The effect of rankings on honesty in budget reporting ☆

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ABSTRACT

We conduct an experiment to investigate the effect of rankings, which are pervasive in practice, on the honesty of managers' budget reports, which is important for sound decision making in organizations. Participants in our experiment are ranked in one of four ways: (1) firm profit, (2) own compensation, (3) both firm profit and own compensation, and (4) randomly, which serves as our baseline condition. None of the rankings affect participants' remuneration. Compared to our baseline (random rankings) setting, where participants indeed exhibit honesty concerns, we find that rankings based on firm profit significantly increase honesty and that rankings based on own compensation significantly decrease honesty. Participants who received both rankings were significantly more honest than participants in the own compensation rankings condition. We did not, however, find significant differences in honesty between the both rankings and firm profit rankings conditions. As such, participants in the both rankings condition seemed to focus more on the firm profit metric than on the financially congruent own compensation metric. We also find that our results are stable across periods, suggesting that the effects of rankings neither increased nor dissipated over time. We discuss the contributions of our study and concomitant findings to accounting research and practice.

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Introduction

Managers routinely receive feedback from the accounting system regarding firm-performance variables under their control and also, of course, their own compensation. In turn, managers frequently are ranked on such variables or can infer their rankings from available information. While such rankings may be used to determine compensation, retention, and promotion, they also may have little bearing on managers' remuneration (e.g., Nordstrom, Lorenzi, & Hall, 1990; West & Mykerezi, 2011) or may even conflict with managers' personal financial incentives (Grant, 2013). Moreover, ample research suggests that individuals' concerns for rank affect their behavior. Research in accounting, for example, has documented positive (e.g., Frederickson, 1992; Tafkov, 2013) and negative (e.g., Hannan, Krishnan, & Newman, 2008; Hannan, McPhee, Newman, & Tafkov, 2013) effects of rankings on effort and concomitant task performance.

Although the use of rankings is pervasive in practice, prior research has not examined whether rankings affect the honesty of managers' reports. For a myriad of reasons, honest reporting by firm participants is important for sound decision making. Indeed, prior research in accounting documents that individuals not only have preferences for honesty (Evans, Hannan, Krishnan, & Moser, 2001; Rankin, Schwartz, & Young, 2003) but also that individuals'

preferences for honesty are affected by fairness concerns (Zhang, 2008), group incentives (Church, Hannan, & Kuang, 2012), and specific features of the managerial setting, such as the precision of the information system (Hannan, Rankin, & Towry, 2006) and who has budget authority (Rankin, Schwartz, & Young, 2008).

In this paper, we examine whether rankings affect the veracity of individuals' reports. We employ a participative budgeting setting similar to Evans et al. (2001) in which managers (hereafter subordinates) receive private cost information and then submit a budget request to a superior. The budget request splits the available surplus between the subordinate and the superior. Subordinate compensation is based on the budget request, and the subordinate has strict financial incentives to request the highest budget amount. The superior's residual claim (firm profit), however, is minimized by this subordinate strategy. Consistent with Evans et al. (2001), the subordinate is requested to provide an accurate (honest) budget request. Increased subordinate budget accuracy (honesty) results in more surplus being allocated to the firm and less to the subordinate.

In our setting, six subordinates, which constitute a cohort, are ranked in one of four ways: (1) subordinate compensation; (2) superior residual claim (firm profit); (3) both subordinate compensation and firm profit; and, (4) randomly. Rankings based on subordinate compensation are congruent with subordinates' financial incentives to maximize the surplus claimed but are not aligned with honest reporting. Rankings based on firm profit are congruent with honest reporting but at odds with subordinates' financial incentives. Rankings based on both subordinate compensation and firm profit provide subordinates one metric that is congruent with subordinates' financial incentives and one metric that is at odds with subordinates' financial incentives. Random rankings are not affected in any way by subordinates' budget requests and, as such, are not under subordinates' control.[1]

We find that rankings significantly affect managerial reporting honesty. Compared to our baseline setting, where subordinates indeed exhibit honesty concerns, we find that rankings based on firm profit increase subordinates' honesty. This finding suggests that firms can use rankings as a low-cost, informal control to constrain opportunistic reporting. Incorporating rankings into the design of control systems could allow firms to reduce information asymmetry between employees and the firm, which leads to better decision making and lower budgetary slack, both of which should increase firm profitability. Moreover, this result suggests that, for example, the firm-level rankings frequently published in the popular press may curb self-interested behavior in organizations.

In contrast, rankings based on own compensation decrease subordinates' honesty. This finding suggests that providing relative performance feedback to employees can lead to behavior that is harmful to the firm. As a result,

firms should consider carefully how they rank their employees and also be aware of how employees may use accounting information to rank themselves. This may help explain why some firms closely guard their compensation data and are loathe to share such information with employees.

