

# Leader Effects in Competition Among Teams: Evidence From a Field Intervention<sup>1</sup>

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## **Abstract:**

This paper investigates the effect of the leader on the performance of teams that participate in tournaments. In collaboration with a medium-sized Latin-American bank, we engineered a field experiment by designing a series of contests among the branches of the bank, in which we varied the prize structure of the tournaments (in some tournaments, the prizes were shared among all branch employees, while in other tournaments there was an additional prize for the branch manager). We combined the tournament performance data with measures of leaders' and teams' characteristics extracted from pre-intervention survey responses and from the pictures that the branch teams posted in the bank intranet to represent their teams. We find evidence that providing explicit incentives to team leaders has a positive effect on team performance, consistent with leaders exerting more effort in monitoring the work of team members and inspiring them to join efforts for the team above their individual interests. However, these explicit incentives may also diminish the leader's credibility among team members who attribute the leader's behavior to self-serving motives.

**Keywords:** *Tournaments, teams, leadership, culture.*

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## I. INTRODUCTION

In this paper we analyze the effect of the leader on teams that participate in tournaments. Tournaments are ubiquitous in organizations and society—sales contests, sports championships or political races for instance—and because of that ubiquity they have received considerable attention in the literature (Holmstrom, 1982; Lazear and Rosen, 1981; Baiman and Rajan, 1995). They are used as part of the explicit (e.g. sales contests) as well as implicit (e.g. promotions or employee-of-the-month programs) incentive schemes designed to motivate employees. However, besides their relevance in organizations, tournaments are also interesting settings because they allow us to understand how individuals behave in competitive environments. And as competition is a fundamental feature driving the efficiency of markets, these settings also help us improve our understanding of the functioning of modern economies.

Although competition among individuals is common, very often it is teams of individuals that compete against each other. Firms compete for market share, or divisions of a firm compete for corporate resources. Moreover, more often than not there is a leader who monitors, coordinates, and motivates the effort of the team members: a CEO, a divisional VP or a team manager. The objective of this paper is to gain a better understanding of how the actions and style of the leader shapes the competitive performance of the team in a tournament and how the strength of the team leader's personal incentives impacts that performance. To the best of our knowledge, these questions remain largely unanswered in the literature.

We present evidence from a natural field experiment we designed to address these issues in collaboration with a medium-sized bank located in Latin America (it has around 3,000 employees and 177 branches). The bank was interested in motivating its customer-facing employees through a series of tournaments among its branches, and we worked with the top

management of the bank to design the tournaments. From September to December of 2014, each branch competed in four monthly tournaments. Each month, the branches were randomly allocated to one of seven tournaments of about 25 branches each. At the beginning of each month, the allocation, as well as the structure of prizes for the month and other rules of the contest, were announced to the entire branch network through the bank intranet. At the end of the month, the top three branches in each tournament received a prize to be shared among all branch employees.

Throughout the four months, branch employees participated in the tournament but were unaware that the tournaments were part of a field experiment. We also implemented an exogenous change, which was an individual prize awarded to the leader of the winning branch during two of the tournament months: October and December. Researchers selected the months with a manager prize in a manner that was orthogonal to branch productivity. Because the same teams participated in all tournament months, this design allows us to identify the causal impact of the explicit incentives for the leader. We do so by comparing the performance of each team in the tournaments with and without reward for the manager, thereby controlling for any time invariant heterogeneity in the teams. Importantly, because we randomize the allocation of teams to the tournaments in each month, we are able to identify the effects of manager prizes without distortions induced by the strategic behavior of teams when they compete in repeated tournaments against the same opponents.

We complement the tournament performance data with socio-demographic information provided by the bank and qualitative information obtained by surveying branch managers and employees prior to the implementation of the tournaments. The survey questions were geared towards measuring managers' job satisfaction and leadership style as well as employees' job

satisfaction and team cohesiveness. Besides the survey data, we obtained additional qualitative information on the teams' characteristics from the tournament intranet site. As part of the internal marketing of the tournament, the bank set up a site in their intranet for branches to post pictures of their teams. We asked three raters to evaluate the pictures across various dimensions indicative of the creativity of the teams and how much fun they seemed to have together.

We combine the data from these different sources to study the effect of the leader on the performance of the team in the tournament, and how this effect varies when there is a prize for the leader. We argue that the leader has two levers to impact team performance in the tournament: monitoring the activities of the team members and inspiring them by appealing to the value of the team above individual interests. Monitoring by the leader reduces the negative effects that members' free-riding and social loafing have on the productivity of the team. However, the dark side of monitoring is that it may reduce the innovative spirit that is behind the productivity of high performance teams (Campbell, Epstein and Martínez-Jerez, 2011). Appealing to the values of the team may motivate team members to exert more effort and increase their collaboration with other members of the team as long as the appeals of the leader are perceived as genuine and convincing. However, if team members see those appeals as self-serving, they may react negatively to them. Offering a prize to the branch manager ought to encourage more monitoring, but on the other hand, make it harder for the manager to appear genuine when inspiring teamwork.

The exogenous changes in the leaders' compensation permit us to observe the impact of the leaders' interventions on team tournament performance. We expect leaders respond to their chance at a prize by increasing their effort in both monitoring and inspiring the team, resulting in a positive performance effect (Bandiera, Barankay and Rasul 2009). However, the effectiveness

of the leaders' actions will depend on factors such as the proclivity of the team members to free-ride or loaf, the innovativeness of the team, and the effect of the potential reward for the leader on the perception of the leader's motives.

Our results show that the leader is an important driver of tournament performance for the team and that when a prize is offered to the manager of the winning branch, the leaders' response results in better team performance than in months without such a reward. This is consistent with branch managers increasing their monitoring and inspiring efforts when their expected compensation is increased.

The performance improvement in months with a manager prize is not uniform across leaders or across teams. Teams that have managers who emphasize the values of cooperation and commitment above personal interests perform better in the tournaments with a team prize. However, the provision of prizes for the leaders of winning teams results in a relative deterioration of performance for those teams. These results are consistent with attribution theory, whereby branch employees respond to the manager's effort to engage their team cooperation and coordination when such a call benefits the team, but do not respond when the branch manager is seen to benefit from the team's increased effort. The manager's exhortations are seen as genuine in the former case, and self-serving in the latter.

We also find that teams that show signs of being more innovative (as measured by the creativity or innovativeness of the pictures they post on the intranet) perform better in the tournament, suggesting that innovative teams are better able to deliver superior value to their customers and achieve a higher performance. However, when the tournament offers a prize for the branch manager, these positive effects are diluted. This result is consistent with managers' increased monitoring leading to lower employee innovation (Campbell, Epstein, and Martínez-

Jerez, 2011) when the tournament offers a prize for the manager.

Our results show that teams with a higher proclivity to free-riding or social loafing, as measured by how much fun the team seems to be having in the team picture, exhibit lower performance. This is consistent with these teams finding it relatively costlier to work than other teams. This could be the case if, for instance, the members of those teams have a stronger preference for leisure than work, or because the fun environment makes it harder for the team members (or the manager) to monitor each other at work, as such monitoring could alter the group dynamic. However, the negative effect of a fun team atmosphere on performance disappears when the tournament offers a prize to the branch manager. This is consistent with the additional incentive leading managers to increase employee monitoring in an effort to reduce free-riding and social loafing.

Our paper makes a significant contribution to the literature in several respects. First, to the best of our knowledge, this is the first paper to analyze the impact of the leader on the behavior of teams competing in a tournament. Most of the research on tournaments tries to identify the design features that are likely to increase motivation, or the individual characteristics (such as gender) that explain the degree of competitiveness (Gibbs, 1996; Matsumura and Shin, 2006; Hannan, Krishnan, and Newman, 2008; Casas-Arce, Deller, and Martínez-Jerez, 2016). However, the bulk of the previous work has focused on tournaments for individuals, and only a minority of studies recognizes that, in practice, most competitions take place among teams (Erev, Bornstein, and Rosen, 1990; Nalbantian and Schotter, 1997; Bandiera, Barankay, and Rasul, 2012). Furthermore, earlier work neglects important features that are relevant in practice, such as the presence of a team leader and the need to balance his/her incentives with those of the team members. Our research aims to shed some light on these issues. In particular, our evidence

suggests that providing incentives to team leaders has a positive effect on team performance. However, these incentives may also diminish the leader's credibility, as team members may interpret the leader's behavior as self-serving.

