

Networks, Trust and Institutional Complementarities

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Il paper fornisce un contributo alla definizione delle condizioni endogene capaci di indurre comportamenti cooperativi e fiducia in un modello Principale-Agente con selezione avversa. Diversamente dalla letteratura standard, il paper mostra come il Principale possa attivamente indurre la fiducia e la cooperazione da parte dell'Agente. Si assume che l'utilità dell'Agente dipende anche dall'auto-stima. Pertanto quando il Principale offre un "dono" o trasferimento monetario di grandezza adeguata l'utilità dell'Agente può diminuire in caso di non reciprocità da parte sua. Il contratto ottimo in presenza di fiducia, così individuato, viene comparato con soluzioni alternative e viene sottolineato il ruolo delle istituzioni complementari. [JEL code: D82, M52, Z13].

This paper provides a contribution to the definition of endogenous conditions that induce cooperative behaviour and trust in a Principal-Agent model with adverse selection. Differently from the standard literature, the paper shows that the Principal can actively generate trust and cooperation by the Agent. It is assumed that the latter's utility function includes self-esteem among its variables. Therefore when the Principal pays a gift or a monetary transfer of adequate magnitude, failure to reciprocate generates disutility to the Agent. The optimal contract with trust, thus defined, is compared with alternative solution and the role of complementary institutions is stressed.

1. - Introduction

Trust keeps markets and organisations in motion. Numerous authors have expressed this conviction at various times and in dif-

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ferent contexts. Recently, the idea has been gaining currency that trust is a more efficient mechanism for governing transactions than contracts, since costs associated with the latter are dispensed with. On these grounds theories have also been put forward to explain the popularity of flat organisational models, with increasingly decentralised decision-making processes and fewer management layers. This popularity could be used as conclusive evidence to the greater use of trust to regulate transactions.

Often these statements are made without reference to an appropriate analytical context in which trust is precisely defined, its peculiarities as a means of governing transactions are clearly outlined and, above all, the costs related to it are examined, so that they can be compared with those generated by a contract with penalties.

This paper intends to contribute to the definition of such an analytical context, starting from the assumption that agents are rational. In order to do so, distinctions will be drawn between trust and co-operation and between trust conditions exogenous and endogenous to transactions. Finally, the costs of endogenous trust are determined and compared with those related to formal contracts with penalties. To this end, a principal-agent model with adverse selection is presented, which will make it possible to perform such a comparison in a rigorous way.

Our analysis will emphasise the role institutions play in tilting the balance toward trust as opposed to contracts, showing how broad the range of factors that may lead decision-makers to adopt the former instead of the latter can be. Furthermore, the factors determining the benefits of the two solutions in the various markets are identified. In particular, we consider the case of the Internet and virtual markets.

2. - Trust and Co-Operation

Trust has long been attracting the attention of social science scholars and, in particular, economists. However, despite the numerous theoretical, empirical and experimental studies, and some

unquestionable progress in the field, there is still no general consensus on a sufficiently clear and precise definition of trust .

In the analysis carried out by economists trust is intertwined with co-operation. In fact, a certain degree of trust is assumed when co-operative behaviour is observed (Hardin, 2003, p. 80). In particular, trust is assigned the role of overcoming the failures of co-operation determined by individual rationality in situations such as that of a prisoner's dilemma. There is no doubt that trust must be examined in relation to co-operation, especially in presence of the assumption that players behave rationally. Nevertheless, the two phenomena must be kept separated. In fact, there can be both co-operation without trust (for example with complete or self-enforcing contracts) and trust without co-operation (when one of the players performs an act of trust to which the other player responds with an opportunistic action).

In a context of rational analysis the problem, in its simplest formulation, is as follows. In the initial situation individual *A* considers the possibility of co-operating with individual *B*. If the latter decides to co-operate, *A* will obtain more than what he would receive in the best alternative to co-operation with *B*. If, on the other hand, *B* decides not to co-operate, *A* would suffer such a loss that non-co-operation would be the best course of action for him.

In the classic trust games (Kreps 1990) - and, more generally, in situations such as that of a prisoner's dilemma - *B*'s payoffs are such that he certainly stands to gain if he does not co-operate. *A*, being fully aware of this, will in turn decide not to co-operate. The effect is the loss of the gains from co-operation for both. The result appears inevitable and trivial. The opposite outcome is equally inevitable and trivial when *B* is aware of the gains deriving from co-operation. In both cases the solution to the problem lies in the definition of the payoffs and there is no room for trust.

