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13

Corporate Trust Games in Modern Knowledge Economies

Leonardo Becchetti and Noemi Pace*

1 Introduction

Over the past decade developments in game theory and experimental games have made trust games very popular. Their success depends also on the fact that they represent an interesting benchmark for testing the anthropological restrictions that mainstream economics poses on the behaviour of economic agents. Following the well-known reference of Sen (1977), the identification of (myopic) self-interest as the unique driver of human action makes economic agents 'rational fouls' and rules out at least other two fundamental motivations of human behaviour: 'sympathy' and 'commitment'. With the former we may make choices that are not in our self-interest, but in that of individuals or groups that we care for. With the latter we perform actions that do not maximize our direct goals but that are consistent with the fulfilment of some duties based on internal acknowledged laws. Some of the mainstream theorists often think that these additional motivations of human behaviour may be easily incorporated into standard modelling with the direct inclusion into the individual's utility function or with the incorporation in some kind of ad hoc contingent goods (i.e. care for relational goods may be incorporated in a higher demand for recreational places which are more efficient in promoting interpersonal exchanges).

*Address for correspondence: Facolta' di Economia, Dipartimento di Economia e Istituzioni, Via Columbia 2, 00133 Roma. E-mail: Becchetti@economia.uniroma2.it.
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The solution of the problem is not so simple. We pursue relational goods not just when they are related to the consumption of marketable goods and services and, when we behave on the basis of moral commitment and our course of actions may even contradict the principle of constrained maximization. Furthermore, as in the famous 'battle of the sexes' the care for relational goods may not just be solved by slightly modifying the utility function with the inclusion of the other player's utility. Without a form of coordination such a small change may in fact lead to the paradox of altruistic utility functions creating an equilibrium in which each player chooses the favourite entertainment of the other and they, paradoxically fail to go together to the same happening. Within this debate experimental trust games (along with ultimatum games) are among the most exploited theoretical framework used to demonstrate that individuals are not myopic, self-interested maximisers. In a sequential game in which a trustor gives to the trustee the possibility of choosing between the opportunity to abuse or that to cooperate, the subgame perfect equilibrium for a *homo economicus* should univocally be that of abusing, if its payoff is higher under this strategy than under all the alternative strategies. On the contrary, most trust games show that, when the trustee has a wide range of choices, whose extremes are taking the entire payoff or leaving it all to the opponent, the first solution is chosen with a probability which is far below the average. Another typical question which is never taken into account in standard economic modelling is not only that individual choices are a mix of myopic self interest, commitment and sympathy, but also that individual dispositions toward these three polar behaviours are not fixed but evolve across time according to a law of motion which is influenced by the structure of the game played and by inputs given by agencies which 'produce' values such as trust, willingness to pay for public goods (family, institutions, media governmental and non-governmental organizations).

The current contribution starts from these considerations by arguing that the evolution of the productive system, from a Tayloristic to a fully flexible system in which human capital and its creativity are crucial to the creation of new varieties of goods and services, makes the study and the analysis of the trust game essential also in production theory. In this framework it has been shown that, when we consider firm activity as a trust game, the law of motion of dispositions, such as trust and willingness to cooperate, is crucial and that a virtuous circle may exists among productivity, job satisfaction and quality of the working environment. Our final point is that the identification of these mechanisms highlights a potential virtuous circle between Corporate Social Responsibility (CSR) and corporate performance if firms are able to recognize them and invest in CSR under the form of improvement of relationships among workers.

2 Why contemporary productive environments are trust game corporations based on knowledge

The premise of our work is that, increasingly, the bulk of the economic activity of modern corporations depends upon a series of trust games played by their employees. Every activity carried on in the firm, beyond cleaning services and a few other blue-collar activities, requires the combination of no overlapping skills of several workers and possesses the intrinsic characteristics of trust games with superadditivity. The definition of a marketing strategy, the preparation of a project or the development of a new innovation necessarily involve different individuals, skills and firm divisions. In this framework team working becomes more and more important. In support of our assumption we can draw on the work of many other authors in the personnel and organizational management literature and also to recent firm practices of hiring teams rather than individuals or of placing a high priority on the social and team-working attitudes of people applying for jobs.[1] In the following sections we try to show that, if we do not conceive the most important part of productive activity as a trust game, we may struggle to understand two existing puzzles of personnel and labor economics. The first puzzle that need to be solved is why pay for performance fees (team compensation fees) are less (more) widespread than it is actually the case in modern corporations, especially when we focus on non-manual occupations (Baker, Jensen and Murphy, 1998; Baker, Gibbons and Murphy, 2002).[2] According to the standard labor economics literature workers are individual productive units driven by self-interested motivation whose performance may be enhanced by the promise of a remuneration that is proportional to the level of their efforts. Since effort is often unobservable, the monetary incentive is tied to the observable output and should in this way solve the moral hazard problem by inducing workers to exert their highest possible level of effort, even though they are not observed when doing so. One explanation for the puzzle is provided by Frey (1997) who identifies a trade-off between intrinsic motivation and monetary rewards. The trade-off is particularly binding for creative white-collar workers and much less for manual workers (who are reasonably supposed to be less intrinsically motivated at the origin). This line of reasoning has also been taken by Benabou and Tirole (2003) who acknowledge that the monetary incentive solution to the principal–agent theory (to which they greatly contributed) finds a limit in the crowding out of intrinsic motivations. Our point of view on this first puzzle is that the simple conception of corporate activity as a series of trust games provides an original line of explanation for it beyond the introduction of intrinsic motivations. In the following model we show indeed that pay for performance fees, by increasing the opportunity cost of the sharing/cooperative behaviour of the trustor, have the negative effect

of making more likely the occurrence of non-cooperative solutions in trust games, thereby having a negative effect on firm productivity. Furthermore, the corporate trust game model also helps to explain a second puzzle – that is, the decision of corporations to invest in the quality of relationships among colleagues (or even, related to this, of hiring teams in order to have *ex ante* a higher relational quality among employees).[3]

Another innovative feature of our contribution is the departure from the standard economic assumption that individual dispositions are fixed and generally self-interested by assuming that our players give value to the quality of their relational goods which, in turn, is not fixed and evolves according to the success or failure of repeated interactions. To base our assumptions not just on speculation but on empirical evidence we synthetically report empirical findings from a related paper on the determinants of happiness (Becchetti et al. 2006). In this chapter we have tested whether the time spent for relationships has a positive effect on declared happiness and/or declared overall life satisfaction. The sample is taken from the World Value Survey database and includes more than 100,000 individuals from 82 countries. In the econometric analysis we introduce the time spent for different types of relational activities (friends, family, sport mates, etc.) including those with job colleagues outside the workplace. In the estimates we have controlled control for sociodemographic characteristics (age, gender, level of education, religious practice, marital status, employment status, household composition) and found robust evidence of a positive and significant effect of the time spent with job friends outside the workplace on happiness (see the Appendix at the end of the chapter).

To sum up, the two assumptions of firms conceived as trust games and of workers having preferences for the relationship with their colleagues allow us to build a model which shows that a virtuous circle among accumulation of trust, relational goods and productivity exists and help to explain why firms' policies may be oriented to investing in quality of relationship among colleagues. To relate this discussion to the technicalities of our model, by introducing these two elements we are able to show, under different versions (uniperiodal, infinitely repeated, with perfect or imperfect information) of our basic 'corporate trust game', that lower quality of relational goods, individual pay for performance schemes and (single winner) tournament incentive structures significantly widen the parametric space of 'non-cooperative'[4] equilibria which, in turn, dampen the circulation of knowledge and the cooperation of workers with different competencies, yielding suboptimal output for the firm.

The novelty of our approach with respect to the existing literature is the following. First, we introduce in the trust game model a concept of relational goods which is slightly different from the dominant one of fairness or reciprocity. As is well known, starting from the anomalies of laboratory experiments on ultimatum games in which a high share of respondents turn down low offers,

or on public good experiments where people tend to contribute with non-zero amounts even when there is the possibility of free-riding, Fehr and Schmidt (1999) develop a model, consistent with these findings, by simply introducing inequality aversion arguments in their utility functions. In further extensions Fehr and Gächter (2000) show that reciprocity (or the intention to reciprocate an action which has been received) is an important determinant in the enforcement of incomplete contracts (Fehr, Gächter and Kirchsteiger, 1997; Fehr and Gächter, 2000; Bewley, 1995).[5] Our concept of relational goods is slightly different from those of inequality aversion or reciprocity. In our model we explicitly assume that players have accumulated a stock of relational goods (friendship, pleasure to spend time with people with whom they have interacted in the past) which can be implemented by further interaction or be entirely depleted in the case of abuse or the violation of friendship. In such a case the stock of relational goods becomes the opportunity cost of an opportunistic behaviour. The concept of relational goods is obviously not entirely novel in the literature where it is specified that they are local public goods (Ash, 2000; Uhlaner, 1989; Gui, 2000) which are simultaneously produced and consumed.[6] To our opinion, the main difference between relational goods and reciprocity is that, for the latter, what is just required is a general sense of duty while, in the former, reciprocity is fuelled by the quality of the relationship between the two players.

