reduce the probability that the seller might reject their price proposal. In addition, the higher share of $\hat{v}$ demanded when v is not known might signal that buyers are anticipating sellers' overreporting tendency.[20]

A distinction based on the type of the lie when v is not leaked (cases *a.1* to *a.3*) and whether or not it was detected in the leak event (cases *b.1* and *b.2*) refines the picture. When v is not leaked, sellers' overreporting and underreporting have, of course, opposite effects on price proposals with the former being significantly higher than the latter. Nonetheless, the requests on shv and shs vary little in the type of the lie. Lastly, in case of leaks, i.e. when there is ultimatum bargaining with complete information like in usual ultimatum games, price proposals are lower when a lie was

[19] As the definitions of shv and shs differ depending on whether there was a leak or not, we do not report their averages for the full sample.

[20] A similar picture emerges for the share of the surplus, shs, which is either 83% or 55%. However, the fact that the requested shs amounts to 83% when v is not known suggests that participants fail to anticipate the effect of q on the aggregate payoff.

detected (case *b.1*; 27.49) compared to when the seller sent a truthful message (case *b.2*; 32.26). This statistically significant discount (paired t test on matching group-level averages; $p - value$=0.0402) could be considered as evidence for buyers discriminating against lying sellers. However, given that sellers are more likely to overreport, overall and more specifically for low v-values, it seems much more reasonable to conclude that in this last case buyers simply adapt their pricing behavior to the known v. Put differently, there is no evidence that buyers discriminate or punish liars. They rather adapt price proposals to their information set. When only $\hat{v}$ is known, they anchor to this value message and prices are higher because sellers are more likely to overreport. As a matter of fact, when a lie is detected buyers claim a lower share of v (case *b.1* in Table 3) compared to when they are not informed (case *a*). This hints to the fact that they claim more when uninformed because they are anticipating that $\hat{v}$ is overreported. However, the low number of observations does not allow for further robust investigations.

Table 3: Summary statistics of buyers' price and value/surplus sharing proposals

Buyers' proposals						
	p	Share of value		Share of surplus		N
		$\hat{v}$	v	$\hat{s}$	s	
All choices	29.71	-	-	-	-	808
a) v not leaked	30.23	0.47		0.83		600
a.1) overreporting	32.18	0.51		0.90		355
a.2) truthtelling	33.33	0.44		0.79		87
a.3) underreporting	24.15	0.41		0.71		158
b) v leaked	28.20		0.30		0.55	208
b.1) v leaked, lie detected	27.49		0.27		0.51	177
b.2) v leaked, lie not detected	32.26		0.44		0.80	31

Notes: share of value and of *surplus* are defined as the payoff the buyer proposes for herself over the available amount (i.e. the value or the surplus), conditioned on the information she has. When v is not leaked, $sh\hat{v} = \frac{\hat{v}-p}{\hat{v}}$ and $sh\hat{s} = \frac{\hat{v}-p}{(1-q)\hat{v}}$; when v is leaked, $shv = \frac{v-p}{v}$ and $shs = \frac{v-p}{(1-q)v}$

Table 4 presents summary statistics for sellers' propensity to accept. In Panel A we report the number of trade opportunities (N), the number of acceptance decisions

(α, i.e. how many of the opportunities turned into realized trades) and the acceptance rate (α/N) overall, by information condition depending on whether v was leaked or not, and by q-value. In Panel B we report the same quantities distinguishing whether acceptance would imply a positive, null or negative payoff for the seller.

Overall, trade occurs in 75% of all bargaining situations. However, if v is leaked (case *a.2*), then acceptance occurs significantly more frequent than if v is not leaked (case *a.1*): 80.77% versus 73.17% (paired t test run on acceptance rate at the matching group level, $p - value = 0.017$). This evidence confirming a *WITL* is summarized by

Result 3:
Information leaks increase the probability of trade and, therefore, are welfare improving.

Furthermore, the acceptance rate is significantly higher when q is low (case *b.1* versus case *b.2*; paired t test on matching group-level averages; $p - value = 0.000$). However, this follows somewhat straight from the the seller's payoff structure. The wider the gap in the valuation of the company between the buyer and seller, the wider the range of price proposals that the seller can accept.

