

HETEROGENEOUS MOTIVES AND THE COLLECTIVE CREATION OF VALUE

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The collective creation of value has remained underexplored in management research. Drawing on social psychology and behavioral economics, we analyze the impact of the mix of employee motives to cooperate and compare the collective value generated by three motivational systems: individual monetary incentives, benevolent cooperation, and disciplined cooperation. Aligning the motivational system with the mix of motives in the workforce allows firms to foster cooperation and realize the value creation potential of their resources.

Resource-based view (RBV) researchers increasingly have paid attention to the role of human motivation in realizing the value creation potential of resources (Coff, 1997, 1999; Durand & Calori, 2006; Gottschalg & Zollo, 2007; Wang, He, & Mahoney, 2009). Their main argument is that value creation depends not only on the firm's resources but also on the motivation of employees to leverage these resources. Beyond individual efforts, leveraging the firm's resources to create value often requires employee cooperation in performing highly interdependent tasks (Coff, 1997; Lado & Wilson, 1994). However, in fostering cooperation among employees, managers usually face a public good dilemma (Fehr & Fischbacher, 2002; Ostrom, 2000): the maximization of individual employees' material payoffs conflicts with the achievement of the collective goal of creating value for the

firm (Olson, 1965). Understanding how managers can solve this dilemma to encourage collective value creation raises the key issue of individual motives to cooperate, which links with calls to adopt sound microfoundations in RBV research (e.g., Felin & Hesterly, 2007). In recent RBV work, scholars have discussed the diversity of motives driving individual behaviors (Gottschalg & Zollo, 2007; Nickerson & Zenger, 2008; Osterloh & Frey, 2000), but these studies have not explored the critical case of motives to cooperate across interacting individuals.

In this article we first draw on research findings from social psychology and behavioral economics to introduce the heterogeneity of employees' motives to cooperate in creating value collectively. In a firm, individuals' motives to cooperate are linked with collective value creation through the firm's motivational system—that is, the system managers use to encourage employee behaviors that contribute to achieving the firm's objectives (Mitchell, 1982).

Second, we examine three main ideal-type motivational systems that differ with regard to their sanctioning mechanisms and their underlying rationale for individuals' cooperation. Two of these alternative motivational systems are suggested by the RBV literature: benevolent cooperation and individual monetary incentives. The third motivational system—disciplined co-

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operation—derives from social psychology and behavioral economics findings. We model the motivational effect of each system on collective value creation in relation to the mix of motives currently present in the firm's workforce.

Third, we extend our baseline model by comparing the motivational effect of the three ideal-type systems under different conditions of observability of individuals' contribution to collective value creation. We extend our baseline model as well by exploring these systems' "sorting effect"—that is, how employees select a firm to work for and how the firm selects employees depending on the firm's motivational system.

This article contributes to the emerging field of literature on the realization of resources' value creation potential (Coff, 1997, 1999; Gottschalg & Zollo, 2007; Wang et al., 2009) by analyzing the impact of the interplay between a firm's motivational system and its employees' mix of motives on collective value creation. Motives and motivational systems form a significant source of differences in interfirm performance: of two competing firms with the same endowment of individual resources, one may exhibit a higher level of collective value creation as a result of a better alignment of its mix of motives and motivational system. This article also suggests how managers wishing to foster cooperation within their firm can better equip their firm to deal with heterogeneous motives to cooperate and to solve the public good dilemma that collective value creation can be.

FROM INDIVIDUAL MOTIVES TO COLLECTIVE VALUE CREATION

Collective value creation results from coordinated and cooperative efforts undertaken by multiple agents within firms to exploit the value creation potential of the firms' resources. Recent RBV studies explicitly advocate introducing behavioral microfoundations at the individual level to explain firms' collective value creation (Felin & Foss, 2005; Felin & Hesterly, 2007; Foss, 2007). Not doing so results in the implicit assumption that all individuals are homogeneous and benevolent contributors to firm activities, regardless of how they are rewarded (Felin & Hesterly, 2007; Foss, 2007), and prevents RBV researchers from examining differences in the level of employees' motivation to create value—

presumably a major source of differences in interfirm performance (Gottschalg & Zollo, 2007).

Those RBV researchers who have explicitly addressed the role of human motivation usually have assumed that all individuals are self-interested (e.g., Coff, 1999; Foss, 1996; Kim & Mahoney, 2002; Nickerson & Zenger, 2004). While fruitful, a perspective built on self-interest tends to fail when attempting to explain cooperation among employees to collectively create value (Foss, 2007). Collective value is a public good because its creation benefits the firm as a whole, including individuals who do not cooperate to create it as well as those who do. However, those individuals who contribute their time and efforts experience a net cost when circumstances prevent managers from adequately rewarding their contributions (Schroeder, Steel, Woodell, & Bembenek, 2003). The high task interdependence that is typical of cooperation limits managers' capacity to monitor and reward individual contributions to collective value creation. On the one hand, the tasks involved in collective value creation are not easily programmed by managers *ex ante* (Kirsch, 1996), making the tasks of measuring and rewarding cooperative behaviors costly and difficult (Eisenhardt, 1989). On the other hand, when tasks are highly integrated such that joint efforts lead to a single output, managers have difficulty separating *ex post* one individual's contribution from the contributions of others on the basis of the observed joint output (Eisenhardt, 1989; Holmström & Milgrom, 1991; Ouchi, 1980). In other words, collective value creation generally occurs under conditions of low observability—that is, the capacity to assess individual contributions to the collective creation of value—by managers. In general, managers have a lower observability than coworkers involved in the highly interdependent tasks: coworkers who interact frequently to create value often have enough information to assess both individual contributions and the reasons why contributions vary across individuals (e.g., the difficulty of the different tasks, the range of skills required and available, the effects of illness, the restrictions of age; Fama & Jensen, 1983).

When low observability prevents managers from adequately rewarding individual contributions to collective value creation, self-interested individuals' collective and individual interests

diverge. Such situations have been labeled public good dilemmas: while cooperating is optimal from the collective point of view, self-interested individuals will tend not to contribute because they do not internalize the benefits accruing to the collective (Kollock, 1998; Olson, 1965; Sweeney, 1973). If all individuals were self-interested, the optimal strategy in public good situations would be to always contribute zero, with the result that the public good would be largely undersupplied (Olson, 1965). Such an outcome, however, contradicts the evidence gathered by social scientists outside the management field who have long studied these situations. It is now well established that in public good experiments (Fehr & Gächter, 2000) where subjects are completely anonymous and can choose how much to contribute to the public good, players, on average, will contribute about half their resources to the public good in both one-shot games and in the first round of finitely repeated games, although in the latter case their contributions typically will decay in further rounds (Fehr & Gächter, 2002; Ostrom, 2000). These findings from laboratory experiments call for the introduction, at the individual level, of motivational foundations that more realistically reflect the social dynamics underlying cooperation in public good situations than the homogeneous assumptions of either benevolence (everybody always contributes) or self-interest (nobody ever contributes). We can draw such microfoundations from research in social psychology and behavioral economics.

