Critical Perspectives on Accounting xxx (2014) xxx–xxx

Contents lists available at ScienceDirect

Critical Perspectives on Accounting

journal homepage: www.elsevier.com/locate/cpa

Honesty in managerial reporting: How competition affects the benefits and costs of lying

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ARTICLE INFO

Article history:
Received 16 October 2012
Received in revised form 8 January 2014
Accepted 13 January 2014
Available online xxx

Keywords:
Competition
Rivalry
Honesty
Managerial reporting

ABSTRACT

Although research on honesty in managerial reporting has provided important evidence for the idea that competition can restrict the relevance of honesty preferences, why exactly competition has this effect remains largely unexplored. This paper suggests that different aspects of competition independently affect honesty in managerial reporting: economic competition affects the economic benefits of lying, while rivalry diminishes the moral costs of lying. Based on recent findings from social psychology and experimental economics on a gender gap in competitiveness, the study further hypothesizes that the effects of competition on honesty differ across gender. A laboratory experiment was conducted, in which participants had to report cost information in a participative budgeting context under different competitive and non-competitive conditions. Results indicate that an individual's willingness to report honestly decreases significantly when rivalry is introduced, even if the economic benefits of lying remain constant. In contrast, economic competition only diminished the salience of honesty preferences of male participants in the experiment. In conclusion, corporate managers who wish to take advantage of the positive effects of competition, such as increased motivation and efficiency in capital allocation processes, should not only focus on its economic effects but also be aware of its potential negative impact.

1. Introduction

Can organizational incentives make honest people lie? This question is of particular relevance in participative budgeting processes. When subordinates are allowed to participate in target-budget setting or are asked to report actual or forecasted costs and revenues, they can often capitalize on their information advantage by misreporting (Fisher et al., 2002b; Jensen, 2003; Zhang, 2008). Traditionally, standard agency theory predicts that, as long as subordinates have an incentive to act opportunistically, they will misrepresent information for their private benefit (Young, 1985).

In contrast, recent experimental research on honesty in managerial reporting has produced two broad findings: first, participants' reporting behavior suggests they have a preference for honesty which prevents them from fully exploiting their information advantage by lying as much as possible (Brown et al., 2009). This is because, apparently, people suffer moral costs when they lie. Second, the willingness of individuals to sacrifice some monetary payoff for the sake of a desire to be honest does not persist unconditionally. Although research has consistently demonstrated that individuals report more

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http://dx.doi.org/10.1016/j.cpa.2014.01.001
1045-2354/

honestly than predicted within a standard agency framework, various personal and situational factors can influence the trade-off between the costs and benefits of lying and thus limit the inclination to report honestly. For example, differences in payment schemes (Chow et al., 1988; Waller and Bishop, 1990), information asymmetry (Fisher et al., 2002a), reputation considerations (Webb, 2002), and the degree of participation in budget-setting (Fisher et al., 2000; Rankin et al., 2008) were all shown to diminish the actual degree of honesty in reporting.

One factor that has also been shown to influence the cost–benefit ratio of lying, is intra-organizational competition. Competition, as opposed to co-operation, is defined as a social situation of negative goal interdependence: the achievement of a goal by one or more members of a group necessarily implies that the other members do not achieve the same goal (Deutsch, 1949; Johnson and Johnson, 1989:4). Competitive social interactions are widespread in modern organizations. Because of their alleged capacity to increase organizational efficiency, internal market mechanisms, such as competition for scarce resources, are increasingly employed in organizations (Baiman et al., 2007; Halal et al., 1993; Malone, 2004) in the hope that they set incentives for certain desirable behaviors such as effort, motivation, or increased productivity.

As several recent experimental accounting studies have shown, competition can reduce individuals' willingness to resist economic incentives and report honestly. For example, the experimental study of Brüggen and Luft (2011) shows that across different competitive and non-competitive capital budgeting contexts, agents under modest competition were most likely to misrepresent their private information to superiors in order to increase the likelihood to win funding for their projects (Fisher et al., 2002b; Young et al., 1993).

Although such studies provide evidence that competition can reduce honesty in managerial reporting, the exact mechanisms through which competition unfolds these effects have largely remained unexplored. It has been acknowledged that competition involves "a combination of economic and psychological factors" (Fisher et al., 2002b:853), or that "economic and behavioral factors" (Frederickson, 1992) are necessary to explain effects of competition (also: Brüggen and Luft, 2011:402–3). However, these different factors and their relation have not been analyzed, yet, although a thorough understanding would be very important, e.g. for the purpose of identifying adequate contract designs.

Against this background, the goal of this study is to disentangle the economic and psychological effects of competition on reporting honesty. It extends prior research in the accounting literature by incorporating recent findings from the social psychology and experimental economics literatures. In particular, it will distinguish different modes of competition and analyze their effects on people's propensity to be honest despite economic incentives to lie. While one mode of competition involves an increase in economic pressure, the other mode induces rivalry amongst participants without, however, changing monetary incentives. In addition to analyzing the main effects of competition, recent findings from gender research will be used to investigate whether the magnitude or direction of these effects vary by gender. The study thus contributes to the literature on gender and ethical decision making in accounting (Keller et al., 2007).