When distinguishing choices according to the sign of the potential payoff (Panel B), sellers nearly always accept buyers' price proposals if this yields a positive payoff and reject if negative. This is clearly in line with sellers being opportunistic (*SO*). Quite surprisingly, in nearly 25% of the cases when acceptance would cause a loss (corresponding to 5.82% of all observations), sellers accept nevertheless and get a negative profits. Compared to this, sellers rejecting positive profits is more rare (around 8.43%). This suggests some altruistic rewarding and sanctioning, respectively.[21]

[21]This would somehow contradict the effect *SO*. However, the corresponding number of acceptance choices are 47 and 51, respectively, which is too low for reliable behavioral conclusions.

Table 4: Summary statistics of sellers' acceptance, overall (Panel A) and by potential payoff sign (Panel B)

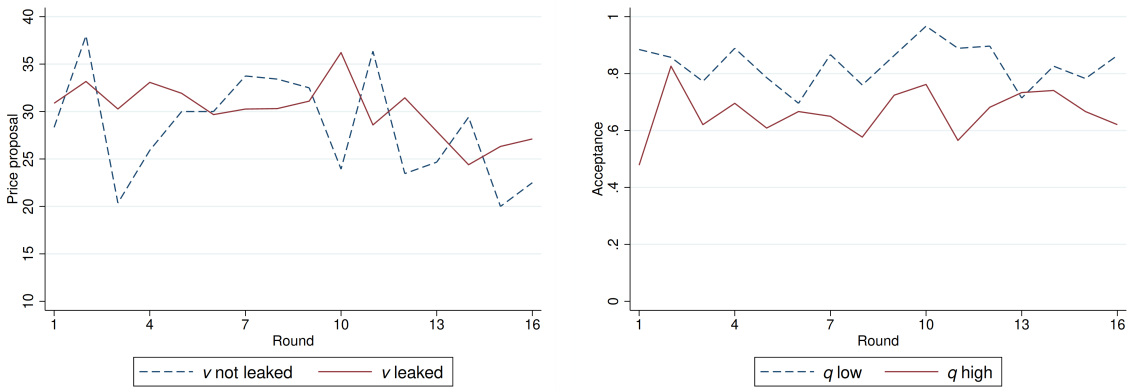
Panel A			
	N	α	*% accepted* (α/N)
All choices	808	607	75.12%
a.1) v not leaked	600	439	73.17%
a.2) v leaked	208	168	80.77%
b.1) q is low	409	343	83.86%
b.2) q is high	407	270	66.34%

Panel B				
	N	α	*% accepted* (α/N)	*% of sample* $(\alpha/808)$
Positive payoffs	605	554	91.57%	68.56 %
Null payoffs	10	6	60.00%	0.74%
Negative payoffs	193	47	24.35%	5.82%

Notes: N indicates the absolute frequency of cases irrespective of the seller's decision (i.e. the number of potential trade opportunities) while α indicates in how many of those cases the seller accepted (i.e. the number of the realized trades.

Finally, Figure 4 illustrates the price dynamics. When buyers are uninformed (v is not leaked; left panel, dashed line), average prices are more volatile than when v is leaked (solid line), although this may also be due to fewer observations without v-leaks. Overall, we see a stable decline of price proposals during the last 6 rounds in both cases.. This could be due to late learning of the winner's curse, i.e., of realizing that for large q, buyers' expected payoffs from trade are negative. Only for low q their losses would be overcompensated by gains. Despite the declining price offers, acceptance rates are relatively stable at around 75% over the course of the rounds (right panel). Of course, acceptance rates are higher for low q.

Figure 4: Dynamics of buyers' price proposals (left panel) and sellers' acceptance (right panel)



5.2.2 Regression Analysis

Table 5 presents the results of regression analyses with buyers' price proposals, p, as dependent variable. We run similar, but not identical, analyses for the split sample based on whether there has been an information leak or not (first two columns) as well as for the full sample (third column). Given that the sample split originates two unbalanced panels with a smaller number of observations than the full one, we resort to random effect regression. To account for matching-group specific effects, all regressions include matching group dummies, as well as round dummies and the set of demographics described in Subsection 5.1.2.

When the buyer is uninformed since v was not leaked, the strong significance of the previous price proposal, p_{t-1}, reveals a clear path dependence (PD) in pricing behavior. Interestingly, buyers' price proposals also depend on their experience with sellers' misreporting behavior in the previous round. We categorize misreports as the relative difference between a past value message and the real value. Underreporting result in a negative difference. In contrast, modest overreporting is reflected in a positive difference below 100 % whereas excessive overreporting comes along with a positive difference above 100 %. The reference category is truthful reporting.[22] The analysis reveals that buyers substantially decrease their price offers after having met a seller who overreported compared to having met truthful sellers. So there is inertia in suspicion.