Second, we help to build up the thin set of natural field experiments in the accounting and tournaments literatures. Most of the empirical tournament literature consists of laboratory experiments (Bull, Schotter, and Weigelt, 1987; Hannan, Towry, and Zhang, 2013; Demere, Krishnan, Sedatole, and Woods, 2016) or field studies (Casas-Arce and Martínez-Jerez, 2009) and only a few field experiments (Bandiera, Barankai and Rasul, 2012). The use of a natural field experiment, although still very rare in the accounting literature (Casas-Arce, Lourenço, and Martínez-Jerez, 2016), has several advantages over laboratory experiments for our research. Our study is done in a real setting with subjects who are professionals performing their daily jobs, increasing the external validity of the results we obtain. Furthermore, the individuals face strong incentives, and therefore take the task seriously. Moreover, our selection of the exogenous change in the leaders' compensation and the randomization of the set of teams that compete against each other in each tournament strengthen the identification of the effects that we are interested in.

The rest of the paper proceeds as follows. Section II discusses the related literature in more detail. Section III describes our setting. We then develop a simple model in Section IV to motivate the hypotheses that we test. Section V describes the data and how we measure the empirical constructs that capture the team and leader characteristics of interest, and Section VI presents the empirical results. Finally, Section VII concludes. The detailed derivations of our theoretical results are described in the Appendix.

## **II. RELATED LITERATURE**

There is an extensive body of theoretical work on tournaments and relative performance evaluation (RPE). The basic theme of this literature is that these compensation schemes impact the agents' decision to exert effort by reducing the compensation risk that stems from common shocks (Lazear and Rosen, 1981; Holmstrom, 1982). Much of the theoretical literature in tournaments has focused on identifying the circumstances under which the desirable incentive effects are maximized (Green and Stokey, 1983; Nalebuff and Stiglitz, 1983; O'Keefe et al., 1984; Gibbs, 1996; Moldovanu and Sela, 2001).

The empirical literature on tournaments and RPE mainly consists of two main streams. The first stream aims to test the existence of relative performance compensation in the contracts of top managers. Although the initial theory found mixed evidence (Antle and Smith, 1986; Gibbons and Murphy, 1990), more recent literature shows consistent use of relative performance compensation when the peer group is carefully selected (Albuquerque, 2009). The second stream has tested whether individuals increase their effort when confronted with tournament incentives and RPE (Matsumura and Shin, 2006; Casas-Arce and Martínez-Jerez, 2009) and how this effort response changes with certain tournament design choices (Hannan, Krishnan, and Newman, 2008; Müller and Schotter, 2010; Casas-Arce, Deller, and Martinez-Jerez, 2016). Most of this literature uses lab experiments as the research methodology, but there is an emerging body of papers using archival data in sports (Ehrenberg and Bognanno, 1990a, b) or business settings.

A prevalent feature in the tournaments literature is that the tournament participants are either individuals (e.g. Orrison, Schotter, and Weigelt, 2004) or teams considered as monolithic entities with a single output, without regard to in-group dynamics (Matsumura and Shin, 2006, with postal stores; Casas-Arce and Martinez-Jerez, 2009, with retailers). There is, however, a

growing stream of literature that studies competition among teams. Erev et al. (1990 and 1993) and Nalbantian and Schotter (1997) design experiments in which two groups of individuals compete to win a prize. These authors find that a contest effectively reduces the free-rider problem, even compared to the use of alternative incentive structures aiming at curing free-riding, such as profit or revenue sharing. A few other papers have followed in a similar vein (see Halevy, 2008; Sutter and Strassmair, 2009; Abbink et al., 2010; Cason et al., 2012; Leibbrandt and Saaksvuori, 2012). Although most of this evidence on team tournaments comes from laboratory experiments, there is an emergent set of studies that look at field experiments (Bandiera, Barankay, and Rasul 2005, 2012). In these studies, teams are typically considered as collections of individuals with a diverse set of characteristics but equal rank, leaving the impact of a leader to be an open question. Our study, a field experiment in which tournament participants are teams with different in-group dynamics and clearly identified leaders, contributes significantly to gaps in the current literature.

Finally, our paper aligns with the significant literature stream arguing that leaders are key determinants of firm performance. Economic theory suggests that leadership drives performance (Rotemberg and Saloner, 1993, 2000; Hermalin, 1998; Van den Steen, 2005; Bolton et al., 2013). The evidence from economics, finance, and management also points to the importance of leaders and leaders' incentives on team performance. Bandiera, Barankay and Rasul (2007) show that when managers receive incentive compensation linked to their subordinates' performance, the mean and dispersion of workers' productivity increases. Goodall et al. (2011) find that teams led by expert leaders perform better. Lazear et al. (2015) show that the effect of supervisors on the performance of subordinates is very large. The finance literature suggests that management style drives corporate decisions (Bertrand and Schoar, 2003), and that CEO characteristics are related

to firm performance (Kaplan et al., 2012). Finally, the organizational behavior literature has also identified several traits and psychological characteristics that make leaders effective (Hogan et al., 1994; Judge et al., 2002; Hackman and Wageman, 2005). We complement this literature by analyzing how team leader incentives affect team productivity in a tournament, and how this effect changes with team characteristics.

### III. INSTITUTIONAL SETTING

For the purpose of this project we partnered with a mid-sized bank in Latin America with over \$2 billion in assets. The bank has around 3,000 employees and 170 branches that are the subject of our research. There are two types of branches: those that target the general public (general branches) and those that target the retirees leveraging the bank's appointment as payment agent of the public pension system (service centers). Although both branch types can in theory sell the same portfolio of products, there are practical differences in the products that the target clients may actually purchase, which is reflected in the branches' commercial targets.

In 2014, the bank decided to introduce a series of tournaments to motivate the branch employees to increase their performance. To increase the contest's salience, the retail bank director decided to brand it around the Soccer World Cup or *Copa Mundial*: *"soccer is a religion here, so we want to leverage the vibe created by the World Cup and bring it to the daily work in the branches."* We became actively involved in helping the bank's top management design the tournaments at this time.

In each of the four months between September and December 2014, the bank organized seven independent tournaments in which roughly 25 general branches or service centers competed for multiple prizes. Aggregation of the performance in these 28 monthly tournaments served to identify two branches—one of each type—as the World Cup winners at the end of the

four months.

In each of the seven monthly tournaments branches competed to score the maximum number of “goals.” The branch scored goals as a function of its level of excess performance over a series of commercial targets established in the variable compensation system. Generally speaking, the branch scored a goal whenever the performance at the end of the month was between 100% and 110% of the target, two goals if it was between 110 and 120%, three goals between 120 and 130%, and four goals above 130%. The goals were then aggregated for all the product dimensions to arrive at the final score that was used to rank the tournament participants. (Additional tie-breaking rules were also defined to allocate the prizes in case several branches obtained the same number of goals.) The “Copa” spanned performance on six dimensions: the change in the deposits held at the branch during the month, and sales of personal loans, credit cards, insurance policies, and two commercial packages.

In the monthly tournaments each branch competed only against the other branches included in its group (referred to as zone, to build parallelism with the groups—zones—in the classificatory rounds of major international soccer tournaments). At the beginning of each month, we randomly allocated each branch to one of seven groups—four for general branches and three for service centers—of about 25 branches each. The reallocation of branches aimed to minimize the presence of dynamic incentives (Casas-Arce and Martínez-Jerez, 2009). If groups remained the same for the four months, the participants could have inferred their relative strength from their performance in the first tournament, and their subsequent effort would likely have been affected by past performance. For instance, trailing branches might have lowered their effort, fearing they had no chance of winning in the future. Similar effects are observed, for instance, in RPE incentive plans when competition is considered unfair (Frederickson, 1992;

Matsumura and Shin, 2006), and in budgeting when target levels are very difficult to achieve (Merchant and Mazoni, 1989; Fisher et al., 2003). By randomly reallocating the branches to new groups every month, we minimize the influence of such dynamic effects, and we can treat consecutive tournaments as independent events.