To test the hypotheses, a laboratory experiment was designed and conducted. Participants in the role of subordinates had to submit budget proposals, which, when accepted, allowed them to invest in a project. Since proposals influenced actual budgets, participants had economic incentives to misrepresent the information they held privately. The three treatment groups differed in whether and what kind of competition prevailed. In the case of economic pressure, participants were competing for scarce resources; in the case of rivalry, participants' relative performance was ranked, as ranking induced rivalry amongst group members, without, however, changing their economic calculus. Data suggest that participants did not fully exploit the possibility of maximizing payoffs through misrepresenting their private information. As hypothesized, however, this inclination to report honestly decreased significantly when competition was introduced. Most interestingly, rivalry indeed increased misrepresentations even when the economic incentives to lie were held constant. In contrast, competitive economic pressure per se did not generally increase misrepresentations. While female participants' propensity to lie remained unaffected by economic pressure through competition, male participants misrepresented their private information to a higher degree in a competitive setting. The experiment's results thus provide evidence for the notion that social norms such as honesty become less salient when individuals find themselves in competitive situations.

2. Background and hypotheses

2.1. Participative budgeting and reporting honesty

In line with Gneezy's definition (2005), in the current study a misrepresentation of information is classified as lying if one person intentionally communicates incorrect information to increase his or her benefit at the expense of others. Lying can be a problem in participative budgeting contexts when information asymmetries exist between superiors and subordinates in the organizational hierarchy. For example, consider a situation in which division managers (the agents) can propose projects that require funding by the corporate headquarters (the principal). If only agents know the actual costs, they have an economic incentive to misrepresent their private information by demanding funding in excess of the amount actually needed for the project ("budgetary slack").

Accounting research has sought to predict agent behavior in light of such incentives. Scholars who base their arguments on standard agency theory have traditionally assumed that lying, in the form of intentionally inaccurate reporting, is merely a function of incentives: whether individuals tell the truth depends on whether there is a strong enough monetary incentive to do so (Baiman and Lewis, 1989). In contrast, other experimental studies suggest that the inherent preference of individuals

Please cite this article in press as: Schreck P. Honesty in managerial reporting: How competition affects the benefits and costs of lying. Crit Perspect Account (2014), http://dx.doi.org/10.1016/j.cpa.2014.01.001

for honesty prevents them from fully capitalizing on their private information in participative budgeting settings (for an overview, cf. Brown et al., 2009). This discrepancy between theoretical predictions and empirical observations has led to the conclusion that non-pecuniary motives must play an important role in explaining how people actually report (Nikias et al., 2010). One such motive is the preference for honesty (Evans et al., 2001; Hannan et al., 2006; Rankin et al., 2008).

Most societies consider honesty an ethically desirable personality characteristic (Murphy, 1993) and individuals are generally assumed to have an aversion to lying, albeit to varying degrees (Lindskold and Walters, 1983). Lying thus corresponds to a violation of a socially accepted moral norm that, psychologically, incurs moral costs: people with a preference for honesty experience disutility when they lie (Gneezy, 2005; Luft, 1997). This disutility then helps explain why participants in experiments generally increase their monetary pay-offs by lying, but not as much as they could (Evans et al., 2001).

2.2. Competition and honesty

Capital budgeting often involves competitive situations (Brüggen and Luft, 2011). Although the research discussed to this point suggests that the honesty preference of subordinates will prevent them from fully exploiting their information advantage, competition might change their reluctance to lie. This effect can occur via two distinct functions of competition.

First, competition can have an impact on the expected monetary payoff of lying. Earlier research has found, for instance, that competitive forms of capital rationing can increase the misrepresentation of private information (Waller and Bishop, 1990). Similarly, in their recent experimental study, Brüggen and Luft (2011) show that if competition provides incentives to lie, and the psychological costs of lying are relatively low (as in a situation of medium competition), individuals choose a higher level of misrepresentation than in non-competitive settings. In the situations that such studies consider, a superior typically has limited resources to invest into alternative projects, which consequently limits the number of investment projects. In those cases, the superior has to choose among different projects proposed by subordinates. Since decisions on resource allocation are based on standard budget proposals, subordinates compete with each other; the hope of increasing the likelihood that their particular project receives funding by the superior functions as an incentive to overstate their productive capacity or their projects' expected revenues. Consequently, the marginal payoff of lying is positive.

A quite different argument was put forward by Fisher et al. (2002b); namely, that competition among subordinates can actually increase reporting honesty. These authors consider the joint effects that budget-based schemes provide when used for both resource-allocation and performance-evaluation purposes. In this case, the subordinates' incentive to *understate* the budget for performance-evaluation purposes is counterbalanced by their incentive to *overstate* it when competing for scarce resources (again, to increase the likelihood that the project will receive funding). In line with this logic, competition was shown to lead to more accurate and thus seemingly more honest reporting (Chow et al., 1994; Fisher et al., 2002b).

In sum, whether competition leads to more or less honest reporting depends on how exactly it changes the incentive structure in terms of the expected monetary payoff of lying.

H1. Competition that increases the expected monetary benefits of lying will, *ceteris paribus*, lead to a higher degree of misrepresentation.

Second, competition might have psychological effects beyond those of economic pressure. To disentangle these two effects, it is important to note that by definition the psychological effects of competition are independent of economic effects; that is, the psychological effects of competition may vary while the expected monetary payoffs of lying are held constant.