HETEROGENEOUS MOTIVES TO COOPERATE AND MOTIVATIONAL SYSTEMS

Lessons from Social Psychology and Behavioral Economics

According to social psychology and behavioral economics, people differ fundamentally with respect to their social value orientation, which is a specific preference for a differential distribution of resources to oneself and to others (McClintock, 1972; Messick & McClintock, 1968), and these differences affect their cooperative behaviors in public good situations (e.g., De Cremer & Van Vugt, 1999; McClintock & Allison, 1989; Van Vugt, Meertens, & Van Lange, 1995). Theoretically, social value orientations can be seen as representing differences in how individ-

uals transform the objective payoffs for themselves and others (which, in a social situation, is a function of one's own and others' behaviors) into a subjective representation of these payoffs, which forms the basis of individuals' decisions about how to act (Van Lange, 1999). Researchers have sought to describe social preferences by proposing a model of outcome transformation that includes three dimensions: (1) the weight assigned to payoffs for oneself, (2) the weight assigned to payoffs for others, and (3) the weight assigned to the reciprocity and fairness of these payoffs (De Cremer & Van Lange, 2001; Stouten, De Cremer, & Van Dijk, 2005; Van Lange, 1999).

On the basis of this model of outcome transformation, social psychologists have found that most individuals can be classified as either *self-regarding*¹ or *reciprocator* (e.g., Kuhlman & Wimberley, 1976; Liebrand, 1984; Liebrand, Jansen, Rijken, & Suhre, 1986) and that these motives are stable personality traits (Bogaert, Boone, & Declerck, 2008; Dehue, McClintock, & Liebrand, 1993). In situations that call for cooperation, self-regarding individuals are inclined to maximize their own payoffs; thus, they care about the choices and payoffs to others only insofar as they influence their own payoffs (Fehr & Gintis, 2007). Reciprocators are more inclined than self-regarding individuals to enhance both joint payoffs and the fairness of payoffs (De Cremer & Van Lange, 2001).

The model of outcome transformation has received support in empirical research. For example, studies on repeated interactions (e.g., De Cremer & Van Lange, 2001; Liebrand et al., 1986) have shown that reciprocators and self-regarding individuals react differently: reciprocators generally begin by cooperating but cease this behavior if other participants fail to reciprocate, whereas self-regarding individuals tend to cooperate only if doing so is likely to increase their personal payoffs. Compared with self-regarding individuals, reciprocators tend to use more and remember better the decision-making heuristics that focus on the enhancement of both joint out-

¹ We have chosen to adopt the labels used by behavioral economists. Social psychologists' categorization of motives matches closely that developed by behavioral economists, although their terminology differs: social psychologists label self-regarding individuals as *individualists* and reciprocators as *prosocials*.

comes and the fairness of payoffs such as "play fair" and "share and share alike" (De Dreu & Boles, 1998). In addition, whether reciprocators assess others' behavior as fair depends not only on the behavior's outcome but also on its underlying intentions (Bolton, Brandts, & Ockenfels, 2005; Turillo, Folger, Lavelle, Umphress, & Gee, 2002) and the fairness principle applied to assess the behavior. Following Deutsch (1975), we assume that the three most prevalent fairness principles are equality (i.e., allocating equally among all individuals), equity (i.e., allocating proportionally according to one's merits), and need (i.e., allocating more to those who need more).²

Behavioral economists have gone further than social psychologists in studying one type of reciprocator who helps to sustain high levels of cooperation in public good situations. They have labeled these reciprocators *strong reciprocators*. Strong reciprocity involves more than reciprocating others' fairness (or lack thereof). Strong reciprocators are ready to sacrifice material resources (1) to reward those they perceive as acting fairly and (2) to punish those they perceive as acting unfairly (Fehr & Gächter, 2002). Notably, strong reciprocators do not punish because they expect higher present or future material³ payoffs; they are ready to punish even when doing so decreases their payoffs. We use the overarching term *sanctioning* to refer to both sanctions that are positive (e.g., rewards) and those that are negative (e.g., penalties).

² Although most work on social dilemmas has studied the use of the equality principle as the rule for distributing payoffs (e.g., De Cremer & Van Lange, 2001; De Dreu & Boles, 1998; Stouten et al., 2005), the principle that is considered the most fair depends on the types of relationships between individuals and the culture in which they live (e.g., Leung & Park, 1986; Murphy-Berman, Berman, Singh, Pachauri, & Kumar, 1984). To keep our theory applicable across different types of relationships and cultures, we use the term *fairness* broadly in this article to encompass all the varying principles reciprocators use.

³ The fact that punishment does not improve the punisher's *material* welfare does not imply that punishment does not generate satisfaction for the punisher. Recent studies in social neuroeconomics suggest that, for some individuals, punishing noncooperation activates the reward circuits in the brain (e.g., DeQuervain et al., 2004) and, thus, has a hedonic value. This suggestion supports the introduction of a term linked to fairness in the (strong) reciprocators' utility function in addition to the material payoffs for oneself and others.

Furthermore, strong reciprocators are not self-centered when sanctioning, in that they are also willing to punish those who behave unfairly toward another person (Engelmann & Strobel, 2004; Fehr & Fischbacher, 2004; Fehr & Gächter, 2002). For example, Fehr and Fischbacher's (2004) study shows that up to 60 percent of participants who play the role of a third party (i.e., whose payoffs are unaffected by others' level of cooperation) will choose to invest resources to punish a noncooperating individual in games where all players remain anonymous and no future interaction will occur between players. These results indicate that strong reciprocators endorse fairness for its own sake and do not sanction purely from the self-centered concern of guarding against being unfairly treated themselves in the future.⁴

In this article we propose motivational assumptions for the RBV on the basis of two motives to cooperate: self-regard and strong reciprocity. In line with the behavioral economics and social psychology literature, we define self-regarding individuals as those individuals who are motivated only by personal monetary payoffs. We define strong reciprocators as those individuals who are motivated not only by personal monetary payoffs but also by others' monetary payoffs and by the fairness of the distribution of payoffs across individuals, and who are ready to sanction (un)fairness at a material cost to themselves.

We select these two motives as motivational assumptions because they have been found to matter most in explaining the level of cooperation that can be sustained in groups of interacting individuals drawn randomly from the general population (Camerer & Fehr, 2006; Fehr & Fischbacher, 2002; Fehr & Gächter, 2002; Fehr & Gintis, 2007; Ostrom, 2000). On the one hand, in public good experiments where the possibility of punishment does not exist, the presence of self-regarding individuals and strong reciprocators

⁴ Strong reciprocity differs fundamentally from "reciprocal altruism," which is often given as an explanation for sustained cooperation, both in infinitely repeated games and in finitely repeated games characterized by incomplete information about when the game will end (e.g., Trivers, 1971). Reciprocal altruists are willing to sanction only when such behavior is likely to lead to future material rewards that offset the costs of sanctioning; as such, they are self-regarding.

cators is enough to explain that some players start the games with a cooperative strategy, but, later on, all players exhibit noncooperative behaviors (e.g., Fehr & Gächter, 2002; Fehr & Schmidt, 1999). Strong reciprocators at first adopt a cooperative strategy but cease to cooperate when self-regarding individuals fail to reciprocate; self-regarding individuals from the start adopt a noncooperative strategy because not cooperating maximizes their own payoffs (e.g., De Cremer & Van Lange, 2001; Liebrand et al., 1986).

On the other hand, in public good experiments where participants are given the option of investing money to punish others, the presence of strong reciprocators is enough to explain that some individuals punish even in one-shot games or in the last round of repeated games (Fehr & Gächter, 2000; Ostrom, Walker, & Gardner, 1992).⁵ Interestingly, the threat of punishment in these experiments suffices to enforce a fully cooperative outcome, despite the presence of self-regarding individuals (Fehr & Gächter, 2000, 2002; Ostrom et al., 1992), which points to the threat of punishment by strong reciprocators as a powerful device to sustain cooperation (Bowles & Gintis, 2002; Fehr & Gintis, 2007; Ostrom, 2000).