Subordinates who received both rankings were more honest than subordinates in the own compensation condition. Moreover, we do not find significant differences in honesty between the both rankings and firm profit conditions. As such, subordinates in the both rankings condition seemed to focus more on the firm profit metric than on the financially congruent own compensation metric. This result is somewhat surprising as, intuitively, one might posit that having both rankings would lead subordinates to engage in more self-regarding behavior because subordinates could internally justify their reporting decisions by focusing on the compensation metric. Our findings from this setting suggest that as long as firm-based rankings are provided the control loss associated with having access to a ranking that encourages self-interested behavior may not be as large as expected. Finally, we find that our results are stable across periods, suggesting that the effects of rankings neither increase nor dissipate over time.

The remainder of this paper is organized into four sections. The next section develops the hypotheses, and the third section presents the experimental design. The fourth section reports the results, and the final section provides a summary of the study.

Background and hypotheses

Research setting

Accurate reporting by employees is important for making sound organizational decisions. To this end, Evans et al. (2001) employed a novel design to examine subordinates' honesty in a managerial reporting setting. In this setting, a subordinate, who has private information regarding the production cost of an investment project, submits a budget request to a superior who funds the project. Both the revenue and the probabilistic distribution of the project's cost are known by the subordinate and the superior. Only the subordinate, however, is aware of the actual project cost. The subordinate's budget request is always approved and the subordinate receives the difference between the budget request and the actual project cost. The superior receives the residual, which equals the difference between the project's revenue and the budget request. In this setting, the subordinate is requested to accurately report the project cost via the budget request.

Assuming subordinates are only concerned with wealth maximization, conventional economic analysis predicts that subordinates will report the highest cost possible and claim the entire budget surplus. Evans et al. (2001) find, however, that subordinates' preferences for honesty attenuate personal wealth aspirations – subordinates' reports are significantly more truthful than would be predicted by conventional economic analysis. Research in accounting has extended this result and finds that individuals not only have preferences for honesty but also that individuals' preferences for honesty are affected by a

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[1] Random rankings serve as our baseline condition. We employ random, rather than no, rankings in our baseline condition to ensure that participants in all conditions have rankings information and, thus, to isolate the honesty effects associated with how participants are ranked.

number of factors, including fairness concerns, group incentives, the precision of the information system, and who has budget authority (Church et al., 2012; Hannan et al., 2006; Rankin et al., 2008; Zhang, 2008).

Adding to this research stream, we examine whether rankings affect the honesty of subordinates' budget requests. We augment the Evans et al. (2001) setting by pairing each subordinate with an actual superior and by ranking subordinates within cohort groups. A cohort group consists of six subordinates, who are ranked from highest to lowest in one of four ways. None of the rankings affect subordinates' remuneration. Additionally, subordinates were only provided with the ordinal ranks. As such, while each subordinate certainly knows his/her actual budget request, s/he does not know the actual budget requests of the other subordinates.[2]

First, we examine a setting where subordinates are ranked each period from highest to lowest based on their own compensation.[3] In this setting, wealth and rank concerns are aligned – subordinates maximize both their wealth and their rank by submitting the highest possible budget request. Preferences for honesty are, however, at odds with preferences for wealth and rank in this setting.

Second, we examine a setting where subordinates are ranked each period from highest to lowest based on firm profit.[4] In this setting, wealth and rank concerns are at odds – subordinates maximize their wealth (rank) by submitting the highest (lowest) possible budget request. Moreover, preferences for honesty are congruent with preferences for rank in this setting.

Third, we examine a setting where subordinates are ranked each period from highest to lowest based on (a) their own compensation *and* (b) firm profit. Thus, in this setting subordinates receive two conflicting rankings, with each ranking containing the characteristics and tensions from our first two settings. Finally, we examine a setting where subordinates are randomly ranked each period from highest to lowest. This setting serves as our control (baseline) treatment condition.

Social comparison theory and prior research

Human beings are a social species, and it is widely accepted that we desire to compare ourselves to others (Buunk & Gibbons, 2007). Festinger (1954) formalized these thoughts and introduced social comparison theory, which posits that individuals have a desire to compare themselves favorably to their peers.[5] Metee and Smith (1977) propose that social comparison theory is about our desire to know ourselves. This desire to know ourselves is not only satisfied by receiving information regarding our performance but also by comparing our performance with others.

Rankings enable individuals to make interpersonal comparisons which, in turn, lead to a desire to improve one's rank and competition. Indeed, there is considerable research consistent with social comparisons affecting individuals' behavior. Specifically, research from experiments (Duffy & Kornienko, 2010; Fisher, Maines, Peffer, & Sprinkle, 2002; Frederickson, 1992; Hales, Hobson, & Resutek, 2012; Hannan et al., 2008, 2013; Tafkov, 2013) and the field (Anderson, Crowell, Sponsel, Clarke, & Brence, 1982; Azmat & Iriberi, 2009; Blanes i Vidal & Nossol, 2011; Nordstrom et al., 1990; Wikoff, Anderson, & Crowell, 1983) both support social comparison theory and find that rankings affect behavior in a variety of settings.