In the literature on co-operation the question has been dealt with essentially to illustrate how various factors can, in fact, alter the payoffs of the initial situation. These payoffs should, therefore, be regarded not as overall indicators of the utility of players

but, essentially, as immediate monetary remunerations which, together with other variables to be specified each time, help to define advantages and, consequently, behaviour. In general, payoffs change either due to the characteristics of the transaction (in particular the frequency with which it is repeated over time and the possibility of exogenous punishments), or due to the social context in which such transaction takes place, or to the players' particular moral propensities. The common denominator of these different assumptions is their exogenous character with respect to the players' strategies. More specifically, going back to our example, none of these solutions presupposes or implies active behaviour by *A* to generate *B*'s cooperation. Our analysis of trust places great emphasis on the distinction between exogenous and endogenous solutions to the problem of co-operation.

3. - Exogenous Co-Operation and Trust

Referring back to the mentioned classification, we examine how the characteristics of the transaction can foster co-operation. The first significant factor is the presence of exogenous punishments which are automatically applied in case of non-co-operative behaviour. This situation is typical of complete contracts. In particular, behaviour has to be observable by the players and verifiable by a third party. It is precisely the remote character of this assumption that makes contractual incompleteness a rather more frequent hypothesis in literature.

Another important characteristic of the transaction which can foster co-operation is its "infinite" repetition through the creation of reputation capital. To this end, possible outcomes of co-operation as expressed by the folk theorem are well established. The infinite repetition of the game and assumptions on the strategies of the players mean that the payoffs associated with the various decisions are different from those in the initial situation and, under certain conditions, such as to render co-operation beneficial for player *B*.

The social context in which the transactions take place — whi-

ch determines their social embeddedness — can facilitate co-operation. According to many authors¹, the presence of social relationships can significantly alter the way effective payoffs are perceived by the players. In particular, non-co-operative behaviour can lead to a reduction of utility in the form of implicit punishment or exclusion from related “social games”. More generally, non-co-operation can imply a loss of the benefits accruing to the individual as a result of her being part of a community and which are different from those that give rise to the reputation established in repeated games. There is a tendency to believe that these benefits are always such as to encourage co-operation but closer scrutiny, such as that in the case of transactions repeated an infinite number of times, does not bear that out.

Finally, moral characteristics can foster co-operation if they lead individuals to identify non-co-operative behaviour with direct disutility. The mechanism at work in these cases is the presence of moral costs or a loss of self-esteem which prompts individuals to co-operate, especially when there is reciprocity with a counterparty. Reciprocity does not imply in itself social ties or repeated transactions. In fact, it seems to be generated by the counterparty’s trust, therefore a phenomenon which has already happened and not merely anticipated. Numerous tests seem to support the theory that this type of trust is not an infrequent behaviour, even in case of actual trust games which neither call for repetition nor consider social ties among the players (Camerer, 2003, ch. 2.7, Heinrich *et Al.* 2001).

These phenomena are all significant and make it possible to investigate co-operation in more structured contexts — especially with regard to the players’ motivations — compared with more traditional economic analysis. It would be wrong, however, to think that the simple observation of one or more of these phenomena would yield sufficient clues to solve the problem of co-operation. If the players are rational — or, at least, reasonable — these elements must be carefully assessed in terms of their ability to alter advantages and behaviour, in any given situation. This does

¹ Among many others see recent contributions by AOKI M. (2001) and CAMERER C.F. (2003)

not usually happen, though there are notable exceptions such as in the case of repeated games.

It is also necessary to ask what the role can be for a rational analysis of trust in relation to each of the indicated mechanisms. Apparently trust can come into play only to fill possible residual uncertainties. For example, individual *A* may not be sure that individual *B* is inclined to reciprocity and, therefore, performs an act of trust in assuming that he is. This way of interpreting trust appears of little interest and tends to be confused with the attitude towards risk and uncertainty. On the other hand, trusting behaviour may not lead to a co-operative solution and in this case, as previously mentioned, we would have trust which does not result in co-operation.