In addition, self-regard and strong reciprocity are very widespread motives. Most empirical studies in social psychology classify the majority of people as either self-regarding individuals or reciprocators (e.g., Kuhlman & Wimberley, 1976; Liebrand, 1984; Liebrand et al., 1986). For example, the two categories accounted for 84 percent of the participants in Liebrand's (1984) first experiment (53 percent were labeled reciprocators and 31 percent self-regarding). Behavioral economists have reported similar results, classifying 40 to 60 percent of participants as reciprocators and 20 to 40 percent as self-regarding (e.g., Abbink, Irlenbusch, & Renner, 2000; Fehr & Fischbacher, 2002). Studies of sanctioning by third parties show that the proportion of strong reciprocators among reciprocators is approximately 60 to 70 percent (e.g., Fehr & Fischbacher, 2004).

⁵ Although laboratory experiments in Western countries usually involve small amounts of money, the same results have been observed in experiments elsewhere when the amounts involved represented substantial portions of individuals' weekly incomes (e.g., Henrich et al., 2001).

Motivational Systems and Collective Value Creation

One way managers can influence employees' motivation to collectively create value is through the design of the firm's motivational system (Mitchell, 1982), which operates on collective value creation via two different mechanisms. First, a firm's motivational system affects current employees' motivation to cooperate (i.e., a motivational effect). Second, it has a sorting effect in the sense that, over time, it influences the composition of the firm's workforce as the firm selects individuals with different motives (selection) and as employees with different motives apply to and stay with the firm (self-selection; Gerhart, Rynes, & Fulmer, 2009). Following the trend in the literature on motivational systems (e.g., Lazear, 1986, 2000), we consider first the motivational effect before turning later to the sorting effect.

As a source of sanctions (i.e., both rewards and punishments), a motivational system can be an organizational solution to a public good dilemma (Tenbrunsel & Messick, 1999) by changing the rules that determine the patterns of social interactions among individuals currently in the firm (Kollock, 1998). Depending on their motivational type, individuals react differently to a firm's motivational system because such a system affects (1) individuals' perceptions of the personal benefits and costs of cooperating (i.e., the payoffs they face), (2) individuals' perceptions and expectations of others' behaviors, and (3) individuals' perceptions of being treated fairly by the firm (Kollock, 1998; Schroeder et al., 2003; Tenbrunsel & Messick, 1999). Self-regarding individuals' cooperative behaviors result exclusively from their perception of the balance between the personal costs of and personal benefits from cooperating—that is, (1) above—which are affected by the sanctions for individuals' (non)cooperation provided by the motivational system.

The impact of the firm's motivational system on strong reciprocators' cooperative behaviors depends not only on the personal payoffs from cooperating but also on the strong reciprocators' perceptions of the fairness of the firm's motivational system—that is, (1), (2), and (3) above. Two potential sources of perceived (un)fairness exist. The first source is horizontal and relates to coworkers' cooperative behaviors and coworkers'

sanctions—(2) above. The expected impact of the firm's motivational system on *other* employees' cooperative behaviors is significant for reciprocators' cooperative behaviors: if reciprocators believe that others are free-riding or will free-ride on their cooperative efforts, they will tend to withdraw such efforts (Fehr & Fischbacher, 2002). The second source is vertical and proceeds from the implementation of sanctions by people higher in the line of authority—(3) above. As Wang and Barney (2006) explain, the vertical relationship between employees and the firm exposes employees to the possibility of being exploited when they contribute to the public good.

Three Ideal-Type Motivational Systems

Motivational systems differ not only because they assume distinct rationales for cooperation but also because of the characteristics of their sanctioning schemes, such as whether they provide sanctions for (non)cooperation and, if so, who administers the sanctions. In this article we examine three ideal-type motivational systems: two suggested by the current RBV literature and a third derived from the literature on cooperation in public good dilemmas.

The first ideal-type motivational system rests on the *benevolent cooperation* of employees and the absence of sanctioning mechanisms. Sanctions are neither administered by the management nor available to coworkers. Such a system is congruent with the view, sometimes adopted by RBV researchers, that all individuals within firms are benevolent contributors to the creation of value (Felin & Foss, 2005; Felin & Hesterly, 2007; Foss, 2007).

The second ideal-type motivational system includes only management sanctions in the form of *individual monetary incentives*. Working with the assumption that all employees are self-regarding, the RBV literature has often argued that managers should provide individual monetary incentives on the basis of individuals' contributions (e.g., Foss, 1996).

The third ideal-type motivational system stems from the literature on cooperation in public good dilemmas, presented above. It accounts for heterogeneity in human motives to cooperate and rests on what we term *disciplined cooperation*—that is, sanctioning implemented by strong reciprocators that helps maintain high levels of cooperation in the absence of sanctions

from a vertical authority (Fehr & Fischbacher, 2002; Ostrom, 2000).

MOTIVATIONAL EFFECT AND COLLECTIVE VALUE CREATION: A BASELINE MODEL

Our baseline model studies the motivational effect of the three ideal-type motivational systems: benevolent cooperation, individual monetary incentives, and disciplined cooperation. The motivational effect is the effect of these systems on collective value creation by the employees currently in the firm's workforce, which implies holding the composition of the firm's workforce stable (e.g., Lazear, 1986, 2000). For every mix of self-regarding individuals and strong reciprocators that could constitute the firm's workforce, we compare the value collectively created by the three motivational systems.

The upper limit of a firm's potential for creating value depends on its resources (Coff, 1997; Lado & Wilson, 1994; Makadok, 2003). We assume that the firm's endowment of resources (including individuals' knowledge and their ability to create collective value) remains constant in order to concentrate on how motivational systems affect employees' motivation to cooperate so as to realize this potential. We also assume that the gap between realized and potential collective value creation is equal to the opportunity and direct costs incurred by the firm's motivational system. Opportunity costs correspond to the loss in collective value creation that results when employees are not fully motivated to realize the value creation potential of the firm's resources. They are a function of the match between the firm's motivational system and the mix of its employees' motives. Direct costs of a motivational system may be substantial, including, among others, expenses related to monitoring employees' contributions and ensuring fairness in processes and outcomes. Note that we consider direct costs to be independent of the distribution of employees' motives because direct costs are seen as the costs of running the firm's motivational system.

Moreover, we develop our baseline model for the condition of low observability by managers and high observability by coworkers (Fama & Jensen, 1983; Holmström & Milgrom, 1991; Ouchi, 1980). In a later stage we consider cases where observability by managers is high and where observability by managers and coworkers is low. We

also relax the short-term assumption that the composition of the firm’s workforce is stable and discuss the sorting effect of the three motivational systems by examining the impact of each of the systems on the mix of motives in the longer term, when self-selection and selection can play out.

Collective Value Creation with Homogeneity-Based Motivational Systems

Figure 1 charts collective value creation as a function of the percentage of strong reciprocators in the firm’s workforce for the three ideal-type motivational systems. In a first approximation we represent these relationships as linear. Line $\alpha_1\alpha_2$ represents the motivational system resting on benevolent cooperation, line b_1b_2 the motivational system involving individual monetary incentives administered by managers, and the broken line c_1c_2 the disciplined cooperation system.