[22]Since the parameters q and w are highly correlated with lying behavior, we avoid including them in the regression given the presence of the value message and of the lie detection variable.

In addition, estimates show that not knowing v let buyers base their decision mostly on the value message received, $\hat{v}$. Obviously, in case of an info leak, it is not $\hat{v}$ but rather v itself which has explanatory power for the price proposals (third column in Table 5). Lastly, the dummy variable *detected*, which is equal to 1 in case v is known and the seller misreported it, turns out to be not significant. Thus, we find no evidence for buyers discriminating against lying sellers. When there is an information leak, buyers rather seem to condition their pricing behavior much more to the real value v.[23]

Result 4:

When there is no information leak, price offers depend on the message received and own past choice which shows a certain path dependency. When there is an information leak, buyers anchor on v but they do not discriminate against lying sellers. Furthermore, there is inertia in suspicion, in the sense that interacting with an overreporting seller decreases later price offers.

[23] Across all three specifications, among the demographic controls, females offer significantly higher prices whereas risk propensity turns out insignificant. Coefficients for demographics and matching group and round dummies are available upon request.

Table 5: Determinants of buyers' proposed price

Depvar: price offer, p_t			
	v not leaked	v leaked	Overall
p_{t-1}	0.241***	0.063	0.218***
	(0.041)	(0.052)	(0.038)
Reporting at $t-1$, baseline: truthtelling			
Underreporting	1.236	-2.307	0.953
	(1.349)	(2.174)	(1.465)
Modest overreporting	-1.960	-4.061**	-1.488
	(1.438)	(2.018)	(1.269)
Excessive overreporting	-3.349**	-4.924**	-3.481**
	(1.365)	(2.403)	(1.417)
$\hat{v}$	0.341***		0.323***
	(0.030)		(0.029)
v		0.480***	
		(0.041)	
Detected		-1.469	-1.608
		(2.335)	(1.465)
Demographics	✓	✓	✓
Round dummies	✓	✓	✓
Matching group dummies	✓	✓	✓
Observations	554	197	751

Notes: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Estimates from random effects model. All specifications include matching group and round dummies and demographic controls (gender, age, grographic origins (with students coming from the central regions of Italy as a baseline), a dummy for students in Economics and the level of experience in lab experiments). Categories of reporting at $t-1$ correspond to $\frac{\hat{v}-v}{v}$ being either negative (underreporting), null (truthtelling, baseline category), <100% (modest overreporting) or ≥100% (excessive overreporting).

Finally, Table 6 presents the marginal effects of pooled probit regressions with sellers' acceptance as dependent variable. We again show results separately for the cases in which v is (not) leaked (first two columns) and for the full sample (third column). All regressions include round and matching group dummies and the same set of demographic controls. In Panel A we use as regressor the price offer received; in Panel B we include the seller's lie (as percentage of v) to check whether own lying

behavior affects acceptance.

As predicted, sellers are fully opportunistic (in line with the idea of SO). The main determinant of acceptance is whether the resulting payoff is at least positive, i.e. whether the proposed price p is larger or at least equal to the seller's valuation of the company, qv. With the exception of an info leak, the price level itself also has a significant, albeit small, effect. Massively overreporting also enhances acceptance, compared to truthtelling, and actually triggers higher and thereby more acceptable price offers. But this phenomenon disappears when restricting the analysis to cases when informed buyers offer prices. Moreover, sellers do not discriminate against buyers who they have found out lying about the company's value. However, the coefficient measuring whether a lie was detected is small and insignificant.[24]

[24]The demographic controls are not significantly associated with the probability of acceptance. Coefficients for demographics and matching group and round dummies are available upon request.