A second dimension of our intervention was the tournaments' prize structure. In each tournament, the branches competed for three prizes awarded to the top goal scorers within the group. The winning branch of a tournament received a gift card valued at US\$2,500. The second prize had a value of US\$2,000, and the third, US\$1,500.<sup>2</sup> Branches had complete freedom in the way they distributed the prize. To explore the role of leadership in branch performance we decided to establish in months 2 and 4 an additional prize of a US\$1,200 gift card for the manager of the top-scoring branch in each of the zones.

The rules of each monthly tournament—i.e. the commercial targets, the set of branches included in each zone and the prize structure—were announced at the beginning of each month shortly after the official announcement of the winners of the prior month's tournaments. To emphasize the differences in prize structures, each of the monthly tournaments was named after a major international soccer competition. Branches knew their performance against targets daily, but they only received interim tournament performance during the third week of the month.

In August 2014, prior to the launch of the sales tournaments, the bank launched an employee satisfaction survey. We helped the bank to refine the measures of satisfaction included in the instrument and enlarged it with questions aimed at capturing the managing style of the branch manager, and the team identity of the branch employees. After the completion of the survey, the bank announced the “Copa” and its detailed rules to the branch network. To increase

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<sup>2</sup> Prizes were designated as gift cards to avoid the legal consideration of variable compensation, which is regulated by the collective bargaining agreement of the bank.

the excitement around the tournaments, branches were instructed to choose a name for the team and upload a picture of the team in the Copa intranet prior to the start of the competition.

#### IV. LEADERSHIP AND TEAM INCENTIVES

Our setting provides a good testing ground for the study of competition among teams. While the theoretical literature on tournaments considers individual participants, we develop our hypotheses by combining the insights from that literature with the results on contracting with multiple agents (teams) and on leadership.

In this section we argue that we should expect to find heterogeneous responses both to the introduction of the tournaments and to the presence of a separate prize for the branch manager. These heterogeneous responses will help us identify the manager and team characteristics that make branches succeed when facing competition.

We expect the introduction of the incentives to lead to higher team performance, just as tournaments geared towards individual participants do. However, because we do not have a control set of branches that are not affected by the contests, and because the measures of performance for the periods before and during the tournaments are not entirely comparable,<sup>3</sup> we will only use performance data for the tournament periods, and limit our inference to testing for heterogeneous effects, i.e. whether the incentive effects vary with team and leader characteristics.

To create some intuition, we develop a very stylized model of leadership in teams. Consider a team that has  $n$  members,  $i = 1, \dots, n$ , plus a manager  $L$ . The role of the manager is not to create value directly, but rather to direct the effort of the team. The value that the team

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<sup>3</sup> The bank changed the definitions of some of the performance measures at the time of the introduction of the tournaments, making the comparison of the measures before and after somewhat problematic. For this reason, and because we are more interested in identifying heterogeneous response to the incentive system, we only look at performance during the four tournament months.

creates is given by  $\pi(e, \theta)$ , where  $e = (e_1, \dots, e_n)$  is the effort choice of each of the team members and  $\theta$  is a parameter that captures the productivity of the team. We assume that  $\pi$  is supermodular in  $(e, \theta)$  and concave in effort. As such,  $\pi$  and  $\partial\pi/\partial e_i$  are both increasing in  $\theta$ . Hence, when  $\theta$  increases, the team becomes more productive and it becomes optimal to exert a higher effort. Team members incur a cost of  $c(e_i) = ke_i$ , where  $k$  measures the marginal cost of exerting effort. Alternatively, we can think of  $k$  as the preferences of the team members for leisure, or their (in)ability to monitor each other's efforts to solve the free-riding problem.

Each of the team members receives a fixed salary  $\alpha_m$  plus a share  $\beta_m \in (0,1)$  of the value created by the team. Their utility is therefore  $U_i = \alpha_m + \beta_m\pi(e, \theta) - c(e_i)$ . On the other hand, the manager cares both about the wellbeing of the team,  $\sum_i U_i$ , and his/her own payoff,  $w_l$ . We let the manager's salary be linear in the team output,  $w_l = \alpha_l + \beta_l\pi$ . If we let  $\mu \in (0,1)$  be the weight attached to the team's welfare, we can write the manager's utility as  $U_l = \mu \sum_i U_i + (1 - \mu)w_l$ . The results extend to a tournament setting, in which the incentive weights  $\beta_m$  and  $\beta_l$  represent the team and manager prizes and  $\pi$  measures the effect of team effort on the probability of the team winning. We elaborate on the tournament model in the appendix, but we keep the linear incentives specification here for simplicity.

We consider two possible actions that the manager can undertake to guide the effort of the team members. First, the manager can monitor the effort of the team. Second, the manager can unleash the full productivity potential of the team by inspiring them to act as a group via a costly signaling action. Following Hermalin (1998), we assume that the manager moves first, and the team members follow the leader after observing his/her action. We study each of these choices in turn.

### *Monitoring of the Team.*

We first consider the role of the manager as one of monitoring the team, and making sure its members exert a sufficient level of effort. To that purpose, we assume that the manager can exert monitoring effort  $m$  at a cost of  $C(m)$ . Such monitoring forces team members to choose an effort level  $e \geq m$ , thereby inducing a minimum level of effort  $m$  upon the team members. This modeling choice captures the idea that monitoring helps managers limit the ability of team members to shirk, reducing the space of their effort choice. The higher the monitoring effort  $m$  of the manager, the more difficult it is for the team members to get away with low effort.

The problem of a team member is

$$\max_{e \geq m} U_i.$$

The optimal effort choice is  $e_i^* = \max(m, e_i^{SB})$ , where  $e_i^{SB}$  satisfies the first-order condition

$$\beta_m \frac{\partial \pi(e_1^*, \dots, e_n^*)}{\partial e_i} = k.$$

That is, effort is equal to the optimal choice for the team member whenever the manager's minimum required effort is lower than the effort that the agent would have chosen in the absence of any monitoring. This could happen because the manager's monitoring effort is relatively low or because the agent is relatively diligent. When monitoring is high and/or the agent is relatively lazy, though, the monitoring constraint is binding and team members are forced to exert the minimum effort required by the manager.

Anticipating the choice of the team members, the manager solves:

$$\max_m V - C(m) \text{ s. t. } e_i = e_i^*.$$

This leads to the following result.

**PROPOSITION 1.** The optimal monitoring  $m^*$  is increasing in  $\beta_l$ .

As a result, increasing the incentives of the manager heightens her monitoring effort. Because the increased monitoring leads to higher team effort, we expect to find that manager incentives increase the average performance of the teams, which is our first hypothesis:

HYPOTHESIS 1. Average team performance is higher when the tournament includes a manager prize than when it does not.

This hypothesis states the common intuition that giving incentives to the team leader can only be good for performance, by forcing the manager to exert more control on the team members. The literature on team incentives suggests that an incentive scheme that rewards individuals based on the performance of the whole team should lead to a free-rider problem (Holmstrom, 1982). This free-rider problem should be more severe for teams whose members have a bigger predisposition to shirk, for instance because they value having fun more or they have more options to have fun, and consequently have a higher cost of effort. The free-riding problem can be overcome by monitoring from the branch manager. Because the manager will have a stronger incentive to monitor the employees when she directly receives a tournament prize, we should see an improvement in average performance.

Another corollary of proposition 1 has to do not only with the average treatment effects, but also with heterogeneous effects. The teams with the higher cost of effort exert low effort when the manager does not monitor, but are forced to increase it when he/she does. On the other hand, the teams with a low cost of effort exert high effort even in the absence of monitoring, and

do not see a need to change when monitoring occurs. We can therefore state the following hypotheses:

HYPOTHESIS 2A. Team output is decreasing in the cost of effort of team members.

HYPOTHESIS 2B. When the tournament includes a manager prize, team output sensitivity to the cost of effort of team members decreases.

These hypotheses suggest that there is a difference in performance among teams based on their cost of effort. However, the differences in performance among teams should be less pronounced when the manager faces incentives.

#### *Signaling the Importance of Teamwork.*

Next, we explore the possibility that manager incentives may have counterproductive effects on performance. This possibility stems from the fact that the manager can influence the actions of the team by means other than monitoring. In particular, we consider the role of communication in inducing teamwork, and argue that manager incentives can limit the ability of the leader to inspire or signal the importance of teamwork to her team.