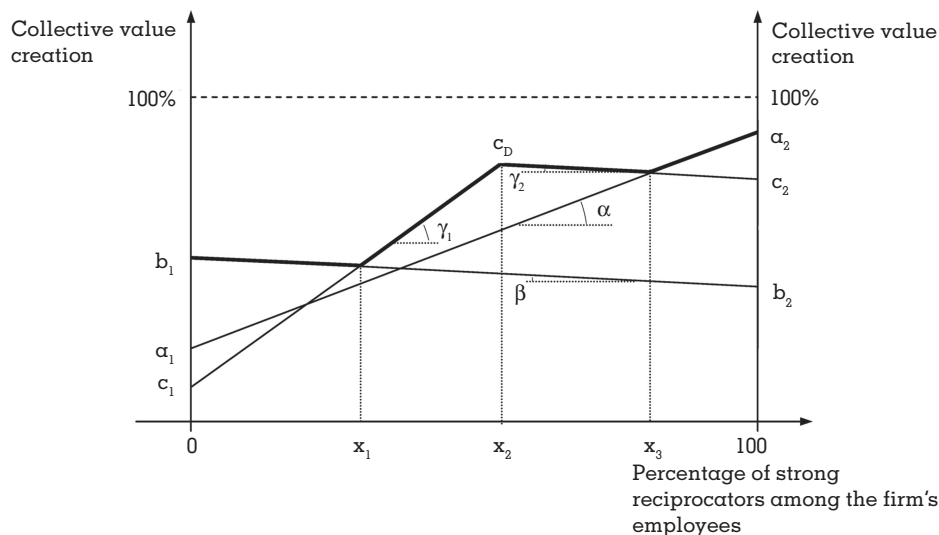
The first motivational system—resting on benevolent cooperation—is characterized by the absence of managerial or coworker sanctions. With this type of motivational system, collective value creation is highest when all the firm’s employees are strong reciprocators ($P_{\text{strong reciprocator}} = 1$) so that all employees, when they feel treated fairly by the firm, will reciprocate others’ cooperative behaviors with their own high contributions to collective value creation (Burlando & Guala, 2005). The firm’s motivational system will incur some direct costs linked to coordination but no opportu-

nity cost from free-riding. As a consequence, α_2 stands for the maximum of collective value creation by the benevolent cooperation model, and actual collective value creation can reach a value close to the potential maximum value of 100 percent.

As the mix of motives diverges from $P_{\text{strong reciprocator}} = 1$, opportunity costs rise. A motivational system that is based on benevolent cooperation does not offer management-administered individual incentives, nor does it offer coworkers sanctions so they can sanction others’ contributions to the highly interdependent tasks. Since strong reciprocators cannot rely on social sanctions to completely compensate for the absence of sanctions available through the motivational system,⁶ a motivational system based on

⁶ Gächter and Fehr (1999) examined the effect of social (dis)approval on people’s willingness to contribute to a public good to determine whether social approval alone can help overcome the free-rider problem. They concluded that social rewards among complete strangers do not significantly increase cooperation but can reduce free-riding when combined with group identity and weak social ties. However, even where social rewards, group identity, and weak social ties were combined, a minority of participants remained unmotivated by social approval and did not cooperate (Kopelman, Weber, & Messick, 2002). Similarly, Masclet, Noussair, Tucker, and Villeval (2003) showed that social disapproval raises the contributions to the public good relative to the baseline with no punishment opportunities, but the increase is lower than that resulting from a material punishment opportunity.

FIGURE 1
Mix of Motives, Motivational Systems, and Collective Value Creation



benevolent cooperation cannot encourage self-regarding individuals to fully cooperate. As the proportion of self-regarding individuals grows, strong reciprocators will be increasingly confronted with noncooperation and they themselves will stop cooperating. Thus, as the proportion of self-regarding individuals increases, the total contribution of employees to the collective creation of value decreases, leading to the following equation for collective value creation under a benevolent cooperation system (CVC_B) as a linear⁷ function of the mix of motives (with $\alpha > 0$):

$$CVC_B = \alpha_2 - \alpha(1 - P_{\text{strong reciprocator}}) \quad (1)$$

This leads to the following proposition.

Proposition 1: With a motivational system based on benevolent cooperation, collective value creation is highest when only strong reciprocators are involved and decreases as the proportion of self-regarding individuals grows.

At the other extreme, some assume that all employees are self-regarding, and, thus, they argue that managers should provide individual monetary incentives on the basis of individuals' contributions (e.g., Foss, 1996, 2007). Line b_1b_2 in Figure 1 represents the collective value creation under such a motivational system as a function of the mix of motives in the firm's workforce. When a firm is composed of only self-regarding individuals ($P_{\text{strong reciprocator}} = 0$), individual monetary incentives that reward cooperative behaviors constitute the most effective system of the three analyzed here in encouraging employees to create value collectively ($b_1 > \alpha_1$ and $b_1 > c_1$). Indeed, a system that is based on individual monetary incentives better aligns self-regarding individuals' interests with those of the firm than either a system that is based on benevolent cooperation (self-regarding employ-

ees do not create value unless sanctioned) or a system that is based on disciplined cooperation (self-regarding individuals do not sanction each other).

But individual monetary incentives are an imperfect way to motivate cooperation when managers cannot easily assess individual contributions to the joint outcome. Individual monetary incentives direct self-regarding employees' efforts toward the aspects of the tasks for which managers can assess contributions and design incentives (to the detriment of less observable ones), which prevents individual monetary incentives from fully solving the public good dilemma. For example, managers can encourage the collective creation of value by offering monetary incentives for contributing knowledge to databases. However, part of the knowledge essential to processing, interpreting, and using databases is exchanged in informal interactions, which managers cannot easily monitor and, thus, for which managers cannot easily design individual monetary incentives (Bartol & Srivastava, 2002). Hence, we posit that the value created collectively by a homogeneous population of self-regarding individuals motivated by individual monetary incentives is equal to 100 percent minus the collective value creation that goes unrealized because of low observability by managers and the direct costs of a system of individual monetary incentives. These latter costs are comparatively higher than the direct costs of a motivational system based on benevolent cooperation and, hence, the collective value lower than for a homogeneous population of strong reciprocators motivated by a benevolent system ($b_1 < \alpha_2$ in Figure 1).

As the proportion of strong reciprocators increases, collective value creation decreases slightly because strong reciprocators are likely to perceive individual monetary incentives as unfair in the case of low observability by managers, and they are likely to sanction the firm for this perceived unfairness by contributing less to the highly interdependent tasks than self-regarding individuals. First, we expect strong reciprocators, like self-regarding individuals, to exercise low efforts on the aspects of the highly interdependent tasks that are not rewarded by individual monetary incentives and, thus, are of a public good nature. Individual monetary incentives highlight to employees the tasks that managers judge most important for creating

⁷ As one of the reviewers suggested, it would also be possible to represent with a broken line the collective value created with a motivational system that is based on benevolent cooperation. Indeed, the distribution of self-regarding individuals in the firm is likely to be such that all strong reciprocators stop cooperating before the proportion of self-regarding individuals reaches 100 percent. We have chosen the simplest representation since it does not make a difference for our comparison of the three motivational systems.

value at the firm level. Hence, in the presence of individual monetary incentives, strong reciprocators will tend to focus their efforts on these tasks to the detriment of other cooperative tasks that may actually be more important to the collective creation of value (Holmström & Milgrom, 1991). In addition, findings from experiments (e.g., Fehr, Klein, & Schmidt, 2007) show that the use of financial sanctions in formal contracts may be perceived as violating notions of vertical fairness and may therefore crowd out strong reciprocators' willingness to contribute voluntarily to value creation. The presence of sanctions administered by managers can also lower cooperation in public good situations because such sanctions act as situational cues, triggering an assessment of the decision to cooperate in terms of costs and benefits rather than in terms of morality (Tenbrunsel & Messick, 1999).