3 The basic corporate trust game

Our basic assumption is that the core of the firm's productive activity is represented by a complex task which requires the application of non-overlapping skills from different workers. To start with the simplest example, we introduce a basic case with two workers, players A and B, whose stand alone contributions to final output are, respectively, $h_a \in \Re^+$ and $h_b \in \Re^+$. As is well known, one of the main characteristics of the trust game is its non-simultaneity: in a first stage player A (the trustor) chooses between two strategies and, specifically, whether sharing or not his skills with the other player. In the following stage of the game player B (the trustee) has to choose in turn between cooperating or abusing. What we assume here by devising corporate trust games with a sequential structure is that any joint endeavour within the firm originates from a first stage in which one of the participants can share his knowledge with the other participants to the venture. It can be sending a file by e-mail or being the first to present one's own arguments in a joint meeting. It is highly unreasonable, and practically impossible, that these actions (or similar ones which are typically at the origin of a joint activity) may be done simultaneously by more than one player. Another crucial assumption of the model is that the interaction creates an externality (which we assume to be nonnegative even though the model may be reasonable and interesting to explore also under the assumption

of negative externalities in case of very critical relationships between the two players). The externality is represented by the super additive component $e \in [0, \infty]$- generated by the dialogic process of jointly performing the task and by the initial sharing of knowledge (Figure 13.1).[7]

To sum up the set of available strategies, we know that player A (the trustor) may decide to share (*s* strategy) or not to share (*ns* strategy) his initial ideas with the trustee who, in turn, may decide to abuse (*a* strategy) or not (*na* strategy). If the trustee decides to abuse he will 'steal' trustor's ideas, join them with his own ones and present everything as his own work, while, if he decides to share, the two players will interact and produce a super additive component *e* as additional contribution to the output stemming from the integration of players perspectives and skills. We reasonably assume that, if the trustee chooses the cooperation, the final output is shared between the two players.

The set of payoffs (player A, player B and firm's output) are:

$\{(0|h_a < h_b, h_a|h_a > h_b), (0|h_a > h_b, h_b|h_a < h_b), Max(h_a, h_b)\}$ if player A does not share;

$\{0, h_a + h_b, h_a + h_b\}$ if player A shares but player B chooses to abuse;[8]

$\left\{\frac{h_a + h_b + e}{2}, \frac{h_a + h_b + e}{2}, h_a + h_b + e\right\}$ if player A shares and player B cooperates.

The game is represented in the extensive form in Figure 13.1.

These payoffs imply several important assumptions. First, the stand alone contributions are not overlapping. Second, the trustee must have enough 'absorptive capacity' to be able to abuse of the skills of the other players. If the fields of knowledge of the two players are too distant this assumption is unrealistic and the possibility of abusing of the contribution of the trustor is more unlikely. Third, in this simplest example in which the firm is made exclusively by the two players, we assume that the joint task is something similar to the participation to an open bid for a project, or to a patent race where some authority (external to the firm) may decide for the best project. Fourth, we do not examine cases in which players exchange, randomly or according to an a priori fixed criteria, the roles of trustor and trustee, even though this may be a nice extension of our game.

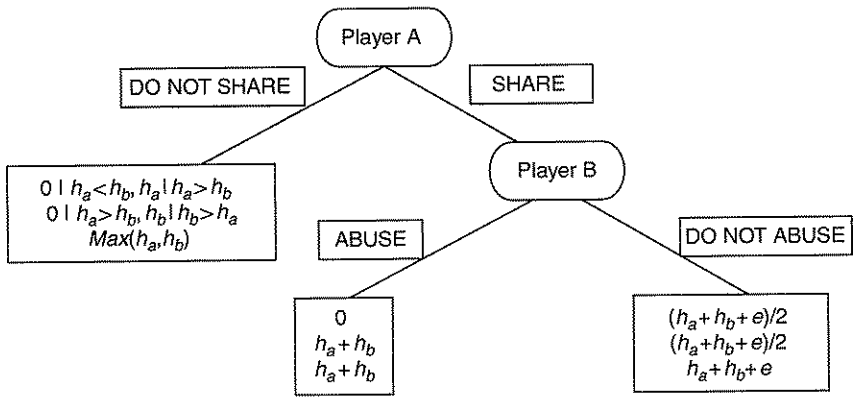

Figure 13.1 The uniperiodal full information game

The analysis of the uniperiodal trust game shows clearly that the 'non-sharing' solution yielding a suboptimal firm output is the Symmetric Perfect Nash Equilibrium (SPNE) of the uniperiodal full information game when (*i*) the trustor has higher stand alone contribution to output than the trustee and (*ii*) the super additive component is inferior to the sum of trustee and trustor stand alone contributions. The 'non-sharing' solution is also the Self Confirming Equilibrium of the game if the trustor believes in (*i*) and (*ii*), even though these beliefs do not corresponds to reality. To demonstrate the first part of our claim consider that the crucial condition to take into account is the comparison between the trustee's payoff when he cooperates and that when he abuses (abuse condition), even though the solution of the game also depends on the comparison between the two players' stand alone contributions. Consider first the case in which the trustor has superior stand alone contribution, namely $h_a > h_b$. In this case his payoff is h_a, if he does not cooperate, and zero, if he decides to cooperate but player B abuses. As mentioned above the abuse condition tells us that player B will abuse if $h_a + h_b > \frac{h_a + h_b + e}{2}$ or $e < h_a + h_b$.

To sum up, if $h_a > h_b$ (superior trustor's stand alone contribution) and $e < h_a + h_b$ (super additive component lower than the sum of the two stand alone contributions) the 'non-sharing' solution is the SPNE of the uniperiodal full information game.[9]

The relevant consequence of this SPNE is that it yields a 'third-best' firm output – $Max(h_a, h_b)$ – lower than the one achievable under cooperation $h_a + h_b + e$, and even lower than the 'second-best' output obtainable under the (share, abuse) pair of strategies.

If we define the social surplus of the game as the difference between the maximum achievable output and the output arising from the solution of the game we conclude that the SPNE yields a loss of social surplus (and of firm productive potential) equal to $h_a + h_b + e - Max[h_a, h_b]$.

Let us consider now the alternative scenario in which the stand alone contribution of the trustor is inferior to that of the trustee or $h_a < h_b$. In this case, if the abuse condition is met, or $e < h_a + h_b$, the trustor becomes indifferent between sharing or not, since the payoff that he will receive is the same in both cases.

As a consequence, we have two SPN equilibria represented by the pairs of strategy (*ns*, .) or (*s*, *a*) yielding, respectively, a second or third best output with a consequent social loss, respectively equal to $h_a + h_b + e - Max[h_a,h_b]$ or e.[10]

To sum up, the first part of our claim demonstrates that, in the full information single-period game when the trustor has a higher stand alone contribution than the trustee, under reasonable parametric conditions on the value of the super additive component, the subgame perfect equilibrium is a non-information-sharing solution and the firm output is inferior to its maximum potential. Under the alternative assumption on the relative human capital endowments of the two players we have two possible solutions. Both of them do not imply information sharing and still yield a suboptimal firm output.

A graphic representation of the cooperation area is provided in Figure 13.2 in which the super additivity component is on the horizontal axis, the trustor stand alone contribution is on the vertical axis and the trustee stand alone contribution is fixed. The area of information sharing equilibria is the one, below the fixed level of trustee stand alone contribution, in which $e > h_a + h_b$.