In the spirit of Hermalin's (1998) leadership model, we assume that  $\theta \in \{0,1\}$ , the parameter summarizing the collective productivity of the team, is observable by the team manager, but is unknown to the team members. After observing  $\theta$ , the manager then chooses action  $a(\theta)$  at a cost  $K(a)$ , before the team members decide how much effort to exert. We can think of  $\theta$  as the degree of complementarity among the team members, and  $a$  as the effort of the manager to inspire teamwork among the members, i.e. convincing them to work hard for the team and leverage those complementarities. For instance, the manager may invest time in

training employees or creating a sense of team spirit. Team members do not observe  $\theta$ , but can infer it by observing the manager's action. For simplicity, suppose that  $a \in \{0,1\}$ , and let  $K(0) = 0$  and  $K(1) = K$ . We assume that all the parties play a Bayesian equilibrium of the game.

PROPOSITION 2. When  $\beta_l = 0$ , there exists a fully separating equilibrium such that the manager chooses  $a^* = \theta$  as long as  $K \in [\underline{K}, \bar{K}]$  ( $\underline{K}$  and  $\bar{K}$  are defined in the proof). Furthermore, for sufficiently large  $\beta_l$ , no fully separating equilibrium exists. A partially separating equilibrium may still exist in which either  $a^* = 0$  with probability  $p$  when  $\theta = 0$  ( $a^* = 1$  with probability  $1 - p$ ) and  $a^* = 1$  for  $\theta = 1$ , or  $a^* = 0$  for  $\theta = 0$  and  $a^* = 1$  with probability  $q$  when  $\theta = 1$  ( $a^* = 0$  with probability  $1 - q$ ). In that case, both  $p$  and  $q$  are decreasing in  $\beta$ .

The proposition shows that the manager's incentives hamper her ability to credibly signal to her team members. Although a separating equilibrium may exist when the manager does not face incentives, as those incentives become stronger, the separating equilibrium disappears. Furthermore, although some information may still be credibly communicated in a partially revealing equilibrium, such an equilibrium has fewer high-type leaders revealing their information as the strength of incentives increases. The intuition for this result is very straightforward: the manager cares about the utility of the team, and therefore, about the cost of effort incurred by its members. As a result, she wishes to induce high effort only when it is beneficial for the members of the team. However, as the manager faces stronger incentives, she cares more about output, and less about the costs agents incur to provide it. Hence, the manager

is more tempted to claim that  $\theta$  is high to induce high effort even if it is not. Team members see through the manager's incentives and are more skeptical of the manager's message.

This proposition suggests the following hypotheses:

HYPOTHESIS 3A. When the tournament does not include a manager prize, the managers who encourage teamwork perform better than those who do not.

HYPOTHESIS 3B. When the tournament includes a manager prize, managers find it harder to inspire their teams to work hard, and as a result, team output is less sensitive to the efforts of the manager to create teamwork.

The intuition behind these hypotheses is simple. When teamwork is inspired by the branch manager, a manager-specific prize can negatively affect team spirit, and consequently, hurt cooperation among team members. The reason for this is that although team members may see the effort of the manager to increase their cooperation as genuine when they are competing for a team prize, the same may not be true when there is a prize for the manager. Employees may see the efforts to build team spirit as self-serving when the manager benefits directly, and consequently may ignore them, leading to a deterioration in performance. As a result, we would expect to see the teams with managers who encourage team spirit to underperform when there is a prize for the manager, as their performance is more sensitive to the credibility of the manager's messages.

In contrast, when teamwork is the result of the internal dynamics of the team, rather than the active encouragement of the leader, we should not see this differential effect of the manager prize.

In the next section we describe the data we use to test these hypotheses, emphasizing the

empirical constructs we use to measure teamwork and opportunity cost of effort.

## V. DATA

To study the ability of teams to perform in the competition, we use data obtained from various sources: the performance data from the bank's systems, employee and manager socio-demographic characteristics from the human resources database, a survey of the branch managers and employees that we run prior to the beginning of the contest, and the pictures posted by the teams on the bank's intranet. In particular, we use the survey responses and pictures to construct various factors measuring team and leader characteristics.

First, we conducted a survey of the branch managers.<sup>4</sup> The survey was sent to 169 managers, 158 of which responded (a response rate of 93.5%). The objective was to measure their satisfaction with the job and their efforts towards encouraging teamwork and building team spirit among their branch employees, an important dimension of their leadership style that hypothesis 2 suggests should lead to a discernible effect on performance during the tournament. In that respect, we calculate the factors Manager Satisfaction and Manager Team.<sup>5</sup> As Table 3 Panel A shows, factor analysis reveals one factor with eigenvalue above one for each construct (1.93 and 2.36, respectively). Factor loadings are above 0.60 for all questions except one that falls to 0.52. Cronbach's alpha also shows a moderately high internal consistency for both factors ( $\alpha = 0.66$  for Manager Satisfaction and  $\alpha = 0.71$  for Manager Team).

We conducted a second survey of branch employees, containing similar questions to the manager survey, in order to capture employees' satisfaction with their job and their ability to work as a team. Although the main objective of the paper is to study the role of the manager, we

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<sup>4</sup> For both the manager and employee surveys we joined efforts with the bank's overall employee satisfaction survey. We conducted the survey including questions of our own design and questions that the bank was planning to ask in its satisfaction survey.

<sup>5</sup> We include employee satisfaction as a characteristic measure of the teams because it has been shown to affect individual performance, and is therefore likely to affect the team's outcome.

use the employee constructs as controls in our regressions. We sent the survey to a target population of 1,768 employees, and obtained responses from 1,098. This represents a response rate of 62%, but virtually all branches are covered. Based on the survey, and aggregating data at the branch level, we construct two factors using the branch mean responses: Employee Satisfaction and Employee Team. Factor analysis, summarized in Table 3 Panel B, shows one factor with eigenvalue above one for each of the two constructs (3.07 and 2.64, respectively). The factor loadings for each of the questions exceed 0.70 in absolute terms, and internal consistency is high (Cronbach's  $\alpha = 0.84$  for Employee Satisfaction and  $\alpha = 0.81$  for Employee Team).

As part of the competition, the bank set up an internal website where branches were encouraged to post pictures of their teams. We downloaded all the pictures and asked three research assistants to evaluate several dimensions of the teams (as reflected in the pictures) on a 5-point Likert scale. For each of the questions, we then averaged the score over the three evaluators and all the pictures of a given branch. Exploratory factor analysis suggests the presence of two factors, which we name Fun and Resourcefulness. The first is related to questions that try to capture to what extent the team seems to have fun, while the second captures the creativity and originality of the banner they display. Table 3 Panel C shows the results from the confirmatory factor analysis, which corroborates the reliability of the factors. For each of these constructs we obtain one factor with an eigenvalue greater than one (3.27 and 1.80, respectively), and loadings on each of the questions above 0.86. Furthermore, both factors show a high internal consistency (Cronbach's  $\alpha = 0.92$  for Fun and  $\alpha = 0.88$  for Resourcefulness).

All six factors are calculated by equally weighting all the component dimensions of the factor. Alternatively, we also weighted the questions according to the factor loadings, and the results (untabulated) remain unchanged.

Finally, besides the performance data during the tournament months, we also collected branch performance for the first eight months of 2014, prior to the start of the tournaments. For each branch, we average the performance over the earlier part of the year to construct an ex-ante measure of branch productivity that, as we explain below, we use to rule out the possibility of reverse causality driving our results. We averaged performance only over the first six months of 2014, dropping the two months prior to the introduction of the tournaments, to eliminate any potential effect of our survey or the announcement of the tournaments on our measure. However, averaging over alternative time periods does not alter our results.

Summary descriptive statistics for each of the questions can be found in Table 2. As the table shows, 55.4% of the branches belong to the general branch network, while the rest are service centers. On average, branches have 10 employees that are 37.6 years old. Pearson correlations for all the variables can be found in Table 3.

## **VI. RESULTS**

### *Manager prizes and performance.*

First, we begin by looking at the average effect of offering a prize to the managers. Hypothesis 1 predicts that the additional incentives of the prize will spur managers to increase the performance of their teams. Table 4 shows evidence consistent with this hypothesis.