Findings from different fields of research suggest that the psychological function of competition might encourage lying when rivalry triggers the desire to win and lowers the moral costs of lying. To begin with, the desire to win can be spurred through the social comparison involved in some modes of competition. This effect is most apparent in the case of competitive performance rankings which provide information on how well one competitor performs relative to the other. Moving up a ranking corresponds to a gain in social status and thus provides psychological rewards (Festinger, 1954). This motivational effect is conceptually independent from that of monetary incentives. Consistent with the theory of social comparison, some experimental studies showed that when competition arises, some participants are even willing to sacrificy monetary gains in order to reduce status differences (Garcia et al., 2006; Hoffman et al., 1954). Based on the same theoretical arguments, several accounting studies showed that the provision of relative performance information alone can already lead to increased effort and performance (Hannan et al., 2008, 2013; Tafkov, 2013). Consequently, when competition involves social comparison it provides non-monetary incentives to lie when lying helps improve one's position in a contest.

The argument that competition might lower the moral costs of lying rests on the notion that it diminishes the salience of social preferences in general. Social psychologists have been analyzing the psychological consequences of competition for a long time, mostly to determine theoretically and empirically whether competition improves individual and group performance in sports, education, and other areas where achievement is paramount. Since in a competitive situation one person's achievement implies his or her competitors' failure, competition does affect one's perception of how he or she relates to others (Johnson and Johnson, 1989). Competitive situations can create such severe rivalry among competitors that the mere desire to beat others increases the likelihood of immoral behavior (Deutsch, 1949; Johnson and Johnson, 1989;

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Kohn, 1992). In an early study in this context, Helen Lewis argued that under competition, the importance of the social group in relation to one's own goals decreases:

> Competition [...] involves a heightening of ego-demands so that the ego-objective is more important than any common objective; i.e., the person is at the focus of consciousness, self-consciousness is at a maximum – the individual is "on the spot" – so that similar behavior may be expected from the member of the competing group and the person driven by inordinate (neurotic) ambition. (Lewis, 1944:115)

Similarly, more recent work on decision making suggests that individuals are less concerned about ethical standards when they judge a situation to be competitive (Butterfield et al., 2000; Messick, 1999). This contextually determined shift in the relative importance of ethical concerns might be attributed to a phenomenon that attracts increasing attention in research on decision making in the context of competition: perceived rivalry. As recent studies suggest, certain contextual factors can heighten perceived rivalry in competitive situations. Specifically, a low number of competitors, time pressure, as well as similarity and repeated interaction among competitors have been found to increase perceived rivalry (Kilduff et al., 2010; Ku et al., 2005). Although rivalry may increase motivation and effort (Kilduff et al., 2010), it can also have unintended effects. Rivalry has been found to trigger "competitive arousal" (Ku et al., 2005). People in such a state shift their attention from performing well to beating their competitors, which, in the context of auction biddings, for instance, can result in irrational behavior (Malhotra, 2010). If competition heightens perceived rivalry it might very well decrease the moral costs of lying, if the desire to win (irrespective of the economic benefits of winning) lessens the competitors' aversion to using lying as a means toward the end of beating the others.

To explain how situational forces such as rival competition can be strong enough to render personal ethical preferences ineffective, psychologists have theorized on the cognitive mechanisms that operate when people discard their ethical concerns. One such mechanism is "moral disengagement," i.e. the process through which people disengage their personal regulatory standards of ethical behavior (Bandura, 1999, 2002; Detert et al., 2008). In a similar vein, the concept of moral identity has been found to play a crucial role in ethical decision making: if "a situational factor decreases the current accessibility of moral identity, then it weakens the motivation to act morally" (Aquino et al., 2009).

In sum, if competition has the power to diminish the perceived importance of social cohesion in relation to oneself and to limit the degree to which social preferences are relevant to individual actions, then this mode of competition might also promote lying in a managerial reporting context. This relation is captured by the following hypothesis:

H2. Competition that increases rivalry will, *ceteris paribus*, lead to a higher degree of misrepresentation.

Finally, we consider recent findings in social psychology and experimental economics which suggest that the effects of competition on reporting honesty might vary across gender. Various experimental and field studies have provided considerable evidence for the existence of a gender gap in competitiveness, suggesting that men are generally more competitive and have a higher preference for competitive environments than women (Croson and Gneezy, 2009; Frick, 2011; Healy and Pate, 2011). For example, some studies showed that competition lead to performance improvements with men, but not with women (Gneezy et al., 2003; Gneezy and Rustichini, 2004). Another often observed phenomenon is that men prefer competition-based incentive schemes over non-competitive ones, for themselves as well as for others (Müller and Schwieren, 2012; Niederle and Vesterlund, 2007; Price, 2012).

While it seems to be commonly accepted that men and women vary in their preferences for competitive situations, there is less agreement on why these differences exist. Some authors explain the gender gap in competitiveness by pointing at differences in socialization (Frick, 2011; Gneezy et al., 2009; House, 1974). According to this argument, from childhood on women learn cultural sex role definitions according to which competition is not seen as feminine but rather a male domain (Stein and Bailey, 1973). Others make differences in traits responsible for the gender gap in competitiveness. From this perspective, hormonal, genetic, and other biological sex differences explain why men and women react differently in competitive situations (Bateup et al., 2002; Buser, 2012; Colarelli et al., 2006).