Second, we expect strong reciprocators to exercise lower efforts than self-regarding individuals on the aspects of the highly interdependent tasks rewarded by individual monetary incentives. Researchers have argued that the use of financial sanctions leads to lower efforts on the part of strong reciprocators because such sanctions signal hostile intentions and distrust from management, leading reciprocators to respond by reducing their efforts (Bohnet, Frey, & Huck, 2001; Gneezy & Rustichini, 2000; Lubell & Scholz, 2001). In addition to perceiving individual monetary incentives as vertically unfair, strong reciprocators are likely to see individual monetary incentives as lacking horizontal fairness in the case of low observability by managers. When managers have difficulty assessing individual contributions to collective value creation, individual monetary incentives imperfectly reflect these contributions. In consequence, they do not fully motivate self-regarding individuals to cooperate, which upsets the strong reciprocators who interact with self-regarding individuals. Strong reciprocators are likely to punish the firm for this violation of vertical and horizontal fairness by exercising lower efforts than self-regarding individuals on the rewarded aspects of the highly interdependent tasks, as well as by not contributing to the aspects of these tasks that are not rewarded.

Our arguments can be summarized by the following equation linking mixes of motives and collective value creation with a motivational system that is based on individual monetary

incentives (as represented in Figure 1, with $\beta > 0$):

$$CVC_I = b_1 - \beta P_{\text{strong reciprocator}} \quad (2)$$

This leads to the following proposition.

Proposition 2: With a motivational system based on individual monetary incentives, collective value creation is highest when only self-regarding individuals are involved and decreases as the proportion of strong reciprocators grows.

Collective Value Creation with Heterogeneity-Based Disciplined Cooperation

We now turn to the third motivational system, disciplined cooperation. In this system sanctions administered by peers (here coworkers) play a pivotal role in sustaining cooperation. Sanctions are personally costly to administer; thus, we can expect that only strong reciprocators will be willing to bear the personal cost of sanctioning noncooperators. Four conditions must be met for strong reciprocators to be both motivated and able to enforce cooperation by sanctioning noncooperation at such a personal cost: (1) they must believe that the firm's motivational system is vertically fair, (2) they must believe that other strong reciprocators' sanctioning is motivated by altruism and is morally legitimate (Fehr & Rockenbach, 2003), (3) they must have access to sanctions that are effective and relatively inexpensive to administer (Lazega, 2000; Ostrom, 1990; Ostrom et al., 1992), and (4) they must be numerous enough to enforce the sanctions (Fehr & Fischbacher, 2002; Fehr & Schmidt, 1999). In turn, the proportion of strong reciprocators necessary to discipline self-regarding individuals and to sustain cooperation depends on the costs of monitoring and sanctioning (Fehr & Schmidt, 1999).

As with the two other motivational systems, we approximate the relation between collective value creation under a disciplined cooperation motivational system and the mix of motives as linear (line c_1c_2 in Figure 1). This line is broken at $P_{\text{strong reciprocator}} = x_2$, where the proportion of strong reciprocators in the firm's workforce becomes high enough to discipline all self-regarding individuals into cooperating fully. Less than this proportion (in the interval $[0; x_2]$)

results in an insufficient number of strong reciprocators to discipline all self-regarding individuals into cooperating. In consequence, some self-regarding individuals who escape disciplining do not cooperate, and those strong reciprocators who observe this free-riding but are unable to sanction will respond by no longer cooperating. As a result, part of the firm's potential to create value through cooperation remains unrealized. In this $[0; x_2]$ interval, the lower the proportion of strong reciprocators, the less value is created collectively. In contrast, if strong reciprocators are numerous enough to be able to discipline all self-regarding individuals ($P_{\text{strong reciprocator}} \geq x_2$), a motivational system that is based on disciplined cooperation motivates all employees to contribute to the public good. Strong reciprocators contribute because they expect all other employees to also cooperate and they want to reciprocate the fair treatment they receive from the firm by helping to achieve its goals. Self-regarding individuals contribute because of the incentives generated by the threat of punishment by strong reciprocators if they do not. The threat of punishment is credible, both because the motivational system provides effective sanctions and because strong reciprocators are numerous and sufficiently motivated to use these sanctions.

Collective value creation reaches its maximum value (c_D) at $P_{\text{strong reciprocator}} = x_2$. At c_D collective value creation is equal to 100 percent minus the opportunity costs of the time the strong reciprocators spent monitoring and sanctioning self-regarding individuals and minus the direct costs of providing monitoring and sanctioning tools to coworkers. Beyond $P_{\text{strong reciprocator}} = x_2$, the net benefits of disciplined cooperation decrease. The threat of punishment remains credible—because sanctions are both available and enforceable—but such a threat is deployed against a decreasing share of self-regarding individuals who are less and less influential, thereby making the motivational system costlier. Indeed, as the share of strong reciprocators grows, more individuals spend time monitoring others' behaviors than is necessary to spot noncooperation in a decreasing number of self-regarding individuals, and such monitoring activities increase opportunity costs by distracting strong reciprocators' attention and efforts from tasks contributing directly to collective value creation. The slightly downhill slope of this part of the collective value creation line (from

c_D to c_2) represents the increase in unrealized value accounted for by the wasted monitoring efforts. The disciplined cooperation system thus exhibits an inverse "V" shape with a maximum (c_D) where the proportion of strong reciprocators equals x_2 .

Our arguments regarding collective value creation in a system that is based on disciplined cooperation (CVC_D) can be summarized in the following double equation, where c_D is the maximum collective value creation realized for $P_{\text{strong reciprocator}} = x_2$ (with $\gamma_1 > 0$ and $\gamma_2 > 0$):

$$CVC_D = c_D - \gamma_1(1 - P_{\text{strong reciprocator}}) \quad \text{if } P_{\text{strong reciprocator}} \in [0; x_2] \quad (3)$$

$$CVC_D = c_D - \gamma_2 P_{\text{strong reciprocator}} \quad \text{if } P_{\text{strong reciprocator}} \in [x_2; 1] \quad (4)$$

This leads to the following proposition.

Proposition 3: With a motivational system based on disciplined cooperation, collective value creation is highest when the number of strong reciprocators is just sufficient to discipline self-regarding individuals and decreases as the proportion of strong reciprocators grows or declines.

Efficiency Domains: Comparing the Motivational Effects of the Three Systems

Two other points on Figure 1 are worth noting: the intersection of the line c_1c_2 and a_1a_2 at point x_3 and the intersection of the line c_1c_2 and b_1b_2 at point x_1 . As the figure shows, when the mix of employee motives is such that $P_{\text{strong reciprocator}} \in [x_1; x_3]$, the motivational system based on disciplined cooperation leads to higher collective value creation than either of the two other systems. On the one hand, compared with a system based on benevolent cooperation, the availability of sanctions that are sufficiently inexpensive to administer allows strong reciprocators to discipline self-regarding individuals, thereby achieving some collective value creation of a public good nature despite a significant proportion of self-regarding individuals.