Social comparison theory (Festinger, 1954) provides a useful framework for understanding the relationship between rankings and behavior. The effects of rankings have been attributed to many factors. For example, rankings can create descriptive norms of appropriate behavior, a way for individuals to improve themselves, help foster/maintain a positive self-image, lead to feelings of pride, or help avoid negative feelings such as shame (see, e.g., Beach & Tesser, 1995; Goldstein & Cialdini, 2007; Lazarus, 1991; Smith, 2000; Tesser, 1988; Tesser & Campbell, 1980; Wood, 1989).

A consistent finding from social comparison studies that is particularly germane to our study is that individuals frequently exhibit an oft-referred to "upward drive" motivation to exceed others' performance (Festinger, 1954; Suls & Miller, 1977). Specifically, prior research finds that individuals compare themselves to others whose performance is better than their performance (Nosanchuk & Erickson, 1985; Wheeler, Koestner, & Driver, 1982; Wood, 1989). For example, several studies find that individuals tend to compare themselves to individuals who are ranked above them (Gruder, 1971; Wheeler, 1966; Wheeler et al., 1969).

Prior research, in turn, finds that these upward comparisons frequently lead individuals to increase their effort, performance, or rank (Buunk, Kuyper, & van der Zee, 2005; Huguet, Dumas, Monteil, & Genestoux, 2001). For example, in a study that is related to ours, Duffy and Kornienko (2010) rank proposers in a dictator game by the amount of money they give to recipients. Duffy and Kornienko (2010) find that ranking participants in this fashion affects the amount of charitable giving. Moreover, Duffy and Kornienko (2010) suggest that the difference in giving behavior is driven, in part, by competition among participants.[6]

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[2] We made this design choice so as not to provide subordinates in our baseline (random rankings) setting information that could be used to rank themselves. We also made this design choice to examine the starkest form of rankings.

[3] As such, subordinates submitting the highest (lowest) budget request would receive the #1 (#6) rank.

[4] As such, subordinates submitting the lowest (highest) budget request would receive the #1 (#6) rank.

[5] Although it is Festinger's (1954) classic paper that details specific hypotheses regarding social comparison theory, the idea of social comparison and reference groups are also highlighted in earlier research. For example, Hyman (1942) finds that the assessment of one's status regarding finances, intelligence, and physical attractiveness depends on one's comparison group.

[6] While our work shares similarities with previous social comparison studies in accounting and other areas, there is a fundamental difference. To obtain a higher payoff in our study, participants must misreport the true cost, which is a feature not present in prior rank-based research. Given that ethical systems encourage honesty (Murphy, 1993) and that honesty can increase efficiencies and surplus (Arrow, 1974; Noreen, 1988), it is important to understand how rankings affect individuals' reporting decisions.

Thus, social comparison research not only suggests that individuals will make upward comparisons but also suggests that, as a result of these comparisons, individuals will take actions to improve their performance to ultimately achieve a more favorable comparison (ranking). In a similar vein, we posit that individuals will attend to the rankings provided to them and exhibit an "upward drive" motivation to improve their rankings. As such, we posit that individuals will change their reporting behavior (honesty) to improve their ranking among their peers.

Hypotheses 1 and 2

In our setting, subordinates' ranks are not tied to their compensation so, as a result, conventional economic theory predicts that subordinates will ignore the rankings and submit the maximum budget request.[7] Social comparison theory and prior empirical research suggests, however, that rankings will influence subordinates' reporting behavior due to their desire to improve their ranking. That is, in the own compensation (firm profit) ranking condition, this means that subordinates will submit higher (lower) budget requests than if subordinates are randomly ranked.[8] This leads to our two hypotheses:

H1. Subordinates who are ranked based on their own compensation will submit *higher* budget requests (i.e., be less honest) than subordinates who are randomly ranked.

H2. Subordinates who are ranked based on firm profit will submit *lower* budget requests (i.e., be more honest) than subordinates who are randomly ranked.

Research question – multiple rankings

In many settings, individuals are ranked on multiple metrics. For example, popular business periodicals frequently rank executives and firms on factors such as executive compensation, firm profitability, and corporate social responsibility. And, the relations among

these variables may be positive, non-existent, or negative.[9]

Likewise, companies often explicitly or implicitly rank employees on metrics that are either not linked, or may even conflict with, their remuneration. For example, companies such as Google, Southwest Airlines, and Zappos provide employees with public relative performance information regarding their organizational helping behaviors (Grant, 2013). These companies do not, however, directly compensate such behaviors, and it is unclear whether such behaviors are ultimately linked to compensation (e.g., "no good deed goes unpunished").

Additionally, many firms utilize "dashboards" that are frequently updated to show managers' ongoing performance across several measures that are not necessarily correlated or may even conflict (e.g., average waiting/service time versus safety/cleanliness at a fast-food restaurant). These dashboards, as exist at companies such as McDonald's and eBay, can serve as rankings by presenting peer-manager performance information. These dashboards also enable managers to "drill down" and/or query others' performance so as to evaluate their relative performance.