With regard to the second part of our reasoning, consider that, if we take into account the concept of Self Confirming Equilibria developed by Fudenberg and Levine (1993), we additionally extend the range of solutions yielding non-cooperation and suboptimal firm's output. As is well known, in sequential games we may have Self Confirming Equilibria which are not Nash Equilibria. The difference between Self Confirming Equilibria is that players' beliefs may not be correct. Two additional basic assumptions which are commonly shared with Nash equilibrium is that players are rational (or maximize their payoff

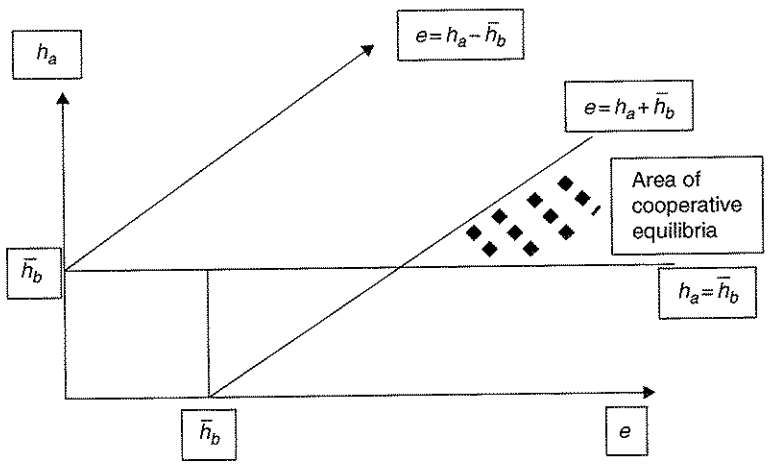

Figure 13.2 Graphic representation of players' payoffs in the uniperiodal full information game (for a given level of $\bar{h}_b$)

conditional to their beliefs over the opponent behaviour) and their beliefs cannot conflict with empirical evidence. In our sequential game the relevant situation is when the trustor believes he has the higher stand alone contribution and that the super additive component is lower than the sum of the stand alone contributions of the two players, even though it is not the case. If, however, based on his erroneous beliefs, the trustor rationally chooses not to cooperate he will never have an empirical proof of his error and the (*ns*, .) will be the self-confirming equilibrium of the game even though it is not a SPNE. Hence, the departure from the full information framework, and the admission that players' beliefs may be incorrect, enlarges the parametric area in which the solution of the game leads to lack of cooperation and suboptimal output.

Consider that the analysis of self-confirming equilibria is a departure from the perfect information framework by allowing the possibility that the two players have incorrect beliefs on the payoffs of the game. A more detailed analysis of the game under imperfect information will be developed in the following sections.

3.1 The one-period corporate trust game with relational goods

The strength of our argument on the non-cooperative inefficiencies in modern corporations based on knowledge sharing and trust games relies on the fact that the 'third-best' output result comes out by assuming standard purely self-interested player preferences. Nonetheless, in this version of the basic game, we want to see how our results change when we introduce in players' utility function the quality of relationships which we demonstrated grounded on empirical results (see Appendix). As we will show in the model, we can anticipate that the taste for personal relationships increases the propensity to be trustworthy since violation of trust involves a reduction in the quality of relationships.

In this section, without directly modelling the law of motion of the relational goods (given the one-period framework), we assume that the two players arrive at the trust game with a stock of accumulated relational goods equal to F which depends on their past friendship and, consistent with the Smithian 'fellow feeling' principle, may jointly produce a relational good f with their decision to cooperate. Under this modified framework, the solution of the uniperiodal game with relational goods is that, when $\frac{h_a + h_b - e}{2} > F$, there exists a threshold value of the relational good in the trustee utility function (f^*) which triggers the switch from the non cooperative to the cooperative (share, not abuse) equilibrium.

To show this point, consider that the new payoff set with the existence of relational goods (player A and player B payoffs and firm output) is:

$\{(F|h_a < h_b, F + h|h_a > h_b), (F|h_a > h_b, F + h_b|h_a < h_b), Max[h_a,h_b]\}$ if player A does not share;

$\{0, h_a + h_b, h_a + h_b\}$ if player A shares but player B chooses to abuse;

$\left\{\frac{h_a + h_b + e}{2} + F + f, \frac{h_a + h_b + e}{2} + F + f, h_a + h_b + e\right\}$ if player A shares and player B does no abuse (Figure 13.3).[11]

If we consider the case in which the trustor has a higher stand alone contribution than the trustee, $h_a > h_b$, we easily find that the subgame perfect equilibrium of the full information uniperiodal game is (*ns*, .). The same occurs when the inequality is inverted, namely $h_b > h_a$. Again, the non-cooperative solution yields a 'third-best' firm's output, $Max[h_a, h_b]$, which is lower than $h_a + h_b + e$ (that is the firm output under the (*s*, *na*) equilibrium) and lower than that obtained under the (*s*, *a*) solution. The main difference with respect to the basic game without relational goods is that the threshold value of the super additive component which divides cooperation from abuse is now lower since the value of relational goods works as an opportunity cost for the decision to abuse. This implies that, given the new abuse condition, if $\frac{h_a + h_b - e}{2} > F$, we may identify a threshold (f^*) in the value of the relational goods for the trustee above which the (share, no abuse) couple of strategies becomes the SPNE of the single-period full information game. Such a threshold is equal to $f^* = Max\left\{\frac{h_a + h_b - e}{2} - F, \frac{h_a - h_b - e}{2}\right\}$.

The wider parametric space for the cooperative solutions is evident also in Figure 13.4. By interpreting this result we may conclude that the empirically grounded consideration for the preference of relational goods among workers outlines a potential virtuous circle among quality of worker relationships,

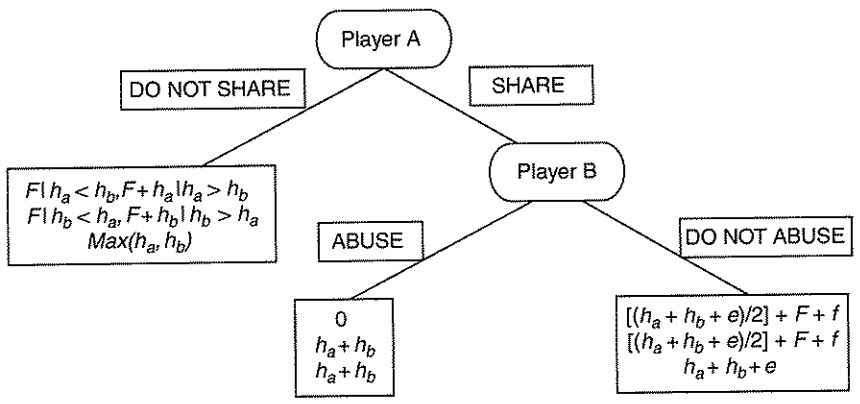

Figure 13.3 The uniperiodal full information game with relational goods

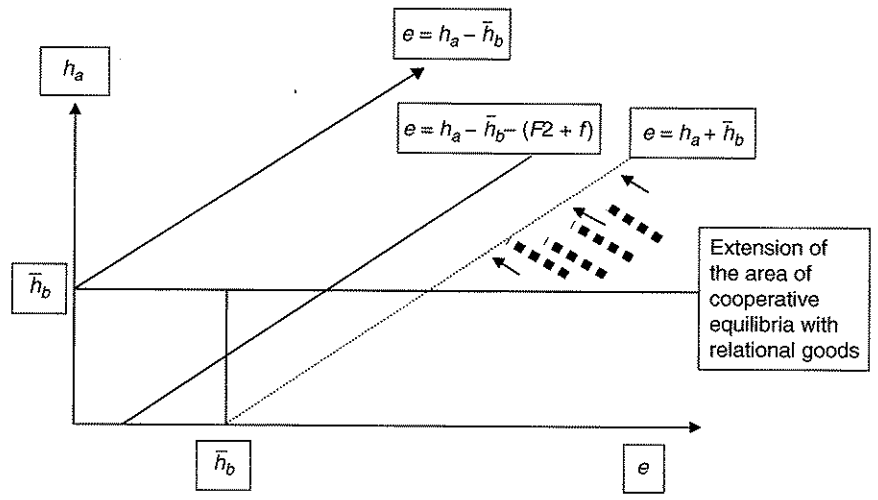

Figure 13.4 Graphic representation of players' payoff in the uniperiodal full information game with relational goods (for a given level of $\bar{h}_b$)

decision to cooperate (which further increases the quality of relationships) and firm productivity, or among relational goods, social capital (under the form of trust and trustworthiness) and firm's productivity.