4. - Endogenous trust and contracts

In order to provide a different answer to these problems it is necessary to endogenise trust. To do this we must assume that *B* has a definite propensity to reciprocity (i.e., he regards non-co-operation as counterproductive, given *A*'s commitment with him) and *A* can use this characteristic in a strategic way. To this end, the crucial assumption is that *A* has to bear a cost whose magnitude might discourage him from resorting to what we call the strategy of trust. This strategy then is rational, makes the counterparty's co-operation endogenous, and has a cost, which has to be compared with that of possible alternatives.

The idea that, to prompt co-operation, it is necessary to bear a cost is not new. We will consider two references, among others. The first is the well-known work by Arrow on the role of gifts in labour contracts (Akerlof, 1982). Offering better conditions than those prevailing in the market can encourage co-operative behaviour through mechanisms which are not different from those related to moral costs or to self-esteem, which feeds on the desire not to disappoint the risky and generous behaviour of the counterparty.

The other reference is the work by Geanakoplos *et Al.* (1989)

on psychological games to examine emotions in a context of rationality. According to this formulation each player would gain utility from positively surprising the other player, adopting a strategy which allows the latter to get a better payoff than expected. Though not identical, this mechanism is certainly compatible with reciprocity and, while it involves a cost for the first player, it can increase the latter's co-operation.

The most appropriate context for the analysis of the problem seems to be that of a Principal-Agent relation. The preference for reciprocity by the agent makes it rational for the Principal to bear costs that can transform that preference into an effective co-operative behaviour. Unlike the prevalent formulation, the propensity to reciprocity does not automatically ensure co-operative behaviour. The agent's co-operation depends also on other elements, which have a bearing on the cost the principal has to incur to induce the Agent to co-operate. In this sense, trust which creates co-operation is costly and endogenous.

Trust is often set against contracts (Dasgupta, 1988; Kreps, 1990). The approach we are following is consistent with this dualism, nevertheless it is necessary to distinguish between complete and incomplete contracts. As we have already pointed out, a complete contract does not pose any problem for the parties and co-operation can occur at no cost for the principal. In the event of incompleteness — in particular when third parties cannot verify the agent's behaviour² — the principal has to bear, instead, significant transaction costs, especially in relation to the drafting of the contract and the provision for effective enforcement mechanisms to prevent the Agent from engaging in opportunistic behaviour.

It is exactly because it makes it possible to reduce costs that trust is frequently considered an advantageous alternative (Dore, 1993; Pelligra, 2002). This assertion seems to rest on the assumption that trust does not have a cost, at least for the parties

² Contractual incompleteness does not derive from the information asymmetry between principal and agent, "incompleteness emerges because there are states of the world, quality and actions which are 'observable' (by the contractual parties) but 'not verifiable' (by third part subjects)" (HART O., 1987). See also HART O. - MOORE J. (1999).

involved. However, this article suggests a different approach. The concept of endogenous trust, as discussed above, shows that also transactions that rely on trust are costly for the principal.

Therefore it is not enough for the principal to refrain from resorting to an enforceable contract to secure co-operation. This assumption characterises the so-called crowding in approaches, whereby the less players are constrained by contracts and penalties the more they co-operate (Frey, 1997).

The apparent weakness of this mechanism, especially if applied on a large scale, further justifies the assumption that trust does have a cost. This makes it necessary to explore the problem of choosing between contracts and trust as alternative ways of inducing co-operation, the first characterised by penalties, the second by the absence of formal enforcement mechanisms and safeguards for the principal.

This type of analysis allows us to better assess the meaning and the validity of a well-known (and very sceptical) statement by Williamson on trust: "trust is a redundant and misleading term to describe commercial exchange for which cost effective safe-guards have been devised in support of more efficient exchange» (Williamson, 1993).

5. - Trust Versus Contracts: A Model of Adverse Selection

In order to compare trust and contracts, we have adopted a principal-agent model in which the information asymmetry that penalises the principal concerns the productivity of the agent. This can be high or low (efficient or inefficient agent), giving rise to low or high marginal costs, respectively.

Let θ_H be the constant marginal cost of the efficient agent and θ_L the constant marginal cost of the inefficient agent. Since the principal cannot observe θ , she can equalise the marginal value of each agent's production, $S'(q)$, to its marginal cost.