Along these lines, we examine a setting where subordinates are ranked each period from highest to lowest based on (a) their own compensation *and* (b) firm profit. Thus, in this setting subordinates receive two conflicting rankings. In such settings it is unclear what rank(s), if any, to which individuals will attend.

Some research suggests that individuals may use "moral wiggle room" to act in their self-interest when they have conflicting rankings (Dana, Weber, & Kuang, 2007; Haisley & Weber, 2010). This line of research suggests that providing subordinates with both rankings may lead subordinates to engage in more financial self-regarding behavior because subordinates can internally justify their reporting decisions via the own compensation ranking. In this scenario, subordinates' budget requests (honesty) would most closely resemble subordinates' budget requests who receive rankings based on their own compensation.

In contrast, another research stream suggests that individuals' behavior may be affected by drawing their attention to pro-social behavior (Cialdini, Reno, & Kallgren, 1990; Krupka & Weber, 2009).[10] For example, Krupka and Weber (2009) examine a binary dictator game with a pro-social allocation and a selfish allocation and find that

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[7] This is also a noteworthy difference between our study and some prior research. By not linking ranks to remuneration, we are able to examine whether rankings *per se* affect behavior. This distinction is important because, when compensation is linked to ranks, it is unclear whether individuals are responding to the rank and/or to the reward. For example, individuals working under a tournament contract may ramp-up their effort if they believe they have the ability to win the prize. Analogously, individuals working under a tournament contract may provide low effort if they assess their chances of winning to be low. In both cases, the compensation-based effect (related to, e.g., effort and/or skill) may swamp the rank effect. Moreover, rankings based on, for example, corporate social responsibility are not necessarily linked to employee remuneration in natural settings (cf. footnote 9).

[8] This means that subordinates in the own compensation (firm profit) ranking condition will be less (more) honest than subordinates who are ranked randomly.

[9] Research generally finds that, despite the strong predictions by economic theory, compensation is often independent of performance (Baker, Jensen, & Murphy, 1988). For example, a meta-analytic review of the literature regarding the determinants of CEO pay finds that size accounts for 40% of the variance in CEO pay and firm performance accounts for less than 5% (Tosi, Wermer, Katz, & Gomez-Mejia, 2000). A number of researchers suggest that CEO pay seems to reflect managerial power and rent-seeking by CEOs rather than the provision of efficient incentive contracting (Bebchuk & Fried, 2003; Blanchard, Lopez-de-Silanes, & Shleifer, 1994). Due to the other forces that determine CEO pay, some studies even document a negative relation between compensation and performance (Core & Larker, 1999; Bick, Palmon, & Wald, 2006). While there are not many studies that examine the relation between CEO pay and corporate social responsibility (CSR), at least one study finds a negative relation between CEO pay and CSR (Cai, Jo, & Pan, 2011).

[10] This is consistent with social comparison theory, which suggests that rankings can provide descriptive norms of appropriate behavior.

having participants focus on what they believe other people should do in such a decision context resulted in more participants choosing the pro-social allocation.

Additionally, research relating to groups (Cookson, 2000; Kramer & Brewer, 1984; Rowe, 2004; Towry, 2003) suggests that the presence of a ranking that encourages the consideration of others may induce subordinates to act less self-interested. For example, Rowe (2004) finds that aligning the accounting report structure and the team structure in such a way to create a "group frame" helps mitigate the free-rider problem.[11] Moreover, in this scenario, subordinates' budget requests (honesty) would most closely resemble subordinates' budget requests who receive rankings based on firm profit.

Finally, the two opposing ranking measures may simply "cancel" each other out resulting in little or no impact. In this scenario, subordinates' budget requests would most closely resemble the budget requests of subordinates who receive random rankings. Given the difficulty in developing a directional prediction for our two rankings condition, we examine the following research question:

RQ: Will subordinates who are ranked based on both their own compensation and firm profit submit budget requests that are different than the budget requests submitted by subordinates who are ranked on either their own compensation, firm profit, or randomly?

Experimental method

Task

We employ a budgeting setting similar to Evans et al. (2001). In our setting, each participant plays the role of either subordinate or superior.[12] The subordinate submits a budget request to the superior to fund the cost of an investment project. Both the revenue ($4.00) and the probabilistic distribution of the project's cost (uniformly distributed, in increments of $0.01, between $2.00 and $4.00) are known by the subordinate and superior but only the subordinate knows the actual project cost. The subordinate's budget request (maximum request = $4.00) is always approved, and the subordinate receives as compensation the difference between the budget request and the actual project cost. The superior receives the residual profit, which equals the difference between the project's revenue and the budget report. Thus, if the project cost equals $3.00 and the subordinate submits a budget request of $3.60, then the subordinate earns $0.60 ($3.60–$3.00) and the superior earns $0.40 ($4.00–$3.60). In this setting, subordinates who wish to

maximize their own compensation should, for every cost realization, submit a budget request of $4.00.