For the purpose of the current study, it is not necessary to further engage in this debate. The gender gap argument implies the same prediction, irrespective of its exact justification: If women find competitive settings less acceptable than men do, they will be more reluctant to trade off their honesty preferences for increased benefits. In other terms, gender might act as a moderator for the previously identified effects of competition on honesty in managerial reporting. Since this argument applies to both, economic pressure as well as rivalry, the following hypothesis refers to both of them equally:

H3. The effects of competition on the degree of misrepresentation will be stronger for men than for women.

3. Experimental design

To test the hypotheses derived above, an experiment was conducted in a behavioral laboratory for economic and social sciences at a large European university. Using the ORSEE software invitations to 60 students from different academic backgrounds were sent out (Greiner, 2004). Participants were randomly assigned to one of three experimental groups (one session each), so that each treatment employed 20 participants. Each session consisted of 10 rounds and lasted approximately 45 min; average pay was approximately €11.50 per participant. The experiment was programmed and conducted with the experiment software z-Tree (Fischbacher, 2007).

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3.1. Task and treatments

In line with the study's aim to disentangle the different effects of competition, two modes of competition were manipulated. One mode of competition involved changes in the monetary pay-off structure compared to the non-competitive treatment, yet without implying any sort of rivalry (economic pressure treatment). In the other competition treatment, the economic calculus remained unaffected compared to the no competition treatment, but participants perceived each other as rivals (rivalry treatment).

The study uses a participative budgeting model similar to that of Antle and Eppen (1985), which has repeatedly served as the background for experimental studies on honesty in managerial reporting (Hannan et al., 2006; Rankin et al., 2008; Zhang, 2008). The model used here refers to a situation in which division managers (the agents) can propose projects that require funding by the corporate headquarters (the principal). For every project, there is an optimal investment volume I, which generates the maximum rate of return r. While the corporate headquarters only know that the projects' optimal investment volume follows a uniform distribution $I \sim [5000; 5500]$, the division managers have more precise information on the market and their projects and thus know the values of each project's optimal investment volume. If an individual agent's payoff depends on a particular project's volume, the corresponding profit function is:

$$\pi_A = \begin{cases} w + \alpha \cdot rI + (\hat{I} - I) & \text{if the project receives funding,} \\ w & \text{otherwise} \end{cases} \quad (1)$$

where π_A, agent's total compensation; w, reservation utility payment; α, agent's share of the project's profit rI; r, project's rate of return (fixed); I, project's optimal investment volume (agent's private information); $\hat{I}$, budget proposed by agent (reported optimal investment volume).

The part of the division manager's payoff that is generated through investing in the project is represented by $\alpha \cdot rI$. In contrast, $(\hat{I} - I)$ represents the fraction of the agent's payoff that derives from that agent's overstating his or her private information. The model thus assumes that the agent personally benefits if his or her division is provided with more funding than actually needed for the project. This assumption is an abstraction because in practice, budgets exceeding actual demands do not necessarily translate into direct monetary benefit. But it may still be realistic as a manager's desire to create slack in a budget might be motivated by the possibility to include expenditures that are not necessary but increase his personal gain (Antle and Eppen, 1985).

In each period, division managers submitted a project proposal to their corporate headquarters and asked for funding. All units were measured in an experimental currency unit (ECU), where 1000 ECU were equal to €1. It was common knowledge that each project required an investment between [5000; 5500] and that values followed a uniform distribution with $E(I) = 5250$. Each project, if funded, yielded a return on investment of 20% ($r = 0.2$). Subjects were remunerated according to a pay scheme, as defined in Eq. (1), with $w = 100$; $\alpha \cdot r = 0.1$. Note that, in this way, the corporate headquarters' minimum payoff from a project was always larger than each agent's maximum overstatement. In addition, every participant received a show-up fee of €4. Each period consisted of two stages: in Stage 1, subjects received a private signal I on their project's optimal investment volume (randomly drawn from a uniform distribution) and proposed a budget $\hat{I}$ to their superior to receive funding for their project. In Stage 2 they were told about the principal's investment decision and their current and total payoffs. In all treatments, all participants took their decisions anonymously. This helped avoid social desirability as a determinant of participant behavior.

In the *no competition treatment*, subjects simply had to report how much capital they needed to invest in a new project. Overstatements were not detectable, and the corporate headquarters' minimum payoff from a project was always larger than each agent's maximum overstatement. Thus, all participants knew that every project would receive funding, and subjects had a strong economic incentive to overstate their actual capital demand. Such a slack-inducing contract was necessary to test whether a preference for honest behavior would prevent participants from maximizing economic payoffs through lying. Subjects played anonymously and were never given any information on the performance of other participants. In this setting, there was no competition whatsoever.

In the *economic pressure* treatment, subjects competed for scarce financial resources. Five division managers per company submitted project proposals, but only the two most profitable ones (measured by expected project profit $r\hat{I}$) received funding. In this setting, lying increased the likelihood of receiving funding, and decreased the likelihood of receiving the base pay only. Whether subjects wanted to avoid not getting funding, or whether they wanted to increase their pay by overstating their actual capital demand: in both cases, the economic pressure to lie was higher than in the no competition treatment. This situation is very similar to tournament pay schemes which have often been used in the economics literature to induce competition (Bracha and Fershtman, 2013; Dargnies, 2012; Niederle and Vesterlund, 2007). To avoid rivalry between subjects (which should be measured in the *rivalry treatment* only), the other four department managers' decisions were simulated by the experimental software, which honestly reported their values of I. This setting was also necessary to ensure participants could compute expected returns without the need to form expectations on other team member's honesty. As in the *no competition* treatment, subjects played anonymously and were given no information on the other participants' performance.