3.2 The two-period full information trust game when the players own the firm

With a two-period example we want to show that solutions of the game are substantially unaltered with respect to those of the single-period game for similar parametric ranges. Let us first consider the model without relational goods. In this case, if the abuse condition is met and if the trustor has higher stand alone contribution than the trustee, the trustor anticipates that the trustee is going to abuse in both periods and therefore will choose not to share. The SPNE is therefore: (*i*) (*ns*, .) if the trustor has higher stand alone contribution and if the super additive component is not too high (or if the abuse condition holds); (*ii*) (*ns*, .) and (*s*, *a*) if the trustor has lower stand alone contribution and if the abuse condition is met.

Let us explore the possibility of more complex equilibria by examining whether the (*s*, *na*) equilibrium may be enforced when the trustor threatens a punishment to the other player in case of abuse in the first period.

A simple punishment strategy may be represented by the refusal to share in the second period game. The extensive form of the game is presented in Figure 13.5.

If player A decides not to share, the firm's payoff will be $h_a(1 + \delta)$, if $h_a > h_b$, while it will be $h_b(1 + \delta)$, if $h_a < h_b$, with δ the inverse of the subjective discount rate or the standard measure of players' 'patience'.[12]

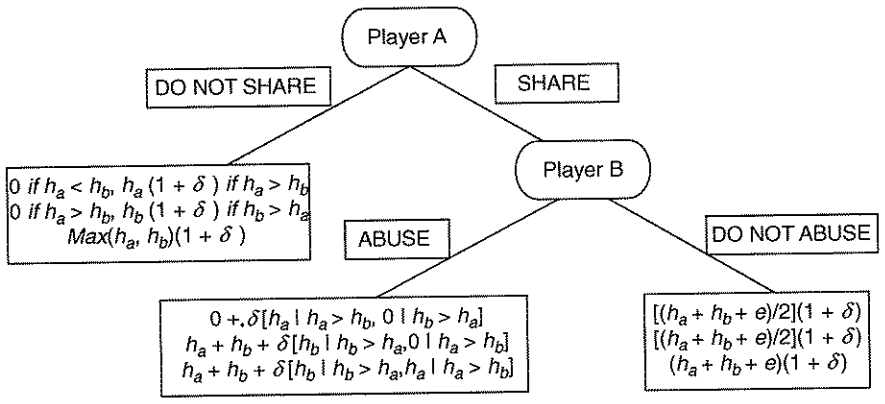

Figure 13.5 The two-period full information game

On the other hand, if player B does not abuse, the payoff of each player will be $\frac{h_a + h_b + e}{2}(1+\delta)$. If player A shares and player B decides to abuse, player A payoff will h_a, if $h_a > h_b$, while player B payoff depends on the difference between the skills of two players. If $h_a > h_b$, player B payoff is the sum of the two players' stand alone contributions, $h_a + h_b$, given that there is not any added value to be discounted in the second period, (player A will decide not to share in the second stage if player B abused in the first), while, if $h_a < h_b$, we must add to $h_a + h_b$ player B stand alone contribution multiplied by the discount rate. Hence, under the $h_a > h_b$ hypothesis, the no abuse condition in the first period is $e > (h_a + h_b)\left(\frac{1-\delta}{1+\delta}\right)$, or $\delta > \frac{h_a + h_b - e}{h_a + h_b + e}$. The condition may be met for reasonable values of $\delta \in [0,1]$, e and players' stand alone contributions. More specifically, with minimum patience, $\delta = 0$, we get back to the no abuse condition of the uniperiodal game $e > h_a + h_b$ while, with maximum patience $\delta = 1$, the no abuse condition is much easier to be respected as it just requires a nonzero super additive component ($e > 0$). If, on the contrary, $h_a < h_b$ the no abuse condition is $e > h_b + h_a\left(\frac{1-\delta}{1+\delta}\right)$.[13]

Again, with minimum patience $\delta = 0$, we get back to the no abuse condition of the uniperiodal game $e > h_a + h_b$ while, with maximum patience $\delta = 1$, the no abuse condition reduces to $e > h_b$. In graphical terms in Figure 13.5 with trustee maximum patience $\delta = 1$ the two period game no abuse area would be represented by all the positive quadrant, under the $h_a > h_b$ hypothesis, and by the area at the right of the $e = h_b$ vertical line, under the $h_a < h_b$ hypothesis (see Figure 13.5).

Even though the no abuse condition is respected, this solution is not renegotiation proof. In fact, the punishment strategy costs in the second period to the trustor $\frac{h_a + h_b + e}{2}$, if $h_a < h_b$, and $\frac{h_a + h_b + e}{2} - h_a$, if $h_a > h_b$ (under the assumption that the trustee would cooperate in that period) but it is zero if the trustor rationally assumes that the trustee will abuse again. Hence, the trustee may propose, after abusing in the first period, a preliminary side payment – in case the trustor decides to share – of ε, when $h_a < h_b$, or $h_a + \epsilon$, when $h_a > h_b$. The trustor should strictly prefer the new proposal.

Hence, the new no abuse condition will be $e > h_a + h_b - \frac{2\delta\varepsilon}{1+\delta}$, when $h_a < h_b$, and $e > h_a + h_b - \frac{2\delta(h_a + \varepsilon)}{1+\delta}$, when $h_a > h_b$.

Renegotiation therefore reduces significantly the parametric space of the no abuse condition.

To sum up, we have then shown that the biperiodal game yields solutions equal to those of the single-period game when we do not include punishment strategies, plus a more complex solution if the trustor defines a simple punishment strategy. The intuition is that, under the (*ns*, .) equilibrium, the trustor will have a zero gain if he has lower stand alone contribution than the trustee or $2h_a$ otherwise. If the trustor threatens the trustee with non-cooperation in the second period, in case he is abused in the first, he has to deal with the fact that his punishment is not at proof of renegotiation at the end of the first period in case of trustee's commitment to cooperation, but, if we consider that the trustee will continue to abuse also in the second period the punishment strategy does not cost anything to the trustor. The trustee, after having abused in the first period, may always propose a side-payment which makes it convenient for the trustor not to enact its punishment. Hence, with the introduction of a simple trustor punishment strategy we have a slightly different equilibrium in which an ε of the total output in the second period goes to the trustor.

3.3 The two-period full information trust game with relational goods when players own the firm

Following the same reasoning, without considering trustor punishment strategies the two-period game with relational goods yields the same results as the single-period one. There are two differences with the two-period game without relational goods: the abuse condition is less likely to be met (lower values of the super additive component violate it) and, when the trustor has lower stand alone contribution than the trustee we obtain a unique (*ns*, *a*) equilibrium instead of the two – (*ns*, .) and (*s*, *a*) – of the game without relational goods. In the two-period trust game with relational goods, the abuse strategy of player A determines the 'destruction' of the accumulated relational stock F (as in the

one-period game). In such a case, player B's payoff is $h_a + h_b + \delta(h_b | h_a < h_b, 0 | h_a > h_b)$ (Figure 13.6).

On the other hand, if player B does not abuse, each player obtains the following payoff $F + \left(\frac{h_a + h_b + e}{2} + f\right)(1+\delta)$. Hence, the no abuse condition in the first period is $F + \left(\frac{h_a + h_b + e}{2} + f\right)(1+\delta) > h_a + h_b + \delta(h_b | h_a < h_b, 0 | h_a + h_b)$. If $h_a > h_b$, the no abuse condition becomes $F + \left(\frac{h_a + h_b + e}{2} + f\right)(1+\delta) > h_a + h_b$ or $e > (h_a + h_b - F)\left(\frac{1-\delta}{1+\delta}\right) - 2f$.

The presence of the relational good arguments makes the no abuse condition less stringent and widens the parametric space of cooperative equilibria. Consider now the case in which $h_a < h_b$.

The no abuse condition is $F + \left(\frac{h_a + h_b + e}{2} + f\right)(1+\delta) > h_a + h_b(1+\delta)$ or $e > (h_a + h_b - F)\left(\frac{1-\delta}{1+\delta}\right) - 2f + 2\frac{\delta}{1+\delta}h_b$.

In such a case it is more difficult to meet the no abuse condition, even in the presence of an inclination towards relational goods.