Table 6: Determinants of sellers' acceptance

Depvar: acceptance decision			
Panel A			
	v not leaked	v leaked	Overall
Non-negative payoff	0.384***	0.370***	0.367***
	(0.019)	(0.039)	(0.020)
p_t	0.004***	0.002	0.004***
	(0.001)	(0.002)	(0.001)
Detected		-0.012	0.024
		(0.085)	(0.027)
Panel B			
	v not leaked	v leaked	Overall
Non-negative payoff	0.401***	0.442***	0.405***
	(0.017)	(0.037)	(0.018)
Reporting at t, baseline: truthtelling			
Underreporting	-0.015	0.080	-0.001
	(0.041)	(0.065)	(0.040)
Modest overreporting	-0.027	-0.066	-0.037
	(0.039)	(0.071)	(0.041)
Excessive overreporting	0.097**	-0.090	0.035
	(0.041)	(0.077)	(0.039)
Demographics	✓	✓	✓
Round dummies	✓	✓	✓
Matching group dummies	✓	✓	✓
Observations	600	184	808

Notes: Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Marginal effects from pooled probit regressions, with standard errors clustered at the individual level. All specifications include matching group and round dummies and demographic controls (gender, age, grographic origins (with students coming from the central regions of Italy as a baseline), a dummy for students in Economics and the level of experience in lab experiments). Categories of reporting at t correspond to $\frac{\hat{v}-v}{v}$ being either negative (underreporting), null (truthtelling, baseline category), <100% (modest overreporting) or ≥100% (excessive overreporting).

We summarize these insights in

Result 5:

Sellers are fully opportunistic. They make their acceptance decision dependent on whether the resulting payoff is positive.

6 Conclusion

Laboratory experiments exploring (im)moral behavior partly suffer from implicit and explicit demand effects. We tried to weaken this not only by employing a market setup, but also render the demand effect for lying ambiguous: although sellers might try to trigger higher price offers via exaggerating value-messages, they should be discouraged by leaking information. In this way, information leaks modify the Acquiring-a-Company setup: by default, there is asymmetric value information of the seller who, as studied before, can send a true or false value message. This we have enriched by including a commonly anticipated probabilistic leak-event whose probability is either 10 % or 40 %.[25] Via info leaks also the buyer can know the true company value. Thus, the buyer can identify an untrue value message as a lie and also determine its extent and sign before proposing a price which the seller may finally reject or accept. Only in the latter case, trade occurs.

Increasing the leak probability surprisingly only mildly increases truthtelling. Instead, it reduces the size of the lies and changes the structure of misreporting where the incentives for deviations from the truth are twofold. On the one hand, sellers frequently overstate the value of their company in order to induce higher price proposals and, thus, boost payoffs. We refer to this as overreporting. However, overreporting accounts only for roughly two thirds of all misreporting and decreases when the leak probability increases. On the other hand, there is also underreporting possibly due to hoping that it increases the probability of trade. Underreporting increases when the informations leaks are more likely. Price proposals of buyers unaware of the true value of the company are based on the value message and show a certain path dependency. In contrast, those buyers who found out value misreporting, anchor on the true value. Thus, they do not care too much when having found out value misreporting and abstain from discriminating against liars. However, they do exhibit a certain inertia in suspicion: having interacted with an overreporting seller makes them decrease their

[25] More generally, commonly anticipated "leak" events allow for continuous classes of hybrid games, in our case including the deterministic border cases where the leak probability is either 1 or 0. See also Fischer et al. (2021), who theoretically analyze leaks in sequential auctions.

price offers in future rounds. Sellers are fully opportunistic with the non-negative sign of the potential payoff being the main driver of their acceptance decision. Thus, morality concerns in this market exchange do not seem to matter much.

Altogether our data indicate a strong trade and welfare enhancing effect of probabilistic leaks, not only when welfare enhancing trade is (game) theoretically unpredicted in case of zero-leak probability, but also when it is predicted to occur with 100 % probability.

The high average acceptance rate of nearly 80 % shows that from the policy perspective info leaks, e.g. due to whistle blowing, are trade and welfare enhancing, even when its probability is low. Thus, creating such information leaks should be encouraged.[26] In our view, incentivizing whistle blowing would help (law) relevance. Nevertheless dealing with private information will always prevail and cannot be neglected. There will be credence goods, insiders on financial markets, hidden information of agents in corporate business, etc. So investigating whereas information leaks may limit exploitation of uninformed by privately better informed parties in market interaction will remain important, irrespective whether whistle blowing is legally and socially encouraged. This is where our paper tries to add to the literature.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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[26] In experimental research incentivizing whistle blowing has been studied via Prisoner's Dilemma experiments which incentivize unilateral defection from mutual cooperation Abbink and Serra (2012).

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