In the *rivalry treatment*, subjects did not compete for scarce financial resources but for their position in a ranking within four groups of five participants. At the beginning of the experiment, subjects were asked to choose one of five preset

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nicknames, which remained constant throughout the entire session.[1] After each period, two rankings indicated the subjects' position in relation to the positions of their group's other members. The first ranking was based on each group member's profit per period, while the second one was based on his or her cumulated profits (sum across rounds). The rankings did not include any information other than the subject's position; there was certainly no explicit information on reported values or profits. In this treatment, the contextual factors discussed above, which are known to heighten perceived rivalry in competitive situations, were manipulated (Kilduff et al., 2010; Ku et al., 2005). Repeated interaction and social proximity were ensured by holding group members constant across all rounds; additionally, time pressure was increased by limiting decision time to 15 s. Participants who did not report their capital demand within this time frame received only their base pay (which was common knowledge). It is important to note that the ranking did not provide any economic incentives to overstate the capital needed for the investments, so that changes in reporting behavior could be entirely ascribed to the participants' desire to improve their position–in other words, to beat their group members.

3.2. Experimental procedures

Each treatment involved a single experimental session. Upon arrival, participants received instructions, which were read aloud by the experimenter to make clear that every participant had to perform the same task. Numerical examples were given to familiarize participants with the setting, their task and the payment structure. Participants were then given the opportunity to ask questions in case any part of the experiment remained unclear to them. Finally, before the actual experiment started, participants had to pass a test to ensure that everyone had understood the payment structure. It was arranged that the first period (of a total of ten) would begin only after all participants had passed the test, and not before. During each period the participants would have to make decisions that would determine their remuneration. After all decisions had been made, participants were asked to complete a post-experimental questionnaire, which included questions concerning manipulation checks and controls. At the end of each session, each participant was remunerated in private in cash.

4. Results

4.1. Manipulations checks

The average age of participants was 23 years (*s.d.* = 3.0). The anonymous invitation procedure did not allow for an equal number of men and women and resulted in 40% of male participants. Several manipulation-check questions were used in the post-experimental questionnaire to ensure that participants attended to the manipulations (responses on a seven-point scale, with 1 being the minimum, and 7 being the maximum agreement). When asked whether the probability of receiving funding for a project was high, participants in the economic pressure treatment showed significantly lower ratings than in the no competition treatment ($t = -2.40$, $p < 0.05$). To test whether participants perceived rivalry, they were asked how important it was to them to perform better than the other participants. Mean responses in the rivalry treatment were significantly higher than in the no competition group ($t = 1.87$, $p < 0.1$). The results indicate that the manipulations worked as intended. The post-experimental questionnaire also included a question which asked participants to rate whether they considered a misrepresentation of their private information a lie; this served as a validity check for the measure of lying. The mean response was at 5.4 (*s.d.* = 1.8), so it is reasonable to assume that participants were aware of any dishonest behavior, and that it was thus appropriate to use overstatements as a measure of honesty throughout the analysis.[2]

4.2. Mean comparisons and hypothesis tests

As in earlier studies on honesty in managerial reporting (e.g., Evans et al., 2001; Zhang, 2008), in this study the participants' overstatements relative to the maximum potential overstatement serve as a measure of honesty. Table 1 provides summary statistics and group mean comparisons for relative overstatements in all 10 rounds of the three groups.

Consistent with the results of earlier studies, participants overstated their actual capital demand to increase their payoff, but did not maximize their payoffs by lying as much as possible. The *no competition* treatment did not impose any external costs on lying (such as monitoring); still, in average, participants only capitalized on 53% of maximal potential overstatements. These results provide additional evidence for the salience of honesty preferences in managerial reporting processes (Evans et al., 2001; Hannan et al., 2006; Rankin et al., 2008) and prompted further analyses into whether this preference would persist when subjects made their decisions within a competitive setting.

More precisely, H1 predicted that, in line with standard economic theory, participants would make more overstatements of capital demands if competition increased the economic pressure to lie. On grounds of very different arguments, H2

[1] The menu of nicknames included common surnames, which did not allow for conclusions on personal characteristics.

[2] Responses to the post-experimental questionnaire provide further support for the validity of this assumption. When asked why they did not fully capitalize on the opportunity to misreport (open question), most participants answered that they wanted to avoid lies and to behave honestly.

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Table 1
Summary statistics and groupwise mean comparisons.[a]

	Obs	Mean	Min	Max	s.d.	*p*-Value
No competition						
Female	12	0.457	0.053	0.831	0.243	–
Male	8	0.641	0.131	1.000	0.321	–
All	20	0.530	0.053	1.000	0.284	–
Economic pressure						
Female	12	0.372	0.018	1.000	0.357	0.75
Male	8	0.945	0.583	1.000	0.146	0.02
All	20	0.601	0.018	1.000	0.406	0.26
Rivalry						
Female	12	0.729	0.400	0.960	0.200	0.00
Male	8	0.825	0.124	1.000	0.290	0.12
All	20	0.767	0.124	1.000	0.238	0.00

[a] This table reports mean average misrepresentations in each group, sorted by gender. *p*-Values refer to *t*-tests (for unequal variances) for different mean values in the two treatment groups, compared to the no competition group respectively.

Table 2
ANOVA with main and interaction effects.