As in the single-period game the presence of relational goods in the two-period full information game widens the parametric space in which cooperative (no abuse) equilibria are attained. Even though the no abuse condition is respected, this solution is not renegotiation proof. In fact, the punishment strategy costs in the second period to the trustor is $f + \frac{h_a + h_b + e}{2}$, if $h_a < h_b$,

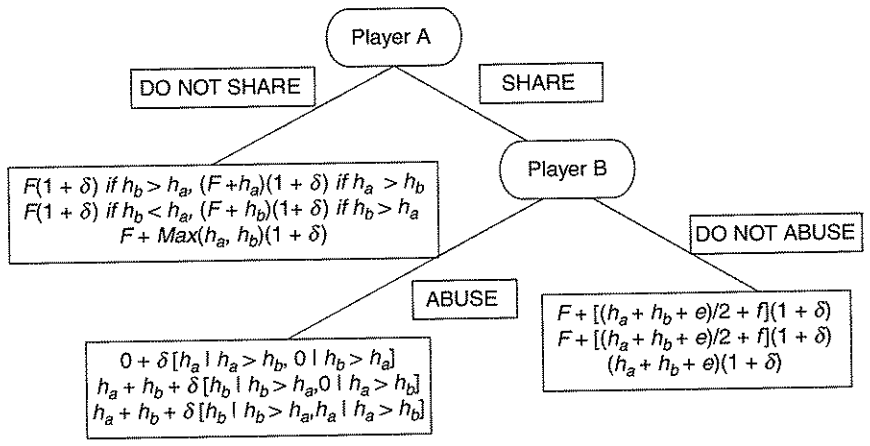

Figure 13.6 The two-period full information game with relational goods

and $f + \frac{h_a + h_b + e}{2} - h_a$, if $h_a > h_b$. As a consequence, the trustee may propose, after abusing in the first period, a preliminary side-payment – in case the trustor decides to share – of ε, when $h_a < h_b$, or $h_a + \varepsilon$, when $h_a > h_b$. Hence, the new no abuse condition will be $e > h_a + h_b - SF - 2f - \frac{2\delta\varepsilon}{1+\delta}$, when $h_a < h_b$, and $e > h_a + h_b - 2F - 2f - \frac{2\delta(h_a + \varepsilon)}{1+\delta}$, when $h_a > h_b$.

Once again, the renegotiation significantly reduces the parametric space of the no abuse condition. Again, even though the trustor anticipates that the trustee will find it convenient to renegotiate after abusing in the first period, the punishment strategy may be convenient since it allows him to earn an additional ε of the total output in the second period.

3.4 The infinitely repeated game

It may seem odd to discuss infinitely repeated games in the context of corporate trust games, but we have to consider that the interactions among workers are extremely frequent so that the large number of games played during a working life may be approximated by infinitely repeated games.

The analysis of the infinitely repeated version of the game without relational goods shows clearly that the (*s, na*) profile is the SPNE for reasonable discount rates, but it may never hold, under given parametric conditions, when the trustee has a higher stand alone contribution than the trustor. Even when the (*s, na*) profile is a SPNE, it is, however, based on a trustor threat which is not renegotiation proof. To demonstrate this, consider that, as is well known, the Folk Theorem applies to the infinitely repeated game if there exists a $\delta \in [0,1]$ such that the (share, not abuse) equilibrium is enforceable. By applying it to this modified version of the game we get $(1-\tilde{\delta})(h_a + h_b) = \frac{h_a + h_b + e}{2}$, if $h_a > h_b$, and $(1-\tilde{\delta})(h_a + h_b) + \tilde{\delta}h_b = \frac{h_a + h_b + e}{2}$, if $h_a < h_b$. If $h_a > h_b$, $\tilde{\delta} = \frac{1}{2} - \frac{e}{2(h_a + h_b)}$, which is below 1 for reasonable parametric values. On the other hand, if $h_b > h_a$, $\tilde{\delta} = \frac{\frac{1}{2} + \frac{1}{2}\left(\frac{h_b}{h_a}\right) - e}{2h_a}$.

Under reasonable parametric conditions – and, more specifically, when $h_b - h_a > e$ – we get $\tilde{\delta} > 1$ and the cooperative equilibrium may not be enforced. In other words, if the trustor may commit himself to an infinite punishment strategy starting from the period following the trustee abuse, and if the discount rate of the trustee is not very high, the (*s, na*) profile in which the two players cooperate may be the NE of the game. However, as is well known, the hypothesis of infinite punishment is not always credible, especially when

the punishment has a cost for the punisher as it is in our case. Consider that the punishment strategy costs any period to the trustor $\frac{h_a+h_b+e}{2}$, if $h_a < h_b$, and $\frac{h_a+h_b+e}{2}-h_a$ if $h_a > h_b$. Hence, the trustee may propose, after abusing in the first period, a preliminary side payment of ε, when $h_a < h_b$, or $h_a + \varepsilon$, when $h_a > h_b$, conditional to the trustor's commitment to share in the following period. The trustor should strictly prefer the new proposal which may be repeated an infinite number of times after any abuse by the trustee. Hence, we get $(1-\tilde{\delta})(h_a+h_b)+\tilde{\delta}(h_a+h_b-\varepsilon)=\frac{h_a+h_b+e}{2}$, if $h_a < h_b$, and $(1-\tilde{\delta})(h_a+h_b)+\tilde{\delta}(h_b-\varepsilon)=\frac{h_a+h_b+\varepsilon}{2}$, if $h_a > h_b$. It is easy to check that, in both cases, and especially when $h_a < h_b$, $\tilde{\delta} > 1$ under reasonable parametric conditions. Notice that, under the case in which the trustor has a higher stand alone contribution than the trustee, namely $h_a > h_b$, the new condition implies that the minimum trustee patience required to have a cooperation equilibrium is negatively related to the ratio between the super additive component and the sum of the two players' stand alone contributions. In other words, since the super additive component is the cost of applying the punishment strategy, the higher it is, the more the cooperative solution may be enforced, even in presence of low levels of trustee patience. When the relationship between the two stand alone contributions is reversed, namely $h_a > h_b$, the minimum trustee patience required to have a cooperation equilibrium is higher and depends positively from the trustee stand alone contribution and negatively from the super additive component and trustor stand alone contribution which are part of the punishment in case of abuse.

Consider again that milder punishment strategies may pass renegotiation demonstrability and be enforced more easily. If, for example, the trustor devises a punishment strategy lasting for N (extension of the punishment strategy for the next N periods) and the trustor commits itself to a random strategy in which he will share for x times and not share for $1\text{-}x$ times. It is in principle possible in this case to find a number N and a probability x such that the punishment strategy is not costly for the punisher and therefore is renegotiation proof.

4 The trust game with imperfect information

In our discussion of the Self Confirming Equilibria we showed that, when departing from the full information framework, by simply assuming that players might have incorrect beliefs over the game payoffs, we were more likely to fall into the non-cooperation equilibria of the game. We now tackle more generally the problem of imperfect information by looking at the two more

general forms of imperfect information related to: (*i*) the relational attitude of the other player, that is, the presence in his utility function of a positive argument related to the cooperation with his colleague; (*ii*) the stand alone contribution to output of the other player.

Under assumption (*i*) it is clear that the two players do not know each other well and, therefore, it is reasonable to assume that $F = 0$. More specifically, if we assume that each player assigns a probability $p \in [0,1]$ to the likelihood that his counterpart gives a value f to the relational good produced by the cooperative working activity (see Figure 13.7), we may easily check that the threshold value of the relational good required to ensure the (share, not abuse) equilibrium is now higher. Hence, the effective value of relational goods in the utility function is less likely to generate equilibria of cooperation between the two workers. Consider in fact that, if each player assigns a probability p to the likelihood that his counterpart gives a value f to the relational good produced by the cooperative working activity, the no abuse condition becomes $2pf + e > h_a + h_b$. Hence, the Bayesian NE of the game is: (*i*) (*ns*, .) if $2pf + e < h_a + h_b$ and $h_a > h_b$; (*ii*) (ns, .) or (s, a) if $2pf + e < h_a + h_b$ and $h_a < h_b$; (*iii*) (*s, na*) if $2pf + e > h_a + h_b$. Hence, a 'threshold probability value' $p^{*\prime}$ exists, such that, when $p > p^{*\prime}$, the (share, not abuse) pair of strategies becomes the NE of the game. We can obtain $p^{*\prime}$ as $p^{*\prime}=\frac{h_a+h_b-e}{2}$. For $p^{*\prime} < 1$ we need $f^{*\prime} > \frac{h_a+h_b-e}{2p^{*\prime}}$. This implies a 'threshold value of the relational good under uncertainty' which is higher than its certainty correspondent (in which $p = 1$).