Each subordinate/superior dyad is paired for the entire experiment, which consisted of two practice periods and ten compensated periods. Each experimental session comprised 12 participants, or six subordinate/superior dyads. In each period, all six subordinates received identical project cost draws.

Manipulations

We manipulate, between-participants, the rankings provided to subordinates. We examine four ranking conditions. None of the rankings, *per se*, affected participants' remuneration.

In the *Firm Profit Condition*, subordinates are ranked each period from highest (first) to lowest (sixth) based on the profit they generated for the superior. In the *Own Compensation Condition*, subordinates are ranked each period from highest to lowest based on their individual compensation. In the *Both Condition*, participants received rankings based on firm profit and on their own compensation. Finally, in the *Random Condition*, subordinates are ranked each period from highest to lowest based on a randomly generated number.[13]

Participants and procedures

We conducted a computer-based laboratory experiment with 180 undergraduate students using *z*-tree software (Fischbacher, 2007). We ran 15 sessions – three sessions for the firm profit, own compensation, and random conditions, and six sessions for the both condition (three sessions where the firm profit ranking was displayed first, and three sessions where the own compensation ranking was displayed first). To ensure the privacy of participants, each subordinate was assigned a color identifier (blue, green, orange, purple, red, or yellow) throughout the experiment. The color identifiers were used when displaying subordinate rankings.[14] Both subordinates and superiors received a $5.00 one-time participation fee and a salary of $0.50 per period ($5.00 in total).

At the beginning of each period, subordinates received information about the project's cost.[15] Each subordinate then submitted a budget request to his/her superior. The budget request could range from $0.50 below the project's

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[11] Rowe (2004) manipulated the accounting report structure by showing the individual manager's payoffs or both the individual manager's payoffs and the payoffs for other managers.

[12] We chose to have a real participant play the role of the superior because this design choice most closely mirrors settings in the natural environment where one's actions invariably affect the welfare of others. Additionally, accounting research examining preferences for honesty has frequently employed real participants for both subordinate and superior roles (see, e.g., Hannan et al., 2006; Rankin et al. 2003; Rankin et al. 2008; Schatzberg & Stevens, 2008).

[13] Notably, subordinates receiving firm profit rankings also have available own compensation rankings, and subordinates receiving own compensation rankings also have available firm profit rankings. This obtains because, for example, in the firm profit condition, the subordinate with highest firm profit rank (#1) will have the lowest own compensation rank (#6), and so on. Thus, by inverting the firm profit ranks, subordinates can obtain the own compensation ranks. In a like fashion, subordinates in the own compensation ranking condition can construct the firm profit ranks. As such, our manipulations make salient certain aspects of the payoff distribution as, informationally, subordinates in all ranking conditions (other than the random condition) have available both firm profit and own compensation ranks.

[14] Each subordinate knew his/her own color but never knew which colors corresponded to the other subordinates. The color was visible to superiors and other subordinates when rankings were displayed.

[15] Participants were informed that cost draws were determined in advance and that the project cost in each period was the same for all subordinates. To facilitate comparisons across treatment conditions, the cost sequences in all sessions were identical.

Panel A: Percentage of Surplus Retained by Subordinates by Ranking Condition and Period
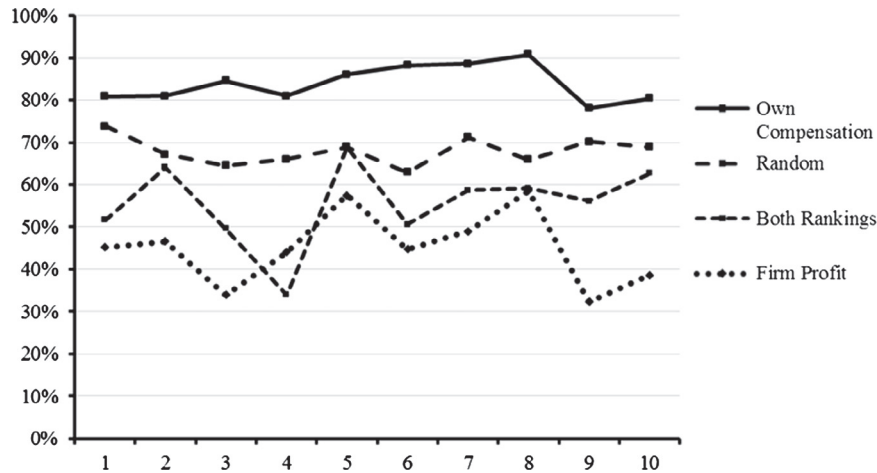
Panel B: Percentage of Surplus Retained by Subordinates by Ranking Condition and Period