Panel A of Table 4 shows the average goals scored by the branches in each of the four tournament months. Notice that the two months with the highest number of goals scored are

precisely the months in which managers have the opportunity to win a prize (October and December).

Next, we test the statistical significance of the difference in performance in a multivariate model by running the following regression:

$$Performance_{it} = \alpha + \beta Manager\ prize_t + \gamma X_{it} + u_{it},$$

where  $i$  denotes a branch,  $t$  is the time period (month), *Manager prize* is a dummy that takes a value of 1 when the tournament awards a prize for the leader of the winning branch and 0 when there are only prizes for the team members, and  $X$  are controls for branch characteristics. In this regression,  $\beta$  measures the difference in performance between the months with a manager prize and those without. The results, in Panel B of Table 4, show that indeed branches score, on average, 1.5 more goals during the months with a manager prize. This increase is both statistically and economically significant, representing a jump of 17% over the 9 goals scored in the months without a manager prize.

Because of the random reallocation of branches to groups after each tournament, we can rule out behavioral responses due to learning from past performance about the relative standing of a branch vis-à-vis its competitors. This allows us to pool all the monthly observations in a regression and treat each consecutive tournament as independent. Furthermore, as we selected the months with a manager prize for reasons orthogonal to team performance, this evidence suggests that offering a prize to the manager leads to increased performance for the average branch. We next look at how this response varies as a function of manager characteristics.

#### *Heterogeneous responses to manager prizes.*

Here, we measure how the performance of the branches varies with leader and branch characteristics. Because we expect the effects of those characteristics to vary according to

whether there is an additional prize for the branch manager or not, we estimate regressions as follows:

$$Performance_{it} = \alpha + \beta Manager\ prize_t + \beta_Z Z_i + \beta_{LZ} Manager\ prize_t * Z_i + \gamma X_{it} + u_{it},$$

where  $Z$  denotes the branch characteristics we are most interested in (team characteristics and management style of the leader). The coefficient  $\beta$  measures the extent to which performance increases during the tournaments that award a prize for the branch manager, as in the earlier specification. The coefficient  $\beta_Z$  captures the effects of team and leader characteristics on performance during the tournaments when the contest offers a team reward, and the coefficient  $\beta_{LZ}$  captures the extent to which the effects of the leader and team characteristics change when the tournament provides an additional prize for the team leader.

Table 5 shows the results when we measure performance with the number of goals scored by the branch in the tournament month. First, column 1 looks at the effects of the manager survey factors. We find that manager satisfaction does not play a significant role in driving the performance of the team, as neither the baseline variable Manager Satisfaction, nor its interaction with Manager Prize have any effect on goals. Only the manager's leadership style has an impact on performance. Consistent with hypothesis 3A, managers who try to influence team performance by inspiring members to put the interest of the team ahead of their individual interests perform better, as shown by the positive coefficient on Manager Team. However, when the tournament offers a prize for the manager, this positive effect goes away (notice that the negative coefficient on the interaction with Manager Prize, -1.348, almost entirely offsets the

positive coefficient on Manager Prize, 1.714). The results are consistent with our hypothesis 3B and team members identifying the manager's message as self-serving.

Next, column 2 considers the effects of the team characteristics. We find that the factor that we called fun is associated with a negative effect on performance, while resourcefulness has a positive effect. This is consistent with fun capturing the relative cost of effort of the team members, which drives their propensity to shirk or loaf. The more pleasant the social activities an employee can engage in with the members of his team, the more likely it is that the employee will engage in those activities instead of his daily work. The negative coefficient on Photo Fun is therefore consistent with hypothesis 2A. On the other hand, resourcefulness captures the ability of the team to unleash the creativity of its members to increase performance. More interestingly, when we interact these two factors with the dummy for manager prize, the effects reverse: fun has less of a negative impact on performance as predicted by hypothesis 2B, while resourcefulness has less of a positive impact on performance. The results are consistent with the manager prize in the tournament encouraging managers to monitor their teams more closely. As a result of the increased monitoring, managers are able to curb the lack of effort by the teams that have more fun, but at the cost of limiting the creativity of the more resourceful teams.

One concern with the previous results is that our measures of leader and team characteristics may be capturing the same underlying force. As a result, they are significant only when considered in isolation. To address this issue, column 3 combines all factors in a single regression. The results are almost identical, suggesting that the various measures we constructed are capturing distinct aspects that are important determinants of branch performance.<sup>6</sup>

*Robustness tests.*

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<sup>6</sup> This is consistent with the results of the factor analysis showing that employee and manager surveys do not share common factors.

Columns 4 through 6 in Table 5 repeat the same regressions of columns 1 to 3 while adding controls for various characteristics of the branch (branch network, the number of employees of the branch, and average tenure and age of those employees, as well as the satisfaction and team factors extracted from the employee survey). Regarding the employee survey factors, we find that the branches with more satisfied employees perform better. However, the employee team factor has little effect (the coefficient is negative but not statistically significant).<sup>7</sup> Likewise, we find that bigger branches are able to score more goals. However, the results for the main variables of interest are robust to adding all these controls.

A final concern is that the factors that we measure are simply capturing the underlying productivity of the branch. This could be the case either because both are correlated, or even because branch productivity causes the factors. This reverse causality can arise, for instance, if a branch that is successful and manages to consistently beat targets makes its manager happy or willing and able to create a good working environment, perhaps because all employees are able to obtain a bonus without having to work excessive hours or compete among themselves.

Notice that if the targets set by the bank reflect the ex-ante expected performance of each branch, our measure of performance should filter out the heterogeneity in ability of the branches. As a result, goals (which are a function of performance relative to target) should display no persistence over time. In this case, all branches would be homogeneous for the purpose of the tournament, and past productivity would be unlikely to drive satisfaction or team spirit. However, to the extent that targets are biased, some branches may be able to consistently beat targets, while others consistently miss them, opening up the possibility of feedback effects from past performance on satisfaction, teamwork, and future performance. In order to rule out this

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<sup>7</sup> We also added interactions of the employee factors with Manager Prize, but none of them were statistically significant. Furthermore, the coefficients on the other variables remain stable when we add those interactions.

possibility, we construct a measure of past performance as the average branch performance relative to target for the first six months of 2014, and use it as an additional control in our regressions.<sup>8</sup>

Columns 7 and 8 show that there is some persistence in performance, as the average performance relative to target for the first six months of 2014 predicts the number of goals in the competition. However, the effects of the factors described above remain virtually unchanged, not only in their statistical significance, but also in their economic magnitude. Employee satisfaction is the only factor that shows a drop in the size of the estimated effect, and becomes insignificant. This could indicate that employee satisfaction is, to some extent, driven by the past performance of the branch. However, the main effects of interest, and in particular the interactions with the dummy for manager prize, remain unchanged.

As a final robustness test, Table 6 repeats the same analyses of Table 5, using the branch ranking as an alternative measure of performance. Because the top branch is ranked in position 1, the expected signs of the coefficients are reversed. Furthermore, because the number of branches remains constant throughout the tournaments, the average ranking cannot change from month to month. As a result, we cannot capture the effect of having a manager prize with these regressions. Nonetheless, although the coefficient on the dummy Manager Prize is meaningless, we keep it in the regressions to make the interpretation of the interacted variables easier. A final consideration to keep in mind is that it is much harder to find any effects on branch rankings because, given the very nature of tournaments, only variables that change the relative standing of a branch will show any effect. It is therefore remarkable that the results are robust to this

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<sup>8</sup> We exclude the months of July and August for two reasons: 1) their proximity to the tournaments may have contaminated the measure, and 2) that was the time when our survey was running. Eliminating these months allows us to avoid any overlap between past performance and our branch factors. Nonetheless, we also run our results using the average performance relative to target for the first four months of 2014, the first eight months of 2014 up to the beginning of the tournaments, and the four months prior to the tournaments. The results are consistent throughout.

alternative measure of performance. Although some of the coefficients show slightly weaker statistical significance, the table shows that all the variables have the expected signs.

Overall, the evidence is consistent with all of our hypotheses.