Let us consider now the second case of imperfect information related to the counterpart stand alone contribution. We may assume here that player A

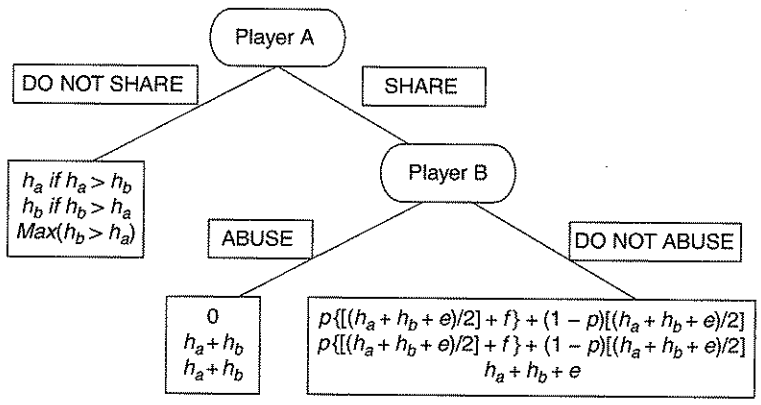

Figure 13.7 The uniperiodal game with imperfect information on trustee relational preferences

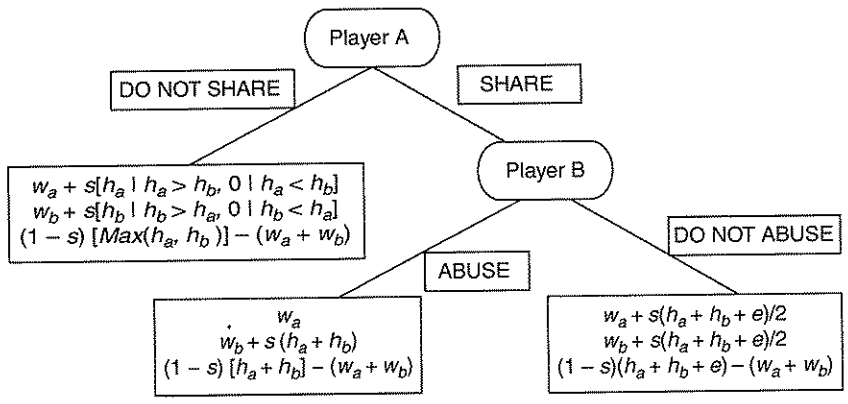

Figure 13.8 The uniperiodal full information game with pay for performance schemes

assigns a subjective probability p_1 ($p_1 \in [0,1]$) to the $h_a > h_b$ hypothesis, while player B assigns a subjective probability p_2 ($p_2 \in [0,1]$) to the alternative $h_a < h_b$ hypothesis (see Figure 13.8). If we also assume that each player does not know the guess of the other we easily find that the abuse condition is unaltered with respect to the basic uniperiodal game. The intuition is obvious. The no abuse condition compares two payoffs of two trustees (conditional to the abuse and not abuse strategies respectively) under the assumption that the trustor has decided to share information. In both cases the trustee payoff includes the sum of the two players' contributions and therefore the relative superiority of one of the two stand alone contributions does not matter. As a consequence, the (*ns*, .) profile is the equilibrium when the super additive component is inferior to the sum of the trustee and trustor stand alone contributions to output. An interesting element in this new framework is that, when the trustee has higher a stand alone contribution than the trustor, we do not have anymore two equilibria – (*s*, *na*) and (*ns*, .) – but only the (*ns*, .) equilibrium.[14]

5 Basic trust game when the players do not own the company

The more natural framework in which corporate trust games must be analyzed consists of the interaction of employees who do not possess the firm. With the exception of specialized professionals (such as engineers and architects), a large firm in which wage-earning employees play many times and in many different situations corporate trust games should be our natural scenario. In such a scenario we aim to evaluate what is the effect that traditional forms of incentives, such as individual pay for performance fees and tournament prizes, have on workers' incentives when the sequential structure of workers' interactions, discussed in the previous sections, is assumed.

We show that the assumption that players' interactions have the form of the corporate trust game is a sufficient condition for determining the relative inconvenience of single winner tournaments (or pay for performance schemes in the presence of worker's preference for relational goods). The novelty of our approach is that we do not need to consider crowding-out effects on intrinsic motivations to obtain this result. This is because: (*i*) when the activity of a firm is conceived as a trust game and, in presence of relational goods, a steeper pay for performance scheme increases the probability of non-cooperative equilibria for given parametric values; and (*ii*) the cooperative equilibrium can never be attained with the introduction of a single winner tournament scheme, even in the absence of relational goods. In the next two sections we show these two points.

5.1 Pay for performance schemes

Consider a standard performance-incentive structure, based on a fixed remuneration (w_a for player A, and w_b for player B), plus an additional share $s \in [0,1]$ of the employee's performance when the latter contributes to firm output. Within this framework we may easily observe that individual payments for performance schemes are neutral in corporate trust games in which players do not own the firm, as they do not help to widen the parametric space of the cooperative equilibrium. On the contrary, in presence of relational goods, a steeper pay for performance scheme may trigger the switch from a cooperative (productively optimal) to a non-cooperative (productively suboptimal) equilibrium and may therefore crowd out cooperation.

The set of payoffs is now

$$\{w_a + s(h_a|h_a > h_b, 0|h_a < h_b),\ w_b + s(h_b|h_a < h_b, 0|h_a > h_b),\ (1-s)Max[h_a, h_b] - w_a - w_b\}$$

under the (*ns*, .) pair of strategies, while it is

$$\{w_a w_b + s(h_a + h_b),\ (1-s)(h_a + h_b) - w_a - w_b\} \quad \text{and}$$

$$\left\{w_a + s\left(\frac{h_a + h_b + e}{2}\right),\ w_b + s\frac{h_a + h_b + e}{2},\ (1-s)(h_a + h_b + e) - w_a - w_b\right\}$$

under the (*s*, *a*) and (*s*, *na*) pairs, respectively (see Figure 13.8).

Without relational goods the no abuse condition is unaltered, while, with relational goods, it becomes $e > h_a + h_b - 2\frac{F+f}{s}$. Hence, a steeper pay for performance fee (a higher *s*) raises the opportunity cost of the cooperation strategy and reduces the parametric space of the cooperation equilibria. In this sense our result provides a simple rationale to the puzzle evidenced, among others, by Baker, Jensen and Murphy (1998) on the relatively low use of individual pay for performance schemes in personnel management. We may easily observe that the negative effect of pay for performance fees on cooperative

equilibria persists in the two-period games and in the infinitely repeated trust games.

In the two-period game the solution crucially depends again on the relative stand alone contributions. When we assume $h_a > h_b$ the 'no abuse' condition is $\delta > \frac{h_a + h_b - e}{h_a + h_b + e}$.[15]

Consider that, here again, the no abuse condition does not depend on *s*. The no abuse condition is $\delta > h_b + h_a\left(\frac{1-\delta}{1+\delta}\right)$, which may be easily satisfied under reasonable parametric assumptions.

Let us suppose now that $h_a < h_b$. In this case, the no abuse condition is $\frac{w_b + s(h_a + h_b + e)}{2}(1+\delta) > w_b + s(h_a + h_b) + \delta(w_b + sh_b)$ which reduces, again, to $e > h_a + h_b$, that is, the no abuse condition of single period full information game when the two players own the firm. Consider now the presence of relational goods in the two-period game (Figure 13.9).

Under $h_a > h_b$ the no abuse condition is

$$w_b + s(h_a + h_b) + \delta w_b < F + \left(\frac{f + w_b + s(h_a + h_b + e)}{2}\right)(1+\delta)$$

yielding

$$\delta > \frac{s(h_a + h_b - e) - 2F - 2f}{2f + s(h_a + h_b + e)}.$$

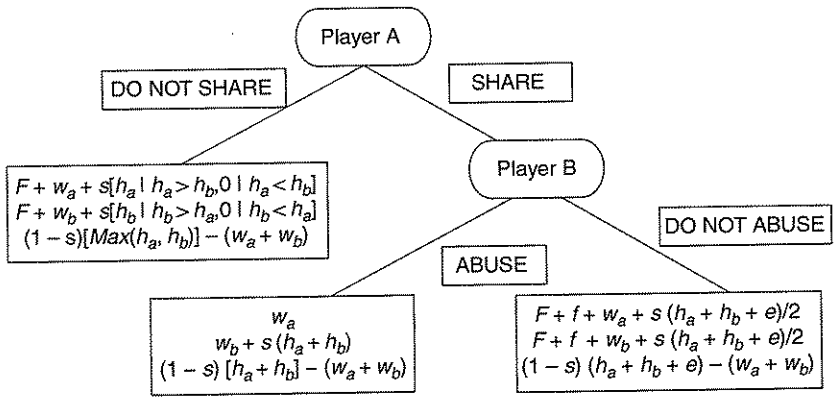

Figure 13.9 The uniperiodal full information game with relational goods and pay for performance schemes

Under $h_a < h_b$ the no abuse condition is

$$w_b + s(h_a + h_b) + \delta(w_b + sh_b) < F + \left[f + w_b + s\left(\frac{h_a + h_b + e}{2}\right)(1+\delta)\right]$$

yielding

$$\delta > \frac{s(h_a + h_b - e) - 2F - 2f}{2f + s(h_a - h_b + e)}.$$

Hence we conclude that, even in the two-period game, steeper pay for performance schemes are neutral in the absence of relational goods, while they reduce the parametric space of cooperation in the presence of relational goods.