Ranking Condition	n	Period										Overall
		1	2	3	4	5	6	7	8	9	10	
Own Compensation	18	80.9%	81.0%	84.6%	81.0%	86.0%	88.2%	88.6%	90.7%	78.1%	80.5%	84.0%
Random	18	73.8%	67.1%	64.5%	66.0%	68.9%	63.0%	71.3%	65.9%	70.2%	68.9%	68.0%
Both Rankings	36	51.7%	65.0%	49.6%	33.9%	68.9%	50.7%	58.6%	59.1%	56.1%	62.7%	55.6%
Firm Profit	18	45.2%	46.5%	33.9%	44.1%	57.5%	44.7%	49.0%	58.5%	32.3%	38.6%	45.0%

The percentage of surplus kept = $\dfrac{\text{Surplus Claimed}}{\text{Surplus Available}}$ = $\dfrac{\text{(Budget Request – Project Cost)}}{\text{(Revenue – Project Cost)}}$

When subordinates reported less than the actual cost, the percentage of surplus retained is negative. To ensure that (the few) negative reports were computed out of a possible 100%, we calculated the percentage of surplus retained relative to the fixed wage. Specifically, we calculated the percentage of surplus retained for negative reports as: (Budget Request – Project Cost) /Fixed Wage per Period. Measuring underreporting relative to the fixed salary is a more appropriate benchmark because it avoids denominator distortions caused by cost draws that are dramatically larger or smaller than the $0.50 salary constraint. For example, in a period where the actual project cost was $2.50, a subordinate could report a cost as low as $2.00. As such, we calculate the misreporting as $0.50/$0.50 = 100% (Maximum allowed).

Fig. 1. Percentage of surplus retained by subordinates.

cost to $4.00. As in Evans et al. (2001), we allow underreporting. As subordinates received $0.50 in salary each period, we limited underreporting to $0.50 to ensure that subordinates' earnings were not negative in any period.

Subordinates' budget requests were automatically approved. After all subordinates submitted their budget requests, subordinates were publicly ranked from first to sixth as per our manipulations.[16] When subordinates' budget requests were identical, they received the same rank and their order was randomly determined. Rankings were visible

to all subordinates and superiors and remained visible until all subordinates indicated that they were ready to proceed to the ensuing period. After the tenth period, subordinates received a final ranking based on their cumulative performance over the experiment. Participants then completed a post-experimental questionnaire and were paid in cash for their participation. Average earnings were $15.00, and each experimental session lasted approximately 45 min.

Results

Hypotheses 1 and 2

There is a fixed amount of resources available each period to be split between the superior and the subordinate.

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[16] As mentioned earlier, only ordinal rankings were displayed – participants did not receive any cardinal information. That is, the subordinate only knew his/her own budget request and not the budget requests of the other subordinates.

Table 1
ANOVA on percentage of surplus retained by subordinates.

Source	df	M.S.	F-statistic	p-Value
Panel A: Overall ANOVA				
Between subjects				
Condition	3	5.32	5.03	0.003
Participant	86	1.06		
Within subjects				
Period	9	0.17	1.87	0.053
Period × Condition	27	0.09	1.02	0.433
Residual	774	0.09		
Total	899	0.20		
Ranking conditions		*F*-statistic		*p*-Value
Panel B: Follow-up ANOVA's – pairwise comparisons				
Own compensation: Random		4.20		0.024[*]
Firm profit: Random		2.81		0.051[*]
Firm profit: Own compensation		8.82		0.003[*]
Own compensation: Both rankings		14.85		0.001
Firm profit: Both rankings		0.97		0.330
Random: Both rankings		2.47		0.122

Panel A presents the repeated-measures ANOVA for the percentage of surplus retained by subordinates. In Panel B, we present the pairwise comparisons between ranking conditions – for these tests, we replicate the repeated-measures ANOVA using the two conditions of interest.
[*] One-tailed *p*-value.

We calculate the total surplus available as the resources in excess of the actual cost. The subordinate's budget request determines how the surplus is split between the superior and subordinate. As such, the surplus retained by subordinates is our primary dependent variable.

Collectively, H1 and H2 predict that the surplus retained by subordinates will be greatest when subordinates are ranked on their own compensation and least when subordinates are ranked on firm profit. We posit that the surplus retained by subordinates who are ranked randomly will be between the two. Fig. 1 presents the average percentage of surplus retained by subordinates for each period by ranking condition.[17] Consistent with H1 and H2, the average percentage of surplus retained by subordinates in the own compensation ranking condition (84%) is higher than the average percentage of surplus retained by subordinates in the random ranking condition (68%) which, in turn, is higher than the average percentage of surplus retained by subordinates in the firm profit ranking condition (45%). The average percentage of surplus retained by subordinates in the both rankings condition (55.6%) lies between the random ranking and firm profit ranking conditions.

Panel A of Table 1 reports the results of an ANOVA with the percentage of surplus retained by each subordinate per period as the dependent variable, condition as the between-subjects factor, and period as the within-subjects (repeated-measures) factor. The results of this ANOVA reveal significant main effects of ranking condition ($p = 0.003$) and period ($p = 0.053$), indicating that the percentage of surplus retained by subordinates differs significantly across conditions and periods.