If she were to offer a contract calling for different compensation levels on the basis of the quantity produced and equal to the respective marginal benefits, the efficient agent could simula-

te being inefficient (producing less) with a view to pocketing a rent. This rent, called information rent, is equal to the difference between the two marginal costs at the “low” production levels, that is to say: $\Delta\theta q_L$. Given these conditions, it is therefore impossible to enter into a first best contract.

Thus, the principal has to establish compensation levels by disregarding the equality between marginal benefit and marginal cost, or she has to define incentive and punishment mechanisms. In both cases she has to bear an additional cost with respect to the first best solution and, consequently, she will choose the less costly solution. We will call this additional cost of the contract CC . Let us briefly review these solutions within the framework of the Laffont-Martimort model (2002).

The problem of the principal is that of maximising profit, that is the difference between the value of production and the associated costs. Profit is assumed to be a linear function of the quantity produced q .

Let: $S(q_H)$ and $S(q_L)$ be the value of production obtained with the efficient and inefficient agents;

t_H and t_L the transfer to the efficient and inefficient agents;

θ_H and θ_L the marginal cost of the efficient and inefficient agents;

$\Delta\theta$ the information rent;

$\Delta\theta q_L$ the value of the information rent;

v and $(1-v)$ the probability to come across an efficient or inefficient agent, respectively;

s_L the probability of discovering the inefficient agent's deception;

$c(s_L)$ the cost of auditing the inefficient agent;

P_H and P_L the amount of the endogenous punishment for the efficient and inefficient agents.

The problem of maximization linked to the principal's profit, in a context of information asymmetry and adverse selection, can be written as follows:

$$(1) \quad \max_{\{q_L, q_H\}} \left\{ v \left[S(q_H) - \theta_H q_H \right] + \left\{ (1-v) \left[S(q_L) - \theta_L q_L \right] \right\} - v \Delta\theta q_L \right.$$

so that:

$$(2) \quad t_H - \theta_H q_H \geq t_L - \theta_H q_L$$

$$(3) \quad t_L - \theta_L q_L \geq t_H - \theta_L q_H$$

$$(4) \quad U_H \geq 0$$

$$(5) \quad U_L \geq 0$$

The solution calls for:

a) same production as first-best for the efficient agent; *b)* a reduction with respect to first-best production for the inefficient agent, with:

$$S'(q_L) = \theta_L + \frac{v}{1-v} \Delta\theta = CC$$

Other things being equal, in the case of an audit mechanism with an endogenous punishment (P), the problem of the principal can be written as follows:

$$(6) \quad \max_{\{q_L, q_H, P_H, P_L\}} \left\{ v \left[S(q_H) - \theta_H q_H - \Delta\theta q_L + s_L P_H \right] + \right. \\ \left. + \left\{ (1-v) \left[S(q_L) - \theta_L q_L - c(s_L) \right] \right\} \right\}$$

such that:

$$(7) \quad P_H \leq \Delta\theta q_L$$

In this case the solution calls for: *c)* same production as first-best for the efficient agent; *d)* a reduction with respect to first-best production for the inefficient agent, with:

$$S'(q_L^S) = \theta + \frac{v}{1-v} (1-s_L) \Delta\theta$$

e) only the inefficient agent is monitored with a strictly positive probability.

It can be seen that the loss of efficiency for the principal is lower in the case of auditing with punishment, since we still get the following:

$$(8) \quad S'(q_L) = \theta_L + \frac{v}{1-v} \Delta\theta = CC \quad S'(q_L^S) = \theta_L + \frac{v}{1-v} (1 - s_L) \Delta\theta$$

Now let us investigate the possibility of resorting to endogenous trust in order to induce the agent to refrain from attempting to obtain information rent, i.e. adopting co-operative behaviour.

It is in the principal's interest to induce reciprocal behaviour of this sort by the agent, if this determines lower costs than those he would bear with a contract. On the other hand, the agent will choose to co-operate only if the utility she derives from it is at least equal to what she would get by complying with the best alternative contract, which in our case is one with monitoring and punishments.

The key assumption is that the agents' utility (in particular, in our model, that of the efficient agent, who is potentially tempted by opportunism) depends on a variable called self-esteem. More specifically, the agent has a utility function which depends on the monetary transfers (t) from the principal, on a cost variable (I), which includes the effort she makes, and on an endogenous variable, i.e. self-esteem (A).