5.2 Firms with a vertical hierarchical structure

Promotions are another basic mechanism which increases employees' wages and create monetary rewards for their performance.[16] Let us consider in our case a basic tournament promotion system, in which the two players are at the same hierarchy level and the best performer in the corporate trust game gets the promotion. We also conveniently assume that, when the (*s, na*) equilibrium applies, the winner is randomly selected and each of the two players has a 50 per cent chance of getting the promotion.

It is trivial to check that, with the introduction of such a tournament promotion system in the corporate trust game, the no abuse condition never applies. If the trustor (player A) decides not to share his information, the payoff set is: $\{w_a + (PR|h_a > h_b, 0|h_a < h_b),\ w_b + (PR|h_a < h_b, 0|h_a > h_b),\ Max[h_a, h_b] - w_a - w_b - PR\}$ where *PR* is the promotion wage premium.

If the trustor decides to share, we have to consider the (*s, a*) and (*s, na*) pairs of strategies. In the first case, the payoff set is: $\{w_a, w_b + PR, h_a + h_b - w_a - w_b - PR\}$ while, in the second case, the payoff set is

$$\left\{w_a + \frac{PR}{2}, w_b + \frac{PR}{2}, h_a + h_b + e - w_a - w_b - PR\right\}.$$

Hence, the no abuse condition is $w_b + \frac{PR}{2} > w_b + PR$ and can never hold. As a consequence, when $h_a > h_b$, the (*ns, .*) is the unique equilibrium of the game, while, when $h_a < h_b$, the trustor is indifferent between sharing or not and we have the two equilibria (*ns, .*) and (*s, a*).

Quite interestingly, in this case, the presence of relational goods may partially mitigate this result. The payoff set will be (respectively for the trustor, the trustee and for the firm):

$$\{F + w_a + (PR|h_a > h_b, 0|h_b > h_a),\ F + w_b + (PR|h_a < h_b, 0|h_a > h_b),$$
$$Max[h_a, h_b] - w_a - w_b - PR\}.$$

If the trustor decides to share the idea, the payoff set is

$$\{w_a, w_b + PR, h_a + h_b - w_a - w_b - PR\} \text{ or}$$

$$\left\{w_a + \frac{PR}{2} + F + f, w_b + \frac{PR}{2} + F + f, h_a + h_b - w_a - w_b - PR\right\}$$

under the (*s*, *a*) and (*s*, *na*) pairs of strategies respectively.

Hence, the no abuse condition is $F + f > \frac{PR}{2}$, and may now be respected in presence of a high stock or flow of relational goods.

6 Conclusions

Corporate social responsibility is not a free lunch. The debate around corporate social responsibility and corporate performance generally evidences a trade-off between on the one hand a higher degree of care for stakeholders other than shareholders and the economic performance of the firm, on the other hand the other the economic performance of the firm. In this chapter we show that this is not always the case by devising a possible virtuous circle between a specific type of corporate social responsibility (care for worker relationship) and performance. If we consider that the main feature of modern corporations is that most productive activities take the form of corporate trust games (that is, complex activities requiring the sequential interaction of workers with no overlapping skills) we find that the quality of relationships among workers may be crucial to avoid paradoxical 'third-best' outcomes and that individual pay for performance schemes or tournament structures may have counterintuitive effects. Hence, if the costs of investing in the quality of workers' relationships are lower than the output gains arising when passing from third-best to first-best productive solutions, a corporate social responsibility policy in this direction may identify a virtuous circle between social responsibility and efficiency. The assumptions and conclusions of our chapter are grounded on the observed empirical reality. The existence of relational preferences for co-workers is demonstrated by empirical evidence, while results of our model help to explain the puzzles of the lower than expected application of pay for performance schemes and the recent propensity of modern corporations to hire teams and to invest in the improvement of the working environment.

Finally, since under the different versions of the model we reasonably find that cooperative solutions become slightly easier in the case of repeated games, corporate trust games identify a novel limit for corporate turnover policies which consists of the reduction of the opportunities for developing relational goods and enforcing trust among workers.

Appendix

The relevance of relational goods in the workplace

In Becchetti et al. (2006), a sample of 82 countries from the World Value Survey has been selected and the following log it model has been estimated to evaluate the impact of different determinants of self declared happiness:[17]

$$\begin{aligned} Happy_i = {} & \alpha_0 + \alpha_1 Eqincome + \alpha_2 Eqincome^2 + \alpha_3 Male \\ & + \alpha_4 Mideduc + \alpha_5 Upeduc + \alpha_6 Age + \alpha_7 Age^2 \\ & + \alpha_8 Unempl + \alpha_9 Selfempl + \Sigma_{k=1}^{K} \vartheta_k Timeforrel_k \\ & + \Sigma_{j=1}^{J} \gamma Drelincome_j + \Sigma_i^I \varphi Marstatus_i \\ & \Sigma_{l=1} \delta_l Dcountry_l \end{aligned}$$

The dependent variable (*Happy*) is built on the answers to the following question – *All considered, you would say that you are: (i) very happy; (ii) pretty happy; (iii) not too happy; (iv) not happy at all* – by giving descending values (from 3 to zero) to answers (*i*) to (*iv*).

Eqincome is a continuous measure of (income class median) income expressed in year 2000 US dollar purchasing power parities, *Male* is a dummy which takes the value of one for men and zero otherwise. To measure the impact of education two dummies are included for individuals with high school diploma (*Mideduc*) and with university degree (*Upeduc*). *Age* is the respondent age (introduced in levels and in squares) to take into account nonlinearities in its relationship with happiness (see, among others, Alesina et al., 2001 and Frey and Stutzer, 2000). The professional status is measured by two different job condition variables, *Unempl* and *Selfempl*, recording unemployed and self-employed individuals respectively.

Timeforrel is a vector including a series of variables measuring the time spent: (*i*) with friends (*timefriends*); (*ii*) with working colleagues outside the workplace (*timejobfriends*); (*iii*) with the family (*timefamily*); (*iv*) in the worship place (parish, mosque, synagogue) with friends sharing the same religious confession (*timerelig*); (*v*) in clubs or volunteering (sport, culture, etc.) association (*timesportfriend*). For each of these questions the answers can be: (*i*) every week; (*ii*) once or twice a month; (*iii*) a few times per year; (*iv*) never. The difference among intensity modes is not continuous and we rank each of the answers on a scale with values which are increasing in the time spent for relationship (i.e., 3 if the answer is every week and 0 if it is never).[18] The relative income effect is calculated by introducing nine dummies (*Drelincome*) measuring individual position in the relevant domestic income decile. The four marital status (*Marstatus*) variables (*Single*, *Married*, *Divorced* and *Separated*) are all dummies taking the value of one if the individual has the given status and zero otherwise. Country dummies are also included.

The results (Table A13.1) show a positive and significant relationship between relational time spent with colleagues at work and individual happiness in the subsample of male, European Union and high-income OECD countries.