On the other hand, a higher level of cooperation can be achieved by a system based on disciplined cooperation than by a system based on individual monetary incentives within this $[x_1; x_3]$ range, where the proportions of self-regard-

ing individuals and strong reciprocators are both significant. Field experiments have found that moderate enforcement of cooperation by an agency external to the group of cooperating individuals (here the management providing individual monetary incentives that do not fully reflect individuals' cooperative behaviors) harms cooperation in comparison with disciplined cooperation (e.g., Bardhan, 2000; Cárdenas, Stranlund, & Willis, 2000). When observability by managers is low but observability by coworkers is high, sanctions delivered by strong reciprocators have several advantages over management-administered monetary incentives to align self-regarding individuals' payoffs with the collective interest and to ensure that strong reciprocators perceive the motivational system as vertically and horizontally fair.

First, compared with managers, coworkers can more closely align self-regarding individuals' personal payoffs with the collective interest. Second, coworkers can, more easily than managers, take the intentions underlying their colleagues' behaviors into account, which, in the eyes of strong reciprocators, increases the fairness of the motivational system. Furthermore, sanctions by coworkers can be more accurately graded to reflect both the circumstances and the seriousness of noncooperative behaviors, providing the motivational system with greater flexibility when dealing with situations of imperfect information or unintentional errors (Ostrom, 2000). Noncooperating individuals may be good-naturedly teased at first and, if their behaviors do not change as a result, sanctioning may follow.

When the mix of motives falls outside the interval $[x_1; x_3]$, collective value creation is lower with a motivational system based on disciplined cooperation than with either of the other motivational systems. As the proportion of strong reciprocators grows toward 100 percent ($P_{\text{strong reciprocator}} > x_3$), a motivational system based on benevolent cooperation has both lower direct costs (i.e., no sanctioning system) and lower opportunity costs (i.e., no time wasted on monitoring coworkers) than a system based on disciplined cooperation (for $P_{\text{strong reciprocator}} = 1$, $\alpha_2 > c_2$). Note also that as the proportion of strong reciprocators grows, the individual monetary incentive system creates the lowest collective value, primarily because of higher opportunity costs in terms of cooperation that does not take place

(hence, $b_2 < c_2 < \alpha_2$). On the other hand, as the proportion of strong reciprocators falls below the threshold $P_{\text{strong reciprocator}} = x_1$, the firm maximizes collective value creation by using individual monetary incentives to motivate self-regarding individuals, even if part of the collective value goes unrealized because of low observability by managers (for $P_{\text{strong reciprocator}} = 0$, $c_1 < b_1$). Note that while both benevolent and disciplined cooperation systems exhibit high opportunity costs in this situation, the gap between these systems comes from the difference in direct costs (hence, $c_1 < \alpha_1 < b_1$).

These arguments can be synthesized through a frontier line (shown in bold in Figure 1) that indicates the motivational system with the highest collective value creation as a function of the mix of motives in the firm's workforce. These arguments also lead to the following proposition.

Proposition 4: The motivational system with the highest collective value creation is a function of the mix of motives in a firm's workforce. Collective value creation is greater with a motivational system based on (a) individual monetary incentives when strong reciprocators are not numerous enough to discipline self-regarding individuals ($[0; x_1]$), (b) disciplined cooperation when there is a significant proportion of self-regarding individuals but strong reciprocators are numerous enough to discipline them ($[x_1; x_3]$), and (c) benevolent cooperation when the proportion of self-regarding individuals is very small ($[x_3; 100]$).

In other words, RBV work that assumes homogeneity suggests two motivational systems—individual monetary incentives and benevolent cooperation—that are comparatively superior when the firm's workforce is actually relatively homogeneous with regard to employees' motives to cooperate. In contrast, the model based on disciplined cooperation helps to create greater collective value when employees' motives are more heterogeneous. We call the $[0; x_1]$ interval "the efficiency domain of individual monetary incentives," the $[x_1; x_3]$ interval "the efficiency domain of disciplined cooperation," and the $[x_3; 100]$ interval "the efficiency domain of benevolent cooperation."

DIFFERENT OBSERVABILITY CONDITIONS AND THE SORTING EFFECT

Changes in Motivational Effect Under Different Observability Conditions

We have compared the value created collectively by the three motivational systems when observability by managers is low while observability by coworkers is high. In some situations, however, managers can more easily assess individual contributions to collective value creation, whereas in other situations individual contributions to collective value creation may be imperfectly observable both by coworkers and managers.⁸ We consider each situation in turn and its consequences for collective value creation.

High observability by managers. Considering that observability by managers is high rather than low modifies the collective value that can be created by a motivational system based on individual monetary incentives (i.e., in Figure 1 the position of line b_1b_2 will differ). Indeed, the better managers can observe individual contributions, the more closely individual monetary incentives will fit individual contributions to collective value creation, thereby increasing self-regarding individuals' motivation to cooperate, which, in turn, is likely to increase strong reciprocators' motivation. In particular, we can analyze the extreme case in which individual monetary incentives perfectly reflect individual contributions to collective value creation. Such a motivational system would motivate self-regarding individuals to cooperate fully. In consequence, with a workforce composed of self-regarding individuals only, the collective value creation achieved would be 100 percent minus the direct costs of a system of individual monetary incentives.

Individual monetary incentives that perfectly reflect individual contributions to collective value creation also motivate strong reciprocators to fully cooperate when they perceive the motivational system as being vertically fair. This is the case if strong reciprocators use equity—that is, an allocation proportional to one's merits—as a principle to assess the vertical fair-

ness of the motivational system (cf. footnote 6) and if they do not perceive individual monetary incentives as signaling hostile management intentions and distrust (Bohnet et al., 2001; Gneezy & Rustichini, 2000; Lubell & Scholz, 2001). Note that for strong reciprocators who adopt equity as a fairness principle, individual monetary incentives that perfectly match individual contributions are always horizontally fair since each employee receives exactly what he or she deserves. Thus, with a workforce composed exclusively of strong reciprocators who perceive the individual monetary incentives as fair, the collective value creation that can be achieved is also 100 percent minus the direct costs of a system of individual monetary incentives.

In sum, the higher the observability by managers, the more the line b_1b_2 moves upward from its original position in Figure 1 because the collective value that goes unrealized decreases (i.e., b_1 and b_2 move upward) and the closer the line b_1b_2 comes to being a horizontal line, achieving collective value creation of 100 percent minus the direct costs of a system of individual monetary incentives (β tends toward 0). These arguments lead to the following proposition regarding the efficiency domains of individual monetary incentives as a function of observability by managers.

Proposition 5: The higher the observability by managers, the larger the efficiency domain of a motivational system based on individual monetary incentives.

Low observability by managers and coworkers. Considering that individual contributions to collective value creation are imperfectly observable not only by managers but also by coworkers changes the collective value that can be created by a motivational system based on disciplined cooperation (i.e., in Figure 1 the broken line c_1c_2 will differ). Because some noncooperative behaviors are likely to escape strong reciprocators' observation and, thus, will not be sanctioned, strong reciprocators face greater difficulties disciplining self-regarding individuals into fully cooperating.

In general, the lower the observability by strong reciprocators, the higher the proportion of strong reciprocators needed to achieve full cooperation (x_2 and c_D move to the right). If the interdependent tasks are of such a nature that

⁸ We do not consider the case in which observability by managers is high while observability by coworkers is low because such a situation seems unlikely to occur when coworkers perform highly interdependent tasks.

having more people monitoring does not increase overall observability, then full cooperation cannot be achieved unless the firm's workforce is composed exclusively of strong reciprocators (c_D moves downward). In addition, strong reciprocators might not perceive the system as being fair if they have the inkling that some employees who do not fully cooperate are not sanctioned or if they observe strong reciprocators sanctioning what are, in fact, cooperative behaviors (c_D and c_2 move downward).