In turn, self-esteem depends to a great extent on the gift which the agent receives from the principal — the gift can be defined as the excess of the remuneration over the reservation price of quality, that is to say with respect to the minimum which would induce the agent to offer that quality. The assumption is that, as the gift gets larger, the high productivity agent will suffer a loss of self-esteem, if she refrains from making an adequate effort.

Thus, both the compensation and the level of productivity can influence the utility of the agent through both the direct and traditional method and the indirect method of acting on self-esteem.

On the basis of these assumptions we can define precisely the

characteristics and the costs of a transaction based on trust. The problem is whether they are lower than those of a contract with penalties.

$$\text{In formal terms: } U = U(t, I, A)$$

$$\text{with: } I = I(q, \theta)$$

$$A = A(I, G)$$

It is assumed that the utility function with respect to the self-esteem variable behaves as follows:

$$U_A > 0 \text{ for } A < A^*$$

$$U_A < 0 \text{ for } A > A^*$$

such that:

$$\begin{aligned} I^* &= \left\{ I \in I \mid A(I, G) = \arg \max_I A(I, \cdot) \right\} \text{ and } G^* = \\ &= \left\{ G \in G \mid A(I, G) = \arg \max_G A(I, \cdot) \right\} \end{aligned}$$

$$\text{If } I^* < G^* \text{ then, } U(A(I^*, G)) > U(A(I, G^*))$$

$$\text{for } U = a + bA \forall a \geq 0, b > 0$$

The principal has to consider the payment of a *gift* (G) to Agents inclined to reciprocate and therefore has to anticipate bearing an incentive cost equal to G_H and G_L for the gifts made to efficient or inefficient agents, respectively.

Her problem can be written thus:

$$\begin{aligned} (9) \quad & \max_{\{U_L, q_L, U_H, q_H, G_H, G_L\}} \left\{ v \left[S(q_H) - \theta_H q_H - U_H \right] \right\} + \\ & + \left\{ (1 - v) \left[S(q_L) - \theta_L q_L - U_L \right] \right\} \end{aligned}$$

such that:

$$(10) \quad U_H = t_H - \theta_H q_H \geq t_L - \theta_H q_L - a_H \Delta \theta q_L$$

$$(11) \quad U_L = t_L - \theta_L q_L \geq t_H - \theta_L q_H - a_L \Delta \theta q_L$$

$$(12) \quad G_H \leq t_H - \theta_H q_H$$

$$(13) \quad G_L \leq t_L - \theta_L q_L$$

$$(14) \quad U_H \geq 0$$

$$(15) \quad U_L \geq 0$$

The first two constraints represent the incentive constraints for the high and low productivity agents, respectively. The last two constraints are participation constraints, while the two intermediate constraints define the condition of non-negative gift for the two agents.

Let $(-a_H)$, such that $-a_H \in (0,1)$ indicates the marginal propensity to disesteem for the more efficient agent who, given her efficiency, depends on the maximum rent she could gain for herself.

If (10) and (15) are both binding we get $U_H = \Delta \theta q_L - a_H \Delta \theta q_L$, and then (12) can be re-written as follows:

$$(16) \quad G_H \leq \Delta \theta q_L$$

The principal's problem becomes:

$$(17) \quad \max_{\{q_L, q_H, G_H, G_L\}} \left\{ v \left[S(q_H) - \theta_H q_H - (1 + a_H) \Delta \theta q_L \right] + \right. \\ \left. + \left\{ (1 - v) \left[S(q_L) - \theta_L q_L \right] \right\} \right\}$$

such that (16) is binding.

The optimal contract implies that: *f*) no distortion is determined with respect to the first-best solution for the efficient agent; *g*) a downwards distortion is determined with respect to the first-best solution for the less efficient agent, such that:

$$S'(q_L^A) = \theta_L + \frac{v}{1-v}(1-a_H)\Delta\theta;$$

h) only the efficient agent is awarded the gift.

The solution with trust has, naturally, second best characteristics due to the costs which it generates and which are represented by the product of the rent in terms of self-esteem for the agent multiplied (still assuming just two qualities) by the ratio of the probabilities of obtaining the two qualities. By incurring these costs the principal can maximise the expected value of her profit function and the agent satisfies the incentive and participation constraints.