Panel B of Table 1 presents the pairwise comparisons between all ranking conditions.[18] These comparisons provide support for H1 and H2. Panel B of Table 1 shows that subordinates who were ranked on their own compensation retained significantly more surplus than subordinates who were ranked randomly ($p = 0.024$). Panel B of Table 1 also shows that subordinates who were ranked based on firm profit retained significantly less surplus than subordinates who were ranked randomly ($p = 0.051$), providing support for H2.[19]

Collectively, our results indicate that, even though the rankings did not affect remuneration in any way, subordinates' budget requests are significantly influenced by the ranking metrics. We find that the percentage of surplus claimed by subordinates almost doubles when rankings are based on own compensation (84%) compared to the condition where rankings are based on firm profit (45%). Our findings suggest that ranking metrics are powerful motivators that firms should carefully consider when designing their control systems. In particular, firms may benefit from ranking on firm-based metrics (e.g., profitability-based metrics), but they may exacerbate control problems when ranking on individual-compensation metrics.

Research question – multiple rankings

Panels A and B of Fig. 1 show that the percentage of surplus retained by subordinates receiving both rankings (55.6%) is closer to the percentage of surplus retained by subordinates receiving the firm profit ranking (45%) than

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[17] An ANOVA revealed no significant order effects in the both rankings condition. That is, the percentage of surplus retained by subordinates did not differ depending on whether subordinates received the own compensation rank or the firm profit rank first or second. As such, we do not distinguish between these two treatment conditions.

[18] In Panel B, we replicate the repeated-measures ANOVA in Panel A using the two conditions of interest. None of the period-by-condition pairwise interaction effects are significant (smallest $p > 0.19$).

[19] Panel B of Table 1 also reports that the surplus retained by subordinates who were ranked on firm profit is less than ($p = 0.003$) the surplus retained by subordinates who were ranked based on their own compensation.
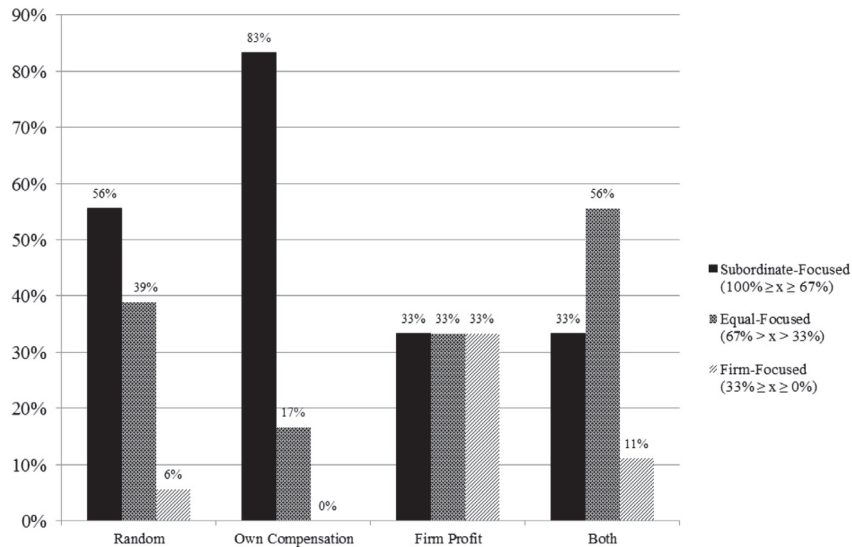
We classify subordinates' strategies using three categories based on the percentage of surplus subordinates retained.
Specifically, we classify subordinates who claim between: (1) 67% and 100% of the surplus as primarily focused on
maximizing their own compensation; (2) 33% and 67% of the surplus as primarily focused on a more equal
(equitable) split; and (3) 0% and 33% of the surplus as primarily focused on firm profit.

Fig. 2. Subordinates' strategies by ranking condition.

to the percentage of surplus retained by subordinates receiving the own compensation ranking (84%). Pairwise comparisons bear this observation out. As documented in Panel B of Table 1, subordinates in the both rankings condition submitted significantly lower budget requests than subordinates in the own compensation ranking condition ($p = 0.001$). The budget requests of subordinates in the both rankings condition, however, did not differ significantly from the budget requests of subordinates in the firm profit ranking condition ($p = 0.330$). This finding is somewhat unexpected as one might posit that having both rankings would lead subordinates to anchor on the own compensation ranking and internally "justify" their reporting decisions via this ranking metric.

Subordinates' budget requests throughout the experiment

In our tests of H1 and H2, we find that the period effect is significant in the overall ANOVA. This is attributable primarily to the period-by-period reporting variance resulting from the actual cost differing across periods rather than to reporting trends over time. To more closely examine the period effect, we compared the reporting behavior of subordinates in the first half of the experiment to the reporting behavior of subordinates in the second half of the experiment. For each of the ranking conditions, the surplus retained by subordinates in the first half of the experiment did not differ significantly from the surplus retained by subordinates in the second half of the experiment (the largest difference is less than 4%, and the smallest $p > 0.15$). Thus, the effects of the rankings neither increased nor dissipated over time.