Source	*F*	*p*-Value (two-tailed)
Effects of competition mode and gender on reporting honesty		
Panel A: Economic pressure treatment		
Economic pressure	1.42	0.24
Gender	16.95	0.00
Economic pressure × gender	4.48	0.04
Panel B: Rivalry treatment		
Rivalry	7.49	0.01
Gender	2.82	0.10
Rivalry × gender	0.28	0.60

predicted that increased rivalry would lower the salience of honesty preferences and would thus increase overstatements. The results summarized in Table 1 only partly support these hypotheses.

As the mean values show, average overstatements across the 10 rounds were higher in each of the two competition treatments compared to the no competition treatment. To test for the statistical significance of these differences, *t*-tests for unequal variances were performed. While, compared to the no competition treatment, overstatements were significantly higher when rivalry was involved ($p < 0.01$), competitive economic pressure per se did not lead to significantly higher levels of overstatements.

H3 stated that the gender gap in competitiveness would lead to different effects of competition on honesty across gender. Group mean comparisons across treatments within gender groups are not fully consistent with this hypothesis. While male participants did increase levels of misrepresentation under economic pressure more than female participants did, this difference was not equally large in the rivalry treatment.

4.3. Multivariate analyses

To better understand the distinct effects of the two modes of competition on male and female participants' reporting honesty, additional multivariate tests were performed. The results of an ANOVA are reported in Table 2 and provide further insights into the strength of the treatment effects relative to gender effects.

The ANOVA additionally includes measures of the interaction between gender and the competition groups. Table 2 shows that, while the effects of rivalry were independent of the participants' gender, interestingly, economic pressure affected male and female participants differently. As indicated by the significant *economic pressure* × *gender* coefficient, economic pressure had a stronger effect on male than on female participants' propensity to overstate their budget proposals. However, there was no such interaction in the rivalry treatment. There were main effects of both the rivalry treatment and gender, but the treatment effect itself was independent of gender. Fig. 1 illustrates this interaction between competition and gender by contrasting male and female average misrepresentation levels in the no competition and the two competition treatments.

In each of the treatments male participants overstated their private information to a higher extent than their female counterparts. But while the gender difference was 0.18 in the no competition group ($p < 0.1$), it was 0.57 in the economic pressure group ($p < 0.01$). Compared across all three treatments, it is striking that participants' gender explained within-group variance best in the economic pressure group. In the economic pressure treatment, male participants consistently capitalized on their opportunity to overstate their private information across all periods, while female participants remained at a comparably low level of misrepresentations. Such gender differences are much less apparent in the other two groups.

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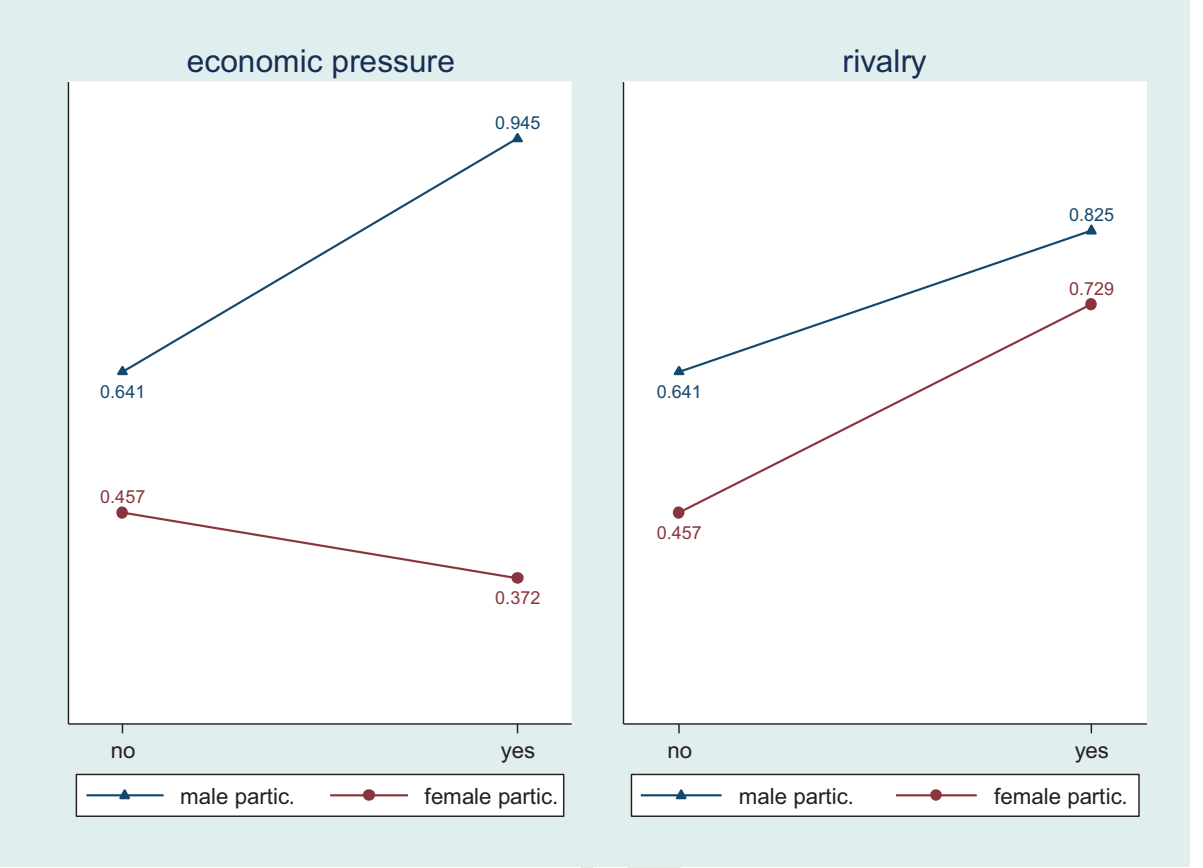

Fig. 1. Interaction effects between modes of competition and gender.