Comparing the second-best solution for the less efficient agent in the case of reciprocity with the second-best solutions obtained with contracts without punishments (18) and with endogenous punishment in the event of the discovery of deception (19), it can be observed that:

$$(18) \quad S'(q_L^A) = \theta_L + \frac{v}{1-v}(1-a_H)\Delta\theta < S'(q_L) = \theta_L + \frac{v}{1-v}\Delta\theta = CC \quad \text{always,}$$

$$(19) \quad S'(q_L^A) = \theta_L + \frac{v}{1-v}(1-a_H)\Delta\theta \leq S'(q_L^S) = \theta_L + \frac{v}{1-v}(1-s_L)\Delta\theta = \text{or}$$

$$S'(q_L^A) = \theta_L + \frac{v}{1-v}(1-a_H)\Delta\theta \geq S'(q_L^S) = \theta_L + \frac{v}{1-v}(1-s_L)\Delta\theta$$

if $(1-a_H) \leq (\geq)(1-s_L)$,

Therefore trust is chosen if the necessary cost of activating the self-esteem $(1-a_H)$ of the more efficient Agent is lower (greater) than the probability $(1-s_L)$ of the loss connected to the non-punishment (exposure) of the less efficient agent in the event of fraudulent behaviour.

It worthy of note that in the contract with trust only the efficient Agent is incentivised with a gift, while in the contract with punishment only the inefficient agent is subject to monitoring with a strict positive probability.

6. - Trust, contracts and complementary institutions

As we have seen, the cost of trust — even when individuals are inclined to reciprocity — is not necessarily lower than that of a contract with penalties, thus the propensity to reciprocate is a necessary but not sufficient condition to favour trust. In general, the following are important: the extent of the propensity to reciprocate which determines what we have called the self-esteem rent necessary to induce co-operation; the factors on which the efficiency of punishments depends in the event of the contract; the factors on which the participation constraint of the agent depends and, above all, the presence of conditions which create a shared concept of what is, under any circumstance, a gift.

With respect to all these elements, the overall institutional frameworks play an important role. In particular, the experience of participating in community relations, whether past or present, determines the extent of reciprocity effects, regardless of expectations in terms of continuity of relations — and, therefore, only as a distinct cultural element. Several institutional elements may contribute to make contractual penalties more efficient and changing conditions in the job market affect participation constraints. In particular, an increase in unemployment rates and a worsening of external working conditions can modify the differential between co-operation and non-co-operation, regardless of monitoring. The mere risk that the firm may face economic difficulty as a result of non co-operative behaviour can be sufficient to foster co-operation. All this has also implications of a distributive nature. An aspect that needs to be further explored is that these changes in the labour market might have different effects on the cost of both contracts and trust.

A particularly important function by institutions might be that of contributing to determine the shared beliefs on which the possibility of recognising a gift depends. To this end, the idea of institutions proposed by Aoki (2001) is particularly interesting: institutions arise when, through complex evolutionary processes, shared beliefs are formed on some important variables.

Thus, it would be fair to say that the possible greater diffu-

sion of trusting behaviours — even though this were to be supported by observation — cannot be explained just with a greater propensity to reciprocate behaviour (i.e., in terms of our model, a greater role played by self-esteem in the agents' utility functions). It can also depend on developments which render other contractual forms less attractive, particularly greater punishment ineffectiveness, which pushes up the cost of contracts.

It is possible that this has happened in many environments as a result of the evolution of technology, of the characteristics of goods and services and also of the altered productive structure, which led firms to shrink and determined a greater decentralisation within economic systems. In virtual markets, a topic which we will dwell on in the final section, reliance on trust seems to be the necessary consequence of the high costs involved in a contract with penalties.

As Aoki (2001) recently pointed out, institutions define opportunities for people and, consequently, influence their choices in every domain in which the availability of alternatives is important. Furthermore, «an institution prevailing in one domain constitutes an institutional environment for agents in other domains, as far as those agents perceive it as exogenously given and beyond their control.....one type of institution rather than another (may become) viable in one domain when a fitting institution is present in another domain....We characterise this interdependence as institutional complementarity» (Aoki, 2001, ch. 8). Our analysis illustrates the importance of complementary institutions in the choice between trust and contracts as mechanisms for governing transactions.