## **VII. CONCLUSION**

There is a strong evidence that individuals respond to incentives when placed in a competitive environment (Matsumura and Shin, 2006; Casas-Arce and Martínez-Jerez, 2009). In such settings, the contest design is important, as various features, such as the size of the tournament, the distribution of prizes, the heterogeneity among competitors, etc. have a large impact on incentives (Hannan, Krishnan, and Newman, 2008; Müller and Schotter, 2010; Casas-Arce, Deller, and Martinez-Jerez, 2016). Although most of the evidence we have is based on competition among individuals, it is important to test whether the same holds true for teams as, in practice, we often see teams or firms competing against one another. In such settings, the ability of teams to work together, as well as the skill of the leader in coordinating team members and instilling team spirit, are likely to play a major role in tournament performance. This paper provides a first look at these questions.

In collaboration with a medium-sized bank in Latin America, we designed a sequence of tournaments among its branches in which we varied the prizes awarded to the winners. In some tournaments, prizes are shared among all branch employees, while in others there is an additional prize for the manager that leads the branch. We also used survey measures to capture several team and leader measures. We find that managers use both the levers of monitoring and inspiring team values to improve team performance. The efficacy of these levers hinges on team characteristics such as the collective resourcefulness of the group and the pleasure they seem to derive from engaging in in-group social interactions.

The results show the importance of both team characteristics and leadership style in driving performance in tournaments. At the same time, they show that the effects of those characteristics are likely to vary with the environment. Hence, the optimal way to organize teams will depend on the type of competitive environment. At the same time, when designing such incentive schemes, special attention ought to be taken with respect to the type of teams that will be competing, the dimension of performance that needs to be stimulated, and the team's ability to restructure in response to the design choices. As such, the results highlight the importance of aligning the explicit and implicit elements of the control system to obtain ideal results. All of these are important questions that are largely ignored in the literature, and we hope that our evidence encourages further work in the area.

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## APPENDIX: PROOFS

This appendix discusses the tournaments interpretation of our model and provides the formal proofs to the results in Section IV.

Suppose that we have a continuum of teams indexed  $t \in [0,1]$  competing to win a prize. There is a prize  $\beta_t$  for a fraction  $\mu$  of the teams, which are awarded based on their performance ranking. The output of each team is given by  $y_t = \pi(e_t, \theta) + u_t$ , where  $e_t = (e_{t1}, \dots, e_{tn})$  is the effort of all the team members (as discussed in the body of the paper) and  $u_t$  is a random shock that is uniformly distributed,  $u_t \sim U[0,1]$ . (Assuming a  $U[0,1]$  is simply a normalization.) For any

choice of effort  $e_t$  over all teams  $t \in [0,1]$  we can define a threshold  $\underline{y}$  such that team  $t$  wins a prize if and only if  $y_t \geq \underline{y}$ . Naturally, such a threshold will depend on the exact distribution of effort across all the teams. Nevertheless, for any such threshold, we have that  $\Pr(y_t \geq \underline{y}) = \Pr(u_t \geq \underline{y} - e_t) = 1 + \pi(e_t, \theta) - \underline{y}$ . As a result, the payoff for the team members is a linear function of  $\pi(e_t, \theta)$ , the analysis of the equilibrium effort choice is essentially identical to the model described in the main text, and the same results obtain. Next, we provide proofs of the propositions.

PROOF OF PROPOSITION 1. Notice that the leader's objective function satisfies:

$$\frac{\partial(\pi - C(m))}{\partial \beta_l} = (1 - \mu)\pi(e^*, \theta),$$

where  $e^* = (e_1^*, \dots, e_n^*)$ . Differentiating again with respect to  $m$  yields:

$$\frac{\partial^2(\pi - C(m))}{\partial m \partial \beta_l} = (1 - \mu) \sum_i \frac{\partial \pi(e^*, \theta)}{\partial e_i} \frac{\partial e_i^*}{\partial m} \geq 0,$$

where the inequality follows from the fact that  $\pi$  is increasing in  $e_i$  and  $e_i^*$  is increasing in  $m$ . It follows that the leader's objective function is supermodular in  $(m, \beta_l)$ , and hence the optimal monitoring choice  $m^*$  is increasing in  $\beta_l$ . ■

PROOF OF PROPOSITION 2. After observing the leader's action  $a(\theta)$ , team members will form beliefs  $\hat{\theta}(a)$  about  $\theta$ , where  $\hat{\theta}(a) = \text{Prob}(\theta = 1|a) \in [0,1]$ . In a Bayesian equilibrium, such beliefs have to follow Bayes' rule.

In a separating equilibrium we have the leader playing  $a^*(\theta) = \theta$ . (Notice that  $a^*(\theta) = 1 - \theta$  cannot be an equilibrium, because in this case, the leader would prefer to deviate and set  $a = 0$  when  $\theta = 0$ . Doing so is less costly, and moreover convinces the team members that  $\theta = 1$ , encouraging them to exert higher effort.) As a result, following Bayes' rule, team

members form beliefs  $\hat{\theta}(a) = a$ . Let  $e^*(a^*(\theta))$  be the optimal effort level of the team members as a response to the action of the leader. If we denote the leader's utility by  $\pi(e, \theta)$ , then the leader's incentive compatibility constraint requires:

$$\begin{aligned}\pi(e^*(1), 1) - K &\geq \pi(e^*(0), 1) \\ \pi(e^*(0), 0) &\geq \pi(e^*(1), 0) - K.\end{aligned}$$

So long as  $\pi(e^*(1), 1) - \pi(e^*(0), 1) \geq K \geq \pi(e^*(0), 0) - \pi(e^*(1), 0)$ , a leader would find it optimal to set  $a = 0$  when  $\theta = 0$  because the cost of the action does not compensate for the inducement of additional effort by the team members. Similarly, the leader would want to set  $a = 1$  when  $\theta = 1$  because now the benefit of communicating the higher value of teamwork to induce higher effort offsets the cost of the signaling. Hence, a separating equilibrium exists.

To see that no such separating equilibrium exists when  $\beta_l$  is sufficiently large, notice that  $\pi(e^*(0), 0) - \pi(e^*(1), 0)$  is increasing in  $\beta_l$ . Therefore, for sufficiently large  $\beta_l$ , we will have  $\pi(e^*(0), 0) - \pi(e^*(1), 0) > K$ , and the low type ( $\theta = 0$ ) will always find it optimal to set  $a = 1$  to mimic the high type if  $a^*(1) = 1$ . As a result, no fully separating equilibrium can exist.

Consider now the partially separating equilibrium in which  $a^* = 0$  for  $\theta = 0$  and  $a^* = 1$  with probability  $p$  when  $\theta = 1$ . For this to be an equilibrium, the leader must be indifferent between the two actions, so that  $\pi(e^*(1), 1) - K = \pi(e^*(0), 1)$ . Notice that the optimal effort of the team members when they observe  $a^* = 0$ ,  $e^*(0)$  is decreasing in  $p$ . Because  $\pi(e^*(1), 1) - \pi(e^*(0), 1)$  is increasing in  $\beta_l$ , we must have  $p$  decreasing in  $\beta_l$  for the high-type leader to be indifferent between the two actions. ■

**TABLE 1. Summary statistics**

	<b>Observations</b>	<b>mean</b>	<b>sd</b>	<b>min</b>	<b>p50</b>	<b>max</b>
Branch network	177	0.554	0.499	0	1	1
Number of employees	177	9.915	7.247	1	8	66
Average tenure	177	2,391	1,131	552.1	1,993	6,499
Average employee age	177	37.62	3.759	28.1	37.71	51.29
Goals	708	9.77	4.966	0	10	23
Branch performance	708	96.82	22.95	33.17	97.13	171.9
Manager satisfaction	157	4.153	0.647	1.333	4	5
Manager team	157	3.556	0.396	1.167	3.5	4.167
Employee satisfaction	175	3.932	0.378	2.9	3.933	5
Employee team	175	3.576	0.483	2	3.563	4.75
Number of photos	178	2.715	1.198	0	3.056	4.389
Photo fun (equal weight)	178	2.744	1.214	0	3.083	4.333
Photo resourcefulness (equal weight)	178	2.655	1.239	0	2.882	4.667

Notes: This table reports the mean, standard deviation and main order statistics of the variables used in this study. *Branch network* is a dummy variable that takes the value of 1 if the branch is full-service and 0 if it is limited-service; *Number of employees* is the average number of employees working in the branch; *Average tenure* is the average number of years the employees in the branch have worked for the bank; *Average employee age* is the average age of the employees working in the branch; *Goals* is the number of tournament goals scored by the branch during a certain month; *Branch performance* is the average percentage of target completion by the branch during the first six months of 2014; *Manager satisfaction* is the factor measuring the job satisfaction of the branch manager extracted from the manager survey; *Manager team* is the factor measuring the extent to which the manager's style hinges on inspiring teamwork among branch employees; *Employee satisfaction* is the factor measuring the average satisfaction of the branch employees with their work extracted from the responses to the satisfaction survey; *Employee team* is the factor measuring the average branch employee cohesiveness and commitment to the team; *Number of photos* is the number of team photos uploaded by the branch employees to the intranet of the Copa; *Photo fun* is the factor measuring the propensity of the branch employees to engage in fun activities together extracted from the evaluations of the team photos; *Photo resourcefulness* is the factor measuring the creative power of the branch employees extracted from the evaluations of the team photos.