Finally, an OLS regression analysis was conducted to control for further determinants of reporting behavior. Results are reported in Table 3. The analysis includes the participants' age and two additional control variables: first, the participants' honesty preferences are measured on the basis of their self-assessment in the post-experimental survey. One difficulty this first measure presents is that the use of self-reports for assessing the respondents' honesty involves a conundrum: in order to derive valid measures, even dishonest people would have to answer honestly. To avoid this problem, the analysis includes a more fundamental assessment of the participants' intention to behave ethically, the Mach IV scale. The Mach IV scale, consisting of twenty items, measures an individual's propensity toward Machiavellian-type behavior (Christie, 1970) and has often been used as a predictor of ethical behavior (in an accounting context, cf. Pope, 2005). It will thus serve as a proxy for honesty preferences. Second, to control for the participants' assessment of the other subjects' reporting behavior, the analysis includes responses on a seven-point scale to the statement "I believe the other division managers overstated their capital demand" (cf. Brüggen and Luft, 2011).

Model (1) contains dummy variables for the treatment groups and for participants' gender. The results on the effects of different modes of competition remain unchanged: while overstatements were significantly higher in the rivalry treatment, the positive difference in overstatements between the competitive economic pressure group and the no competition group is not statistically significant. This may be explained by the relatively large variance in the economic pressure treatment, which leads to large standard errors of the estimated coefficient. These results are also consistent with those of Brüggen and Luft (2011), who find that, compared to medium-level competition, a very high level of competition is associated with lower levels of misrepresentation. In their experiment, high competition meant that corporate headquarters only funded one out of three project proposals (while two out of three were funded in the medium competition group). This is fairly close to the economic pressure treatment presented in this study, in which two out of five proposed projects were funded.

In Model (2), interaction terms were added to account for differences in effects that competition had on male and female participants, which basically corresponds to the ANOVA reported above. Model (3) additionally contains the participants' age, a dummy variable indicating whether subjects were "high machs" (above the Mach IV scale mean) or "low machs" (below the mean), and participants' believe about the other participants' reporting honesty. The participants' age and responses to the Mach IV scale questions do not add predictive power to the model, while the subjects' beliefs about the

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Table 3
OLS regression results.[a]

Model	(1)	(2)	(3)
OLS estimation results (DV: reporting honesty)			
Regressors			
Economic pressure	0.071	−0.085	0.002
	(0.090)	(0.110)	(0.106)
	(0.437)	(0.445)	(0.986)
Rivalry	0.237**	0.272**	0.347***
	(0.090)	(0.110)	(0.104)
	(0.011)	(0.017)	(0.002)
Gender	0.284***	0.184	0.152
	(0.075)	(0.123)	(0.115)
	(0.000)	(0.142)	(0.191)
Economic pressure × gender		0.389**	0.399**
		(0.175)	(0.161)
		(0.030)	(0.016)
Rivalry × gender		−0.088	−0.115
		(0.175)	(0.161)
		(0.617)	(0.479)
Age			−0.010
			(0.011)
			(0.367)
Mach IV scale (dummy)			−0.062
			(0.069)
			(0.376)
Belief about others' honesty			0.077***
			(0.023)
			(0.002)
Constant	0.417***	0.457***	0.241
	(0.071)	(0.078)	(0.288)
	(0.000)	(0.000)	(0.405)
N	60	60	60
Prob > *F*	0.000	0.000	0.000
R^2	0.278	0.375	0.511

[a] Standard errors are reported in parentheses. Model (1) reports treatment and gender effects only (dummy variable, where 1 indicates "male"); Model (2) additionally includes interactions between gender and treatments. Model (3) includes the control variables Age, Mach IV scale (dummy variable, where 0 = "low machs" and 1 = "high machs"), and Belief about others' honesty (responses on a seven-point scale to the statement "I believe the other division managers overstated their capital demand").

Q4 * Individual coefficients are statistically significant at the 10% level (two-tailed *t*-test).
** Individual coefficients are statistically significant at the 5% level (two-tailed *t*-test).
*** Individual coefficients are statistically significant at the 1% level (two-tailed *t*-test).

other participants' behavior significantly predict reporting behavior. Taken together, these results qualify the present study's previous finding that economic pressure had no statistically significant effect on reporting behavior. Economic pressure through competition did lead to higher levels of misrepresentations, but only for male participants.

5. Discussion and conclusions

This study argued that competition can impede honesty in managerial reporting via two distinct functions: changes in economic pay-offs and rivalry. Based on recent findings from social psychology and experimental economics on a gender gap in competitiveness, the study further hypothesized that the effects of competition on honesty differ across gender. To test these arguments empirically a laboratory experiment was designed and conducted. The results indicate that these effects indeed exist independently of each other. They also revealed that competition can significantly increase an individual's propensity to lie, although these effects partly depended on participants' gender. Rivalry, through the provision of non-monetary incentives to lie and through diminishing the salience of social preferences such as honesty, affected all participants' behavior. In contrast, the economic effects of competition, which increase the economic value of lying, only affected male participants' misrepresentations.