7. - Trust and the Internet

The role played by trust in the functioning of organisations seems to have grown considerably, as firms increasingly adopt flat organisational models. These models are characterised by increasing decision-making decentralisation and fewer management layers, as widely documented in the literature. In many ca-

ses, this trend has been fostered by the introduction of Information and Communication Technologies (Schivardi and Trento, 2000; Brynjolfsson and Kahin, 2002).

Also for this reason network organisations, which in general make greater use of trust, seem to have won the institutional competition against the traditional model of a hierarchical productive organisation.

The arguments expounded above make it possible to place these statements in a broader context and to conclude that the dynamic route followed up to now may have been characterised by several other changes capable of reducing the relative cost of trust with respect to more complete contracts with explicit penalties. Furthermore, conditions in some markets — vis-à-vis the overall organisational framework that affects them — may be such as to create conditions which are more or less favourable to trust.

Consider virtual markets. How can trust reciprocity in these markets be conceptualised? Perhaps the shared beliefs Aoki describes did not take root in these markets and this prevents trust-based solutions from gaining ground.

Shared beliefs can be regarded also as proto-institutions in which the co-ordination mechanism is based on a very small set (*à la* Lancaster) of characteristics of the individuals who make up the community, corresponding to common and shared interests.

Nevertheless, as a result of the ease with which different electronic identities can be acquired in different community contexts, it seems a lot more difficult in the electronic marketplace to transfer reputation capital acquired in a micro-community of consumers to another context of relations or of transactions. In a less fragmented market, in which the behaviour of the individual is easily traceable to a defined identity, co-operative behaviour is encouraged by the possibility of the repetition and the continuity of relationships. In the electronic marketplace this is a much rarer condition. In terms of our model, the level of self-esteem which individuals tend to express in this context can be significantly lower, mainly because of this condition of “identity evanescence”.

The above is a condition preventing virtual agents from crea-

ting a solid reputation capital that can be transferred in different transactional systems or contexts. An interesting example of this difficulty was *Amazon.com's* attempt to allow its users to import the rating acquired on *e-Bay*, a move that was strongly contested by the latter which stated that the reputation capital of its users was proprietary (Resnick *et Al.*, 2002).

Other more universal attempts designed to guarantee the reliability of consumers (e.g. *virtualfeedback.com*), by supplying a rating service for users among different systems, seem to be a long way from reaching that critical mass of credibility required to become solid institutional mechanisms.

The electronic market is witnessing a proliferation of micro-communities founded on very restricted, specific interest clusters in which efficient proto-institutional forms have developed (the most successful example is *e-Bay*), though they can hardly be transferred to a broader context of relations and transactions.

In this institutionally unstable and fragmented environment the need for endogenous trust, which also mitigates the effect of the loss of reputation in the passage from one transactional context to another, is still very high since the effect of complementarity among institutions appears still weak.

8. - Conclusions

Various authors have drawn a comparison between trust and complete contracts. Nevertheless, the conditions which make the use of trust more beneficial for the parties (and in particular for the principal) have not been pinned down. In this paper we have presented a principal-agent model which helps to pin down such conditions.

A distinctive feature of this model is that trust — of the type we have called endogenous — generates costs (essentially represented by the payment of a gift) which have to be compared with those of contracts with endogenous enforcement mechanisms. The recognition of these costs makes the willingness of the agent to reciprocate (formally expressed by the concept of self-esteem) a

necessary but not sufficient condition to resort to trust. Furthermore, the importance of the overall institutional framework — captured above all by the notion of institutional complementarity — appears very important and this explains the differences in the contractual solutions which characterise the various markets. In particular this analysis leads to a better insight into some specificities of virtual markets.

The proposed analysis can be deepened and developed in a number of directions to understand better the role played by trust and contracts. For example, the inclusion of self-esteem in the utility function might reflect an accumulation effect (related to past good behaviour) so that reciprocity could have a decreasing marginal utility. This could explain the tendency to be less inclined to co-operation in the successive repetitions of game interactions which some authors have observed in numerous experiments (Hardin, 2003), which seems to be at variance with what is expected to happen in repeated games.

Above all, acknowledging the existence of endogenous costs for trust broadens the search for factors that can encourage the preference for a greater contractual incompleteness for reasons more important than the transaction costs of contracts, concerning which doubts have been expressed and alternatives have been suggested (Mukerji, 1998; Fehr and Gächter, 2000, Basili and Franzini, 2003).

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