Proposition 6: The lower the observability by coworkers, the narrower the efficiency domain of a motivational system based on disciplined cooperation.

The Sorting Effect of Motivational Systems

We revert here to the observability conditions of our baseline model to consider how motivational systems may affect collective value creation over a longer time horizon as a result of their impact on the mix of motives present in the firm—that is, a sorting effect. Although we have just compared the motivational effects of the three motivational systems for any possible mix of the two motives, the sorting effect influences the mix of motives the firm actually faces (the location on the x-axis in Figure 1). The sorting effect is double-sided. On the one hand, different motivational systems have a tendency to attract employees with different motives to cooperate (a self-selection effect). On the other hand, people in charge of managing the firm's human resources can select and retain employees with different motives (a selection effect).

Motivational systems, self-selection, and the mix of motives. Employees may be more attracted to one motivational system than another as a function of their motive to cooperate. Self-regarding individuals, when given the choice between employers with different motivational systems, will tend to choose the firm where they can receive the highest personal payoffs. In the case of low observability by managers, the firms offering the highest payoffs for cooperative effort are likely to be those with a motivational system based on individual monetary incentives for cooperation. Compared with a system based on disciplined cooperation, individual monetary incentives allow some room for free-riding if managers are not able to perfectly as-

sess individual contributions. Compared with a system based on benevolent cooperation, individual monetary incentives provide some material rewards for cooperative efforts.

Strong reciprocators are attracted to firms having motivational systems they perceive as fair. We have argued that if managers can only imperfectly observe individual contributions to collective value creation, then a motivational system based on individual monetary incentives is unlikely to be perceived as fair by strong reciprocators. In consequence, strong reciprocators will prefer to shun or leave firms offering individual monetary incentives to reward contributions to collective value creation. In self-selecting between benevolent cooperation and disciplined cooperation, strong reciprocators are likely to prefer benevolent cooperation, but only when the firm is able to effectively select out self-regarding individuals. A system based on benevolent cooperation has the advantage of not requiring strong reciprocators to monitor and sanction coworkers but has the disadvantage of lacking sanctioning mechanisms if self-regarding individuals are present in the firm. In Gürerk, Irlenbusch, and Rockenbach's (2006) study of self-selection comparing a system with sanctions by peers and a system without sanctions, only one-third of the participants initially opted for the system with sanctions by peers. However, in the system without sanctions the contributions to the public good plummeted over time because of free-riding, and, thus, nearly all participants eventually opted for the system with sanctions and cooperated fully. High collective value creation by a firm with a motivational system based on benevolent cooperation may signal to strong reciprocators that the firm is successful in selecting out self-regarding individuals and so ensures horizontal fairness.

On the basis of these arguments related to self-selection as a function of employees' motives to cooperate, we can conclude that for a firm whose motivational system is based on individual monetary incentives, self-selection increases the proportion of self-regarding individuals in the firm's workforce over time, which is positive for collective value creation. Similarly, for a firm whose motivational system is based on benevolent cooperation, when effective selection mechanisms are in place, self-selection increases the proportion of strong reciprocators

within the firm's workforce over time, which is favorable for collective value creation.

For a firm with a disciplined cooperation system, self-selection forces are likely to make the mix of motives evolve away from the optimal proportion of strong reciprocators, x_2 (unless the rate at which the firm gains and loses strong reciprocators through self-selection is the same as the rate at which it gains and loses self-regarding individuals). Let us assume that, at the workforce level, the only significant difference between strong reciprocators' and self-regarding individuals' self-selection stems from the availability of outside options that employees with these two motives find attractive (benevolent cooperation for strong reciprocators, individual monetary incentives for self-regarding individuals). If there are more opportunities available to current and potential employees to join firms with a benevolent cooperation system than firms offering individual monetary incentives, self-selection forces decrease the proportion of strong reciprocators in the workforce of the firm using disciplined cooperation, and this proportion is likely, over time, to fall below x_2 . On the contrary, if there are more opportunities to join firms offering individual monetary incentives than firms with a benevolent cooperation system, over time, the firm using disciplined cooperation will see the number of self-regarding individuals decrease and have a proportion of strong reciprocators in its workforce that exceeds x_2 . These arguments are summarized in the following proposition relating self-selection to the collective value creation over time with the three motivational systems.

Proposition 7: Over time, self-selection increases the homogeneity of the firm's workforce, which positively affects collective value creation in firms whose motivational system is based on individual monetary incentives or benevolent cooperation and erodes collective value creation in firms whose motivational system is based on disciplined cooperation.

Selection and the mix of motives. Managers can influence the firm's mix of motives by putting in place selection devices. In firms with a motivational system based on benevolent cooperation, selection mechanisms to exclude free-riders are needed to prevent strong reciproca-

tors from selecting out of the firm's workforce because of the presence of self-regarding individuals. In fact, the exclusion of noncooperative individuals is another potential solution to public good dilemmas, in addition to sanctions by peers (Kollock, 1998), since the presence of mechanisms to exclude free-riders makes it possible for strong reciprocators to regroup and achieve high levels of cooperation under a system of benevolent cooperation (Page, Putterman, & Unel, 2005). In firms whose motivational system is based on disciplined cooperation, selection devices are required to maintain the heterogeneity of the mix of motives in the face of self-selection forces that can either encourage more self-regarding individuals or more strong reciprocators to select out, depending on the employment opportunities available in the market.

In contrast, firms with a motivational system based on individual monetary incentives do not need devices to select employees as a function of their motive to cooperate. Self-selection will on its own make the composition of the workforce evolve toward the mix of motives maximizing collective value creation, which represents a cost advantage of individual monetary incentives over the two other systems. In a classical asymmetrical information problem, firms with a motivational system based on benevolent or disciplined cooperation may face difficulties in selecting strong reciprocators, since self-regarding job candidates have no interest in revealing their preference. Thus, job candidates may require additional interviews if their motives are to be discovered, making screening on this basis a costly process. Instead of selecting applicants, firms could choose to select out self-regarding individuals over time, once their motive has been revealed, but dismissing trained employees is also costly. Hence, managers who estimate a firm's collective value creation for the longer term should account for the costs incurred by selection devices necessary to keep a firm's mix of motives within the efficiency domain of either benevolent or disciplined cooperation, in addition to accounting for the motivational effect on collective value creation of these motivational systems compared to a system based on individual monetary incentives. "Value gap" is what we call the difference between the collective value created with either benevolent or disciplined cooperation and the

collective value that individual monetary incentives would create with the same mix of motives.

Proposition 8: A motivational system based on benevolent or disciplined cooperation yields the highest collective value creation over time only if the costs of maintaining the mix of motives within the efficiency domain of this system are smaller than the value gap.

DISCUSSION

This article contributes in four ways to the recent RBV literature emphasizing the importance of human motivation (e.g., Felin & Hesterly, 2007; Foss, 2007; Gottschalg & Zollo, 2007; Makadok, 2003; Wang et al., 2009). First, the article explicitly deals with the interindividual heterogeneity of motives to cooperate and the influence of these motives on collective value creation. Scholars have called to anchor the RBV in more realistic assumptions than is usually the case (Felin & Hesterly, 2007; Foss, 2007; Tsang, 2006). In an attempt to increase the realism of the motivational microfoundations of the RBV while preserving the parsimony of the behavioral assumptions at the individual level, we have proposed motivational assumptions on the basis of self-regard and strong reciprocity. Working with these motivational assumptions shows that motivational heterogeneity contributes to explaining collective value creation in firms and sets up the foundations for models to manage motivational heterogeneity.