**TABLE 2. Correlation matrix**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Goals	1.0000											
(2) Manager satisfaction	0.1204***	1.0000										
(3) Manager team	0.1079***	0.2682***	1.0000									
(4) Number of photos	0.1108***	0.1509***	-0.0240	1.0000								
(5) Photo fun	0.0931**	0.1435***	-0.0163	0.9900***	1.0000							
(6) Photo resourcefulness	0.1391***	0.1559***	-0.0376	0.9612***	0.9127***	1.0000						
(7) Employee satisfaction	0.1545***	0.2273***	0.3270***	0.0675*	0.0705*	0.0579	1.0000					
(8) Employee team	-0.0000	0.1261***	0.1920***	0.0594	0.0701*	0.0351	0.6103***	1.0000				
(9) Branch network	-0.0708*	-0.0356	-0.1123***	-0.0380	-0.0539	-0.0047	-0.1134***	-0.0637*	1.0000			
(10) Number of employees	0.1562***	0.0981**	0.0176	0.1457***	0.1609***	0.1073***	0.0155	-0.1277***	-0.1065***	1.0000		
(11) Average tenure	-0.0760**	-0.1849***	-0.1736***	-0.0833**	-0.0898**	-0.0656*	-0.3155***	-0.1480***	0.4904***	-0.1484***	1.0000	
(12) Average employee age	-0.0982***	-0.1185***	-0.1624***	-0.1073***	-0.1231***	-0.0698*	-0.1415***	-0.0868**	0.5439***	-0.0211	0.4452***	1.0000

Notes: This table reports the Pearson correlations of the variables used in the study.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**TABLE 3. Construction of branch factors**

<b>Panel A: Manager Survey Factors</b>							
	<b>Confirmatory factor loadings</b>	<b>N</b>	<b>mean</b>	<b>sd</b>	<b>min</b>	<b>p50</b>	<b>max</b>
<b>Satisfaction (Cronbach's alpha = 0.6591, Chi-square = )</b>	<b>Eigenvalue = 1.93173</b>						
I would recommend working at my branch to my best friend	0.6172	157	3.924	1.059	1	4	5
The bank is a great place to work	0.8986	157	4.197	0.755	1	4	5
In general, I feel satisfied working at the bank	0.8621	157	4.338	0.646	2	4	5
<b>Team (Cronbach's alpha = 0.7082, Chi-square(5) = 6.24)</b>	<b>Eigenvalue = 2.36350</b>						
The branch climate is excellent	0.7445	157	3.885	0.808	1	4	5
When I talk about my branch I usually say "we" rather than "them"	0.7731	157	4.637	0.568	1	5	5
In my branch we work as a team	0.7499	157	4.287	0.717	1	4	5
I have no problem with branch employees expressing different opinions than mine at work	0.6129	157	4.382	0.656	1	4	5
I promote teamwork among the different areas of the organization	0.523	157	4.146	0.723	2	4	5
<b>Panel B: Employee Survey Factors</b>							
<b>Satisfaction (Cronbach's alpha = 0.8396, Chi-square = 9.28)</b>	<b>Eigenvalue = 3.07324</b>						
My branch has an excellent reputation in the community	0.7275	175	3.716	0.499	2	3.714	5
I would recommend working at my branch to my best friend	0.8222	175	3.766	0.554	1.75	3.8	5
The bank is a great place to work	0.812	175	4.067	0.458	2.5	4	5
When someone praises my branch, it feels like a personal compliment	0.7058	175	3.929	0.462	2.75	4	5
In general, I feel satisfied working at the bank	0.8429	175	4.18	0.444	3	4.2	5
<b>Team (Cronbach's alpha = 0.8103, Chi-square(1) = 0.87)</b>	<b>Eigenvalue = 2.63957</b>						
The branch climate is excellent	0.8806	175	3.746	0.66	2	3.8	5
When I talk about my branch I usually say "we" rather than "them"	0.7747	175	4.337	0.39	3	4.375	5
In my branch some employees claim other employees' achievements as theirs	-0.7116	175	2.765	0.694	1	2.833	4.5
In my branch we work as a team	0.8704	175	3.987	0.627	2	4	5
<b>Panel C: Photo Factors</b>							
<b>Fun (Cronbach's alpha = 0.9247, Chi-square(1) = 1.78)</b>	<b>Eigenvalue = 3.27310</b>						
How fun do you think the team in this picture is?	0.9121	153	3.2	0.621	2	3.067	4.667
How cohesive do you think the team in this picture is?	0.8914	153	3.327	0.548	2	3.333	4.667
How passionate do you think the team in this picture is?	0.8683	153	3.075	0.51	1.667	3	4.333
How much would you like to be on the team in this picture?	0.9448	153	3.169	0.63	1.667	3.222	4.667
<b>Resourcefulness (Cronbach's alpha = 0.8846, Chi-square = )</b>	<b>Eigenvalue = 1.80490</b>						
How creative do you think the team in this picture is?	0.95	153	3.121	0.638	1.667	3.167	4.667
How would you rate the originality of the banner designed by the team in this picture?	0.95	153	3.057	0.754	1.333	3	4.667

**TABLE 4. Manager prize and tournament performance****Panel A: Goals by month**

	September (no prize)	October (prize)	November (no prize)	December (prize)
Mean	9.65	10.09	8.418	10.92
Std. deviation	4.586	5.09	4.977	4.906
Observations	177	177	177	177

Notes: This table reports the mean and standard deviation of the monthly goals scored by the branches during the months of the Copa. The Copa is a series of monthly tournaments organized among the branches of the bank subject of this study. The ranking of the branches is determined by the number of goals scored. Branches score goals when they exceed the targets of commercialization of certain products. In general, the higher the percentage of excess performance over the target the higher the number of goals scored. Number of goals is capped at a certain level of performance.

**Panel B: Manager prize and goals**

VARIABLES	(1) goals	(2) goals
Manager prize	1.472*** (0.265)	1.472*** (0.266)
Branch network		0.007 (0.768)
Number of employees		0.105*** (0.034)
Tenure		-0.000 (0.000)
Age		-0.118 (0.087)
Constant	9.034*** (0.309)	12.579*** (3.164)
Observations	708	708
R-squared	0.022	0.056

Notes: This table reports the OLS regression of the number of goals scored by a branch during a tournament month: *Manager prize* is a dummy variable that takes the value of 1 if the tournament includes a specific prize for the branch manager and 0 otherwise; *Branch network* is a dummy variable that takes the value of 1 if the branch is full-service and 0 if it is limited-service; *Number of employees* is the average number of employees working in the branch; *Tenure* is the average number of years the employees in the branch have worked for the bank; *Age* is the average age of the employees working in the branch.