Additional analysis – subordinates' strategies

Finally, we examine subordinates' reporting strategies across ranking conditions. We classify subordinates who

claim between: (1) 67% and 100% of the surplus as primarily focused on maximizing their own compensation; (2) 33% and 67% of the surplus as primarily focused on a more equal (equitable) split; and (3) 0% and 33% of the surplus as primarily focused on firm profit. Using these three categories, Fig. 2 shows subordinates' strategies in each of the four ranking conditions.

Fig. 2 reveals that the strategies chosen by subordinates across the four ranking conditions vary markedly. In the random ranking condition, 56% of the subordinates are focused on their own compensation, 39% are focused on a more equal split, and only 6% are focused on firm profit. When rankings are based on own compensation, the percentage of subordinates in these categories is 83%, 17%, and 0%, respectively. A striking result in the own compensation ranking condition is that no subordinates are defined as firm-focused.

In the firm profit ranking condition, subordinates were split evenly across the three categories. This condition also had the highest amount of subordinates who were classified as firm-focused. In the both rankings condition, 33% of the subordinates are focused on their own compensation, 56% are focused on a more equal split of the surplus, and 11% are focused on firm profit. Collectively, these results show how subordinates' reporting decisions were affected by our ranking conditions. Moreover, these results reveal why we observe differences in the levels of honesty among our ranking conditions.

Conclusion

In this study, we examine whether rankings affect the honesty of subordinates' budget requests. In our experiment, subordinates are requested to truthfully report a project's actual cost. Subordinates, however, have financial

incentives to maximally misrepresent the project's true cost and, as such, claim 100% of the project's surplus. We rank subordinates in one of four ways: based on (1) own compensation, (2) firm profit, (3) both own compensation and firm profit, and (4) randomly. None of the rankings affect subordinates' remuneration.

We find that subordinates' budget requests (honesty) are significantly affected by the rankings. Subordinates ranked on firm profit claim the least surplus (45%), followed by subordinates ranked on both individual compensation and firm profit (55.6%), subordinates ranked randomly (68%) and, finally, subordinates ranked on own compensation (84%). Moreover, the surplus claimed by subordinates in the both rankings condition is significantly lower than the surplus claimed by subordinates in the own compensation condition but not significantly different from the surplus claimed by subordinates in the firm profit condition. We also find that our results are stable across periods, suggesting that the ranking effects we observe neither increase nor dissipate over time.

Our results have several important implications. First, complementing extant research that documents the effects of rankings on effort and performance (e.g., Frederickson, 1992; Hales et al., 2012; Hannan et al., 2008, 2013; Tafkov, 2013), we show how rankings significantly affect another variable vital to organizational success, managerial honesty. Collectively, our findings suggest that organizations can use firm-based rankings as a low-cost, informal control to constrain opportunistic reporting. Our results also suggest, however, that compensation-, or even perquisite-, based rankings could lead employees to engage in dishonest reporting and, as a result, firms should consider carefully how they rank their employees and also be aware of how employees may use accounting information to rank themselves.

Second, we examine a setting in which subordinates receive two conflicting rankings. We find that subordinates in this condition respond more to the firm profit ranking than to the own compensation ranking. This result is somewhat counter-intuitive, as one might reasonably posit that having both rankings would lead subordinates to engage in more self-regarding behavior (because subordinates could internally justify their reporting decisions by focusing on the own compensation ranking). This particular finding suggests that, as long as firm-based rankings are provided, the control loss associated with having access to a ranking that encourages self-interested behavior may not be as large as expected.

Certain limitations of our study provide opportunities for further inquiry. For example, we chose to have a real participant play the role of the superior because accounting research examining preferences for honesty has used real participants for both subordinate and superior roles and because this setting most closely mirrors the natural environment where one's actions invariably affect the welfare of others. However, as noted by an anonymous Reviewer, this design choice may have prodded participants receiving both the firm profit and own compensation rankings to, for other-regarding reasons, focus more on the firm profit ranking than on the own compensation ranking. Future research could examine the robustness of our results to this specific design choice, either by having a hypothetical superior and/or by examining a setting where the actions of the subordinate have a more tenuous/indirect relation to the superior's remuneration.

As suggested by another anonymous Reviewer, future research also could examine how cardinal ranking information affects the veracity of employees' reports. In our experiment, subordinates were only provided with ordinal ranks. We made this design choice so as not to provide subordinates in our baseline (random rankings) setting information that could be used to rank themselves. We also made this design choice to examine the starkest form of rankings. That said, employees frequently know the level of a performance variable (e.g., the amount of firm profit) and, as such, could use this information to rank themselves. Moreover, employees often are provided with a formal rank coupled with the level of performance. Research that extends our work to settings with different types of ranking information and feedback could prove quite fruitful.

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