The study's main implications primarily concern the behavioral role that individual preferences can play vis-à-vis strong situational forces. This study provides further evidence that whether or not people are willing to honor their honesty preferences, even in light of strong incentives to lie, depends on circumstances. The results revealed that this willingness decreased when different modes of competition were introduced. Preferences matter – but organizational structures can diminish their influence. This has a number of implications for the overall evaluation of intra-organizational competition and the design of respective incentive systems. The study's results can inform corporate managers who wish to take advantage of the positive effects of competition, such as increased motivation and efficiency in capital allocation processes. They should not only focus on its economic effects but also be aware of its potential non-intended impact. This study thus contributes to

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existing research on unintended effects in the context of budgeting (Armstrong, 2011). As a growing body of research suggests, competition can have counterproductive effects that might even outweigh its benefits. For instance, competition mechanisms that involve direct comparisons of individuals should be employed with care, as the present study suggests. Also, gender composition in teams should be considered when designing contracts as men and women might react differently when subjected to competitive incentive systems.

Obviously, this study is also subject to limitations. One such limitation concerns the degree of competition, which was not manipulated in the experiment. As Brüggen and Luft (2011) demonstrated in their experimental study, the degree of competition can have an impact on the strength of misrepresentations in managerial reporting. Moreover, studies from social psychology suggest that the number of participants involved affects the level of perceived rivalry (e.g., Ku et al., 2005). In light of the above, future research could analyze whether the degree of rivalry can also have an impact on the salience of social preferences such as honesty.

Another limitation concerns the generalizability of results obtained from experiments (Levitt and List, 2007). Given its specific experimental design, critics might question whether the study's insights with respect to honesty in managerial reporting reveal anything about real-world decision-making.[3] It is true that compared to actual decisions in corporations, stakes involved in the current study were relatively low. However, some previous experimental studies on social preferences have shown that social preferences can persist even when stakes rise (Cherry et al., 2002; Fehr et al., 2002), so chances are high that the reported results can be extrapolated to real situations.

Critics could further argue that participants might not have felt that their misrepresentations were very harmful because they could not associate any real person (other than the experimenter) with their 'corporate headquarters'. However, manipulation checks indicated that participants were fully aware of the fact that misrepresentations corresponded to lying. Even more important, the findings revealed in this study are not based on decisions per se, but on observed *differences between treatments*. So even if participants' social preferences were not very salient in the experimental setting, the study's intention was to show how context can reduce their salience even further: individuals' willingness to act in line with their honesty preferences decreases under competitive pressure.

A second thread to the generalizability of this study's results concerns the observed gender differences. Participants were students with an average age of 23 years. It should be questioned whether the observed gender differences reflect differences between men and women in general. Prior studies on the gender gap in competitiveness suggest that there are fundamental differences in competitiveness between men and women, indeed (Gneezy et al., 2009; Gneezy and Rustichini, 2004). However, it would require additional data obtained in more realistic settings to test whether the observed patterns are representative. This would be particularly important to gain further insights into why female and male participants responded differently to different modes of competition. Field studies would be ideally suited to generate such data (Grant and Wall, 2009) although it is very difficult to get access to data on ethical decision-making in real-world situations.

The study's results might also have been different if aspects of monitoring had been taken into account. The experiment's conservative design, which aimed at making it possible to trace honest behavior to the participants' preferences rather than to economic incentives, meant that no economic costs were imposed as a consequence of lying. Participants did not face any risk of being caught and, what's more, lying increased, rather than lessen, the likelihood that a project would receive funding.

In practice, managers have significantly less discretion to misrepresent actual numbers than the experiment suggests. And as several experimental studies on honesty in managerial reporting have shown, individuals change their behavior when the chosen forms of monitoring imply that lying may be detected and penalized (e.g., Webb, 2002; Zhang, 2008). It is therefore possible that the effects of rivalry recorded in this study might have been different if the experimental setting had included different modes of monitoring.

Overall, the results of the present study suggest several interesting directions for further research. Future investigations could illuminate in greater depth possible explanations for different responses from men and women to different modes of competition. In the current study such differences only existed when the economic benefits of lying were affected by competition. But the experiment was not designed to explore alternative explanations for these gender differences. Similarly, the current study did not consider how responses to competition differed depending on competitors' gender. As nicknames in the present study where common surnames and thus gender-neutral, gender team composition did not have any effects. Given that past research has shown that the gender gap in competitiveness also depends on the competitors' gender (Gneezy et al., 2003), future studies might explore whether the results obtained in the current study should be qualified depending on gender team composition.

Finally, future research could investigate how incentive systems should be designed to take advantage of the positive effects and avoid the unintended effects of rivalry. As the work of Fisher et al. (2002a) suggests, competition can increase reporting honesty when it increases the costs of lying. It might very well be that rivalry has similar effects in certain settings. And where it does not, as in the setting of this study, it would be interesting to find out more about how competitive structures and rivalry can be prevented from diminishing the effects of critical social preferences, which accounting research has only just started to investigate.

[3] As summarized by one of the anonymous reviewers: "Readers who find this sort of evidence convincing will be convinced; those who don't, won't."

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.cpa.2014.01.001.

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