Clustered standard errors (branch level) are in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**TABLE 5. Tournament performance in goals: September–December 2014**

VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Manager prize	4.641* (2.745)	1.400* (0.787)	4.793* (2.867)	4.639* (2.759)	1.374* (0.791)	4.771* (2.880)	4.793* (2.869)	4.771* (2.882)
Manager satisfaction	0.568 (0.463)		0.335 (0.467)	0.329 (0.454)		0.124 (0.449)	0.132 (0.466)	0.065 (0.432)
Manager team	1.714** (0.723)		1.961*** (0.707)	1.241* (0.740)		1.471** (0.728)	1.559** (0.702)	1.370* (0.704)
Manager satisfaction * Manager prize	0.405 (0.435)		0.463 (0.435)	0.399 (0.437)		0.454 (0.437)	0.463 (0.436)	0.454 (0.438)
Manager team * Manager prize	-1.348** (0.613)		-1.437** (0.619)	-1.337** (0.616)		-1.425** (0.622)	-1.437** (0.620)	-1.425** (0.622)
Photo fun		-1.234** (0.615)	-1.302* (0.670)		-1.733*** (0.619)	-1.841*** (0.672)	-1.146* (0.664)	-1.465** (0.673)
Photo resourcefulness		1.710*** (0.626)	1.831*** (0.672)		2.040*** (0.614)	2.215*** (0.645)	1.539** (0.674)	1.782*** (0.653)
Photo fun * Manager prize		0.802 (0.507)	0.876 (0.544)		0.894* (0.518)	0.934* (0.554)	0.876 (0.544)	0.934* (0.555)
Photo resourcefulness * Manager prize		-0.802* (0.478)	-0.933* (0.510)		-0.888* (0.486)	-0.982* (0.519)	-0.933* (0.511)	-0.982* (0.519)
Employee satisfaction				2.461** (0.977)	2.857*** (0.857)	2.482** (1.001)		1.788* (0.989)
Employee team				-1.172 (0.725)	-1.101 (0.688)	-1.131 (0.729)		-0.812 (0.700)
Branch network				0.037 (0.809)	-0.215 (0.721)	-0.017 (0.773)		0.406 (0.756)
Number of employees				0.117** (0.034)	0.106*** (0.034)	0.126*** (0.036)		0.094** (0.036)
Tenure				0.000 (0.000)	0.000 (0.000)	0.000 (0.000)		0.001** (0.000)
Age				-0.118 (0.093)	-0.128 (0.086)	-0.133 (0.090)		-0.142* (0.085)
Past performance							0.050*** (0.012)	0.057*** (0.016)
Constant	0.678 (2.961)	7.876*** (0.591)	-0.566 (2.882)	0.374 (5.270)	4.376 (4.282)	-0.353 (5.014)	-2.778 (2.846)	-4.172 (4.823)
Observations	628	708	628	624	700	624	628	624
R-squared	0.046	0.050	0.075	0.098	0.115	0.131	0.115	0.160

Notes: This table analyzes the impact of team characteristics and leadership style on the effect of the provision of explicit incentives to the branch manager on team performance. It reports OLS regressions in which the dependent variable is the number of goals scored by a branch during the month. Goals are scored as a function of the branch commercial performance relative to their targets. *Manager prize* is a dummy variable that takes the value of 1 if the tournament includes a specific prize for the branch manager and 0 otherwise; *Manager satisfaction* is the factor measuring the job satisfaction of the branch manager extracted from the manager survey; *Manager team* is the factor measuring the extent to which the manager's style hinges on inspiring teamwork among branch employees; *Photo fun* is the factor measuring the propensity of the branch employees to engage in fun activities together extracted from the evaluations of the team photos; *Photo resourcefulness* is the factor measuring the creative power of the branch employees extracted from the evaluations of the team photos; *Employee satisfaction* is the factor measuring the average satisfaction of the branch employees with their work extracted from the responses to the satisfaction survey; *Employee team* is the factor measuring the average branch employee cohesiveness and commitment to the team; *Branch network* is a dummy variable that takes the value of 1 if the branch is full-service and 0 if it is limited-service; *Number of employees* is the average number of employees working in the branch; *Tenure* is the average number of years the employees in the branch have worked for the bank; *Age* is the average age of the employees working in the branch; *Past performance* is the average percentage of target completion by the branch during the first six months of 2014.

Clustered standard errors (branch level) are in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**TABLE 6. Tournament ranking: September–December 2014**

VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Manager prize	-3.610 (4.497)	0.320 (1.228)	-4.107 (4.587)	-3.605 (4.523)	0.370 (1.234)	-4.060 (4.612)	-4.107 (4.591)	-4.060 (4.615)
Manager satisfaction	-0.814 (0.719)		-0.507 (0.717)	-0.493 (0.697)		-0.201 (0.685)	-0.269 (0.728)	-0.107 (0.668)
Manager team	-2.156* (1.143)		-2.509** (1.135)	-1.696 (1.151)		-2.005* (1.138)	-2.038* (1.122)	-1.845 (1.118)
Manager satisfaction * Manager prize	-1.168* (0.597)		-1.281** (0.604)	-1.152* (0.599)		-1.261** (0.605)	-1.281** (0.604)	-1.261** (0.606)
Manager team * Manager prize	2.356** (0.977)		2.496** (0.993)	2.328** (0.982)		2.468** (0.997)	2.496** (0.993)	2.468** (0.998)
Photo fun		2.082** (0.910)	2.216** (0.977)		2.653*** (0.921)	2.805*** (0.993)	2.034** (0.961)	2.207** (0.992)
Photo resourcefulness		-2.615*** (0.912)	-2.850*** (0.961)		-2.960*** (0.897)	-3.282*** (0.940)	-2.502*** (0.951)	-2.593*** (0.952)
Photo fun * Manager prize		-0.882 (0.868)	-1.014 (0.901)		-1.070 (0.884)	-1.138 (0.916)	-1.014 (0.902)	-1.138 (0.917)
Photo resourcefulness * Manager prize		0.792 (0.818)	1.220 (0.851)		0.966 (0.830)	1.325 (0.863)	1.220 (0.852)	1.325 (0.864)
Employee satisfaction				-3.474** (1.555)	-4.174*** (1.347)	-3.507** (1.576)		-2.404 (1.558)
Employee team				1.359 (1.063)	1.258 (1.016)	1.253 (1.069)		0.746 (1.021)
Branch network				-1.680 (1.158)	-1.516 (1.033)	-1.592 (1.105)		-2.265** (1.052)
Number of employees				-0.162*** (0.051)	-0.161*** (0.045)	-0.180*** (0.053)		-0.129** (0.053)
Tenure				-0.000 (0.000)	-0.000 (0.000)	-0.001 (0.000)		-0.001*** (0.000)
Age				0.136 (0.133)	0.163 (0.126)	0.162 (0.131)		0.178 (0.124)
Past performance							-0.059*** (0.018)	-0.090*** (0.024)
Constant	24.119*** (4.604)	14.401*** (0.940)	25.625*** (4.510)	28.471*** (7.831)	22.780*** (6.200)	29.308*** (7.518)	28.212*** (4.447)	35.376*** (7.261)
Observations	628	708	628	624	700	624	628	624
R-squared	0.026	0.029	0.055	0.074	0.091	0.108	0.080	0.142

Notes: This table analyzes the impact of team characteristics and leadership style on the effect of the provision of explicit incentives to the branch manager on team performance. It reports OLS regressions in which the dependent variable is the ranking achieved by the branch in the monthly tournament. Rankings are determined by the number of goals scored by a branch during the tournament month. Goals are scored as a function of the branches' commercial performance relative to their targets. *Manager prize* is a dummy variable that takes the value of 1 if the tournament includes a specific prize for the branch manager and 0 otherwise; *Manager satisfaction* is the factor measuring the job satisfaction of the branch manager extracted from the manager survey; *Manager team* is the factor measuring the extent to which the manager's style hinges on inspiring teamwork among branch employees; *Photo fun* is the factor measuring the propensity of the branch employees to engage in fun activities together extracted from the evaluations of the team photos; *Photo resourcefulness* is the factor measuring the creative power of the branch employees extracted from the evaluations of the team photos; *Employee satisfaction* is the factor measuring the average satisfaction of the branch employees with their work extracted from the responses to the satisfaction survey; *Employee team* is the factor measuring the average branch employee cohesiveness and commitment to the team; *Branch network* is a dummy variable that takes the value of 1 if the branch is full-service and 0 if it is limited-service; *Number of employees* is the average number of employees working in the branch; *Tenure* is the average number of years the employees in the branch have worked for the bank; *Age* is the average age of the employees working in the branch; *Past performance* is the average percentage of target completion by the branch during the first six months of 2014.

Clustered standard errors (branch level) are in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1