Table A13.1 The effect of relational time on happiness

Dependent Variable: Happiness	*Male*	*Female*	*Hi-oecd*	*NoHi-oecd*	*European Union*
Timefriends	0.052**	*0.053***	0.162**	0.042**	0.056
	[0.023]	*[0.021]*	*[0.048]*	*[0.016]*	*[0.113]*
Timejobfriends	0.047**	–0.009	0.07**	0.013	0.169**
	[0.016]	*[0.016]*	*[0.032]*	*[0.012]*	*[0.077]*
Timefamily	0.055**	0.055	0.08**	0.051**	0.055
	[0.022]	*[0.022]*	*[0.039]*	*[0.017]*	*[0.113]*
Timerelig	0.138**	0.113**	0.155**	0.107**	0.135
	[0.017]	*[0.016]*	*[0.031]*	*[0.012]*	*[0.078]*
Timesportfriends	0.065**	0.058	0.088**	0.057**	0.14
	[0.017]	*[0.019]*	*[0.03]*	*[0.014]*	*[0.078]*

Notes

1. Thompson and Wallace (1996) conclude that team working has currently emerged as a central focus of redesigning production, due to the development of lean production and other forms of work organization under advanced manufacturing. Katz and Rosenberg (2004) emphasize that 'the productivity of an organization crucially depends on cooperation between workers' and underline the importance of altruistic and cooperative attributes in workers. This point of view is largely agreed in the organizational theory (see, among others, Smith et al. (1983), Organ (1988), Organ and Ryan (1995), McNeely and Meglino (1994), Penner et al. (1997) and Podsakoff and Mackenzie (1993).
2. Empirical evidence documents that, in 1988, 20 per cent of the US labour force (22 million employees) participated in over 400,000 workplace profit-sharing plans. Lawler (1971, p. 158) quotes six different works on the relationship between pay and performance, and finds that 'their evidence indicates that pay is not very closely related to performance in many organizations that claim to have merit increase salary systems. The studies suggest that many business organizations do not gain additional profit tying pay to performance. This conclusion is rather surprising in light of many companies' very frequent claims that their pay systems are based on merit.'
3. Regarding this point, a good example is an original initiative of one of the biggest Italian banks, Mediobanca, that finances weekend skiing holidays for its managers with the motivation that it 'makes the business more fluid'. In the US, the NRG Systems, a global manufacturer of wind measuring systems, received the 2004 Psychologically Healthy Workplace Award for small businesses from the Vermont Psychological Association (VPA) thanks to their overall workforce practices and benefits and the emphasis they have placed on creating a healthy workplace.

4. Note that in the paper we define as *cooperative solution* the equilibrium given by the share–not abuse pair of strategies (see Figure 13.1) and as *non-cooperative solutions* the two equilibria which do not imply the joint work of the two players. Hence, the term cooperative is not referred to the structure of the game (or to the coordination/non coordination of players decisions) but to the characteristics of its equilibrium.
5. The employment relationship may be characterized by complete or incomplete contracts. Under complete contracts, a cooperative job attitude would be superfluous because all relevant actions would be described and enforceable, while, under incomplete contracts, workers have a high degree of discretion over effort levels since no explicit performance incentives are defined. In this case reciprocity can be very important in the labour process since, if a substantial fraction of the work force is motivated by reciprocity considerations, employers can affect the degree of cooperation by varying the generosity of the compensation package.
6. Adam Smith (1759), in his publication 'The Theory of Moral Sentiments', may be considered one of the finest forerunners of this theory with his concept of 'fellow feelings'. His argument is that relational happiness increases in: (i) the amount of time and experiences that two individuals have lived together and have shared in the past; and (ii) their common consent, with the former significantly affecting the latter.
7. The rationales for a positive effect of the interaction are mainly two. First, part of productive skills may be acquired only by integrating experiences of different people. This is exactly the story of the wise man and the blind, where the blind asks the wise man what is an elephant. The wise man proposes them to go, touch it and report to each other. Every blind man comes back with a specific and unique knowledge of the elephant. When the different experiences are shared, the group of the blind comes up with a clearer idea of what is an elephant. The second rationale is that the super additive component may stem from the interaction, even though not directly by what learned from the other. As it is well known individuals clarify to themselves what they know about an issue in their effort of explaining it to others, often discovering and overcoming in this way inconsistencies and limits in their own concepts and reasoning.
8. The reasonable assumption is that, when the trustee abuses, he decides to do so before the cooperation between the two players starts. Therefore, $e = 0$.
9. Two intuitions stemming from this result are that: (i) non-cooperation will be more likely to occur when the trustor has higher skills; (ii) the cooperative solution is more likely to occur when the two players' stand alone contributions are small with respect to the output they can generate by dealing together with some issue (i.e. the task has complex rules that can be interpreted only by combining players' skills).
10. Note that if we would introduce some forms of inequity aversion of the type documented in experimental games and modelled by Fehr and Schmidt (1999) the trustor would strictly prefer the (*ns*, .) solution as it would get a disutility increasing in the difference between the trustee and his output. In that case only the third best output would apply.
11. The implicit assumption here is that the trustee decision to abuse completely depletes the stock of accumulated relational goods, while the trustor decision not to share neither affects the stock nor it creates a new relational good. Under our assumptions, in presence of relational goods, the trustor will not be indifferent anymore between sharing or not when $h_a < h_b$ and the no abuse condition is not met since, by sharing, he will "induce into temptation" the counterpart with the risk of loosing the accumulated stock of relational goods. Hence, if $F > 0$ and $h_a < h_b$, the (*ns*, .) is the only SPNE. In this case the introduction of relational goods may have negative effects since

the 'third-best' output is the only solution while, without relational goods, the two possibilities of a second best and third best output were equally available.

12. Consider that higher values of δ can also be viewed as a measure of the reduced distance between two consecutive stages of the game.
13. Remember that, also in this case, when the no abuse condition is not met, player A is still indifferent on whether to share or not and may still decide to share. We therefore have two SPNE, *(ns, .)* and *(s, a)*, both yielding suboptimal output for the firm. The output loss is respectively $(h_a + e)(1 + \delta)$ and $e(1 + \delta)$ under the assumption that player A reiterates the same strategy in the two periods.
14. This is because, under imperfect information on counterpart's skills, each player always attaches a non zero probability to the fact that his skills may be superior to those of the other player.
15. Note that, with $s = 1$ and $\delta = 0$, we get back to the no abuse condition of the full information single period game, while, with $s = 0$ and $\delta = 0$, to a single period fixed wage model.
16. The existing literature provides an extensive discussion of pros and cons of promotion-based incentives. Baker, Jensen and Murphy (1998) underline that promotion-based incentives: (i) do not work properly after promotion of a young employee with a long expected horizon in the job since this kind of promotions decrease the probability of future promotion and the incentive to work hard for co-workers; (ii) are reduced for employees that already obtained it; (iii) are absent for employees that fall short of the promotion standard; *iv*) generate problems in slowly growing or shrinking firms.
17. Reliability of self-declared happiness data is supported by Alesina et al. (2001) when they recall that psychologists extensively use these data. Alesina et al. (2001) also observe that there exists a well documented evidence of a positive correlation between self declared happiness and healthy physical reactions such as smiling attitudes (Pavot, 1991; Ekman et al., 1990), heart rate and blood pressure responses to stress (Shedler, Mayman and Manis, 1993), electroencephalogram measures of parefrontal brain activity (Sutton and Davidson, 1997) and of a negative correlation between the same variable and the attitude to commit suicide (Koivumaa-Honkanen et al., 2001).
18. By looking at the relationship between our indicator and the likely number of times per month spent in relationship which can be inferred from sample answers we figure out that our scale risks to flatten the actual frequency of the time spent in relationship. A robustness check in which we attribute an approximate per month frequency and use the value of 4, 1.5 and 0.3 for the 'every week', 'once or twice in a month' and 'a few times per year' answers respectively, shows that our findings are substantially unaltered. Results are available upon request.

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14

Effects of Different Stakeholder Groups' Strategic Control on Organizational Effectiveness and Well-Being of Customers and Employees: An Empirical Investigation*

Avner Ben-Ner and Ting Ren

1 Introduction

The allocation of strategic decision-making authority in an organization has both efficiency and distributional effects. Effective allocation takes into account the availability of information and knowledge relevant to decision-making in different areas, and is supported by adequate incentives for decision-makers. Irrespective of how and why they obtained their decision-making roles, those with decision-making power will likely seek to affect outcomes in favor of their objectives, which includes their own well-being or that of groups or goals they favor.

This chapter examines the effects of participation in decision-making on strategic matters by different groups of stakeholders – employees, executives, community representatives, owners and customers – on organizational efficiency and the well-being of two key stakeholder groups, customers and employees. This is the first study to examine the impact of decision-making by various stakeholder groups on such outcomes. We focus on a narrowly defined industry, nursing homes for the elderly, in a single state in the US, Minnesota, in order to minimize unobserved heterogeneity in industry characteristics, legal, cultural and social influences and geographic conditions, and in order to be able to study for-profit, nonprofit and government organizations that operate side by side in the same industry and market. The nursing homes industry is particularly interesting because customers – elderly residents – are frail and

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