Second, the article proposes that the motivational system put in place by managers is a key determinant of firms' success in leveraging their mix of motives to create value collectively. As such, the analysis supports the recent claim in the RBV literature that the extent to which a firm realizes the value creation potential of its resources is highly dependent on the motivation of its employees and the mechanisms in place to manage their motivation (Foss, 2007; Gottschalg & Zollo, 2007; Wang & Barney, 2006; Wang et al., 2009). Our analysis also complements this literature by analyzing a source of interfirm performance heterogeneity that has not yet been recognized: the match between the firm's motivational system and the mix of motives present in the firm's workforce. This insight

sheds new light on the existing literature. For example, Wang et al. (2009) found that better-performing firms encouraged employees' investments in firm-specific resources by adopting economic- or relationship-based motivational mechanisms that alleviated employees' hold-up concerns (granting employees stock ownership or building firm-employee relationships, respectively). Considering the match between the firm's motivational system and the mix of motives present in the firm's workforce allows us to speculate on the mix of motives for which adopting an economic-based motivational mechanism would be more efficient than choosing a relationship-based mechanism.

Third, the article compares three specific motivational systems—two inspired from the current RBV literature (individual monetary incentives and benevolent cooperation) and one suggested by studies of public good dilemmas (disciplined cooperation). In particular, we have proposed that disciplined cooperation is more efficient than the other two motivational systems when the firm's workforce is composed of a significant proportion of both self-regarding individuals and strong reciprocators and when observability by managers is low and observability by coworkers is high. We are not the first management scholars to recognize the importance of sanctioning by peers to sustain cooperation in firms (e.g., Fama & Jensen, 1983; Kandel & Lazear, 1992). Our analysis contributes an understanding of the motives driving individuals who sanction—namely, strong reciprocity—and the identification of the conditions that must be met in organizations for strong reciprocators to sanction (the perception that the motivational system is vertically fair, the perception that coworkers' sanctions are legitimate, and a relatively low cost of monitoring and sanctioning). Our analysis also highlights that disciplined cooperation is not a panacea: depending on the composition of the firm's workforce and on the degree of observability by managers and coworkers, individual monetary incentives or benevolent cooperation may be more efficient.

Fourth, the article points to an important role of management, beyond picking or building resources: to foster collective value creation, managers should reflect on whether their firm's motivational system aligns with the mix of motives present in the firm's workforce. Through the strategic choices of a motivational system to encour-

age cooperation among employees and of devices to select employees, managers influence both the firm's direct costs and the value creation potential of resources that remain unrealized because employees do not cooperate fully (i.e., opportunity costs). Managers should also be mindful to maintain over time the alignment between the motivational system and mix of motives. Firms may be confronted by self-selection pressures that change the firm's mix of motives over time and, if not adequately addressed by managers through the use of selection devices, may threaten collective value creation.

We see three interesting avenues for further research. First, management scholars could further tap into the rich literature on strong reciprocity and peer sanctioning (also called "community governance") that, over the last two to three decades, has accumulated in fields such as economics, psychology, political science, and biology. This article has applied some of this literature to compare peer sanctioning to two other ideal-type motivational systems often mentioned in the RBV literature. Yet much unexploited potential remains, such as the ways in which different ideal-type motivational systems interact and influence cooperation, which is important in specific contexts such as alliances between firms or expansion through acquisition.

Second, the issue of value sharing between employees and the firm's owners deserves further inquiry in light of the motivational assumptions we have proposed. Following the arguments presented above, the most beneficial motivational system for the firm's owners is influenced by the amount of collective value created by each system, which, in turn, depends on the mix of motives in the firm's workforce. But even when higher collective value creation occurs, if employees can appropriate the additional value created, higher profit for the firm's owners may not accrue (Coff, 1999). It is interesting to note that individual monetary incentives and vertical fairness, two mechanisms used to align employees' interests with the firm's interests, redistribute differently the collective value created between employees and the firm's owners. Individual monetary incentives align employees' interests by linking their personal payoffs with the realization of the firm's objectives. The individual monetary incentives themselves are the part of the value created collectively that

is appropriated by the employees. In contrast, vertical fairness helps realize the firm's objectives by encouraging strong reciprocators to reciprocate the fair treatment received from the firm by engaging in activities that create value. Any motivational system needs to ensure vertical fairness to motivate strong reciprocators, but developing and maintaining vertical fairness transfers to the employees some of the collective value created because the firm's owners are usually required to make substantial investments in such human resource practices as long-term employment policies, training, and high noncompetitive wages that are perceived as being fair (Wang et al., 2009). A worthwhile study would be to compare the value appropriated by the firm's owners and employees under different motivational systems—in particular, in the presence or absence of vertical fairness and related costs.

More generally, the presence of strong reciprocators also calls for further development of the theory of strategic factor markets (Adegbesan, 2009; Barney, 1986) for the special case of labor markets. Lab experiments have shown that employers anticipate that strong reciprocators will respond to a fair wage with high effort and offer, in consequence, high (i.e., above the competitive level) wages, even when competition in labor markets is very intense (Fehr & Falk, 1999; Fehr et al., 2007). These findings suggest that the motivation of some employees to reciprocate (un)fairness may severely limit the impact of supply-side competition on wages in labor markets where effort is not completely observable and is influenced by firms' motivational systems (Fehr & Fischbacher, 2002). It may also help to explain how employees can sometimes appropriate a significant share of the value they help create, even if they have little bargaining power in the sense of controlling valuable resources (in contrast to the condition identified by Coff [1999], which is based on the assumption that all employees are self-regarding).

Third, in order to focus on the impact of motivational systems on employees' motivations to cooperate, our comparison of the three motivational systems has kept constant the firm's resource endowment and individuals' judgment on resource potential. An interesting research avenue to develop our model further would be to introduce cognitive differences across motives

and to assess the consequences for collective value creation. More specifically, individuals with different motives might not only differ in terms of their motivation to cooperate but might also exhibit systematic cognitive differences likely to affect their individual potential to create value. In particular, we expect self-regarding individuals not to conform to social norms to the same extent as reciprocators (De Cremer & Van Lange, 2001; Simon, 1993; Stouten et al., 2005), which might make them more likely to generate original or unusual ideas. Creative individuals have often been described as independent, self-sufficient, high in self-esteem, nonconformist, and sometimes even asocial—acting independently of others—or antisocial—acting against others (Barron & Harrington, 1981; Burch, Pavelis, Hemsley, & Corr, 2006). While the ranking of the three motivational systems for a specific mix of motives would stay the same if we allowed for variation in creativity across mixes of motives, researchers interested in innovation might find it worthwhile to further explore the benefits in terms of collective value creation that might result from achieving high creativity and high cooperation with a mix of heterogeneous motives managed with a motivational system based on disciplined cooperation.

In a nutshell, this article advances the RBV by introducing the match between the firm's mix of employees' motives and the firm's motivational system as a powerful leverage for collective value creation. Motives and motivational systems are sources of interfirm performance differences that have not yet been taken fully into account in the RBV but that need to be adequately managed to realize the value creation potential of the firm's resources.

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