Incomplete Contracts, Asset Specificity and Overinvestment

Antonio Nicita

Department of Economics,University of Siena and Italian Competition Authority

n. 249

Marzo 1999

Abstract -The paper stresses - in sharp contrast with the main contributions in the relevant literature on incomplete contracts - the strategic role of the degree of assets specificity for the enforcement of incomplete contracts. It is shown that under the assumption of endogenous outside options, (i) contractors could maintain strong incentives to make a specific over-investment; (ii) over-investment could act as an endogenous enforcement device. In a bilateral incomplete contract, the rationale for over-investment relies upon the fact that a specific over-investment could lock-in the counterpart into the relationship if it raises the exit costs of the latter by reducing her ex-post outside options. For the same reason, it is shown that a "general purpose" over-investment, could lock-in the counterpart into the relationship if it decreases the exit costs of the investor by increasing his/her ex-post outside options. When outside options are affected by the investments made, each agent tries to reach a monopolistic position by "destroying" his competitors and/or by

It is then shown that in order to achieve the enforcement of incomplete contracts, specific investments could then provide an optimal enforcement strategy, rather the failure of incomplete contracts. Under the assumption of endogenous outside options, we show that specific investments could increase or decrease counterparts' ex-post outside options, having a strong impact on their incentives to select opportunistic post-contractual behaviour.

1. Introduction

According[1] to Hart (1987) a contract is incomplete when it involves at least one of the following transactions costs: (1) the cost to each party of anticipating the various eventualities that may occur during the life of the relationship; (2) the cost of deciding , and reaching an agreement about, how to deal with such eventualities; (3) the cost of writing the contract in a sufficiently clear and unambiguous way that the terms of the contract can be enforced; and (4) the legal cost of enforcement.

When incomplete contracts involve specific assets it may be impossible to write a binding contract. Specific investments, indeed, provide a higher ex-post value in respect to the ex-ante parties' outside options only if the underlying transaction takes place. Once made, a specific investment will lock-in the investors into the contractual relationship by raising their ex-post exit costs: outside the transaction, the ex-post value of specific assets or investments will thus be lower than their best ex-ante outside options. Agents who make specific investments are then vulnerable to counterpart's post-contractual opportunism and they might require appropriate safeguards, in terms of property rights on assets and/or breach penalties to be induced to invest.

Thus, in order to align parties' incentives to maximise their expected joint rent, economic agents have to design optimal endogenous enforcement devices ("private orderings"). According to the Neo-institutional literature, incomplete contracts characterised by specific investments cause - at least for one party in a contract - the Williamsonian "fundamental transformation", for which an ex-ante competitive transaction is ex-post transformed into a monopolistic one.

However, for an incomplete contract, to lock-in the parties involved, every change affecting parties' outside options has to be not "binding" (MacLeod and Malcomson, 1993). In order to guarantee that this outcome will always occur, the ex-post division of surplus between the parties should give them a payoff greater then the one provided by their next best alternative.

[1] I am grateful for useful comments to Ugo Pagano, Maurizio Franzini, Frank Hahn, Samuel Bowles, Vincenzo Scoppa and the participants to the Siena Summer School on Economics and Evolution. Usual disclaimers apply. The opinions expressed do not reflect necessarily the point of view of the Italian Competition Authority. Financial support by Murst is gratefully acknowledged (*Progetto di interesse nazionale* "Incomplete Contracting and the Analysis of Institutions ").

In this work we argue that if the dimension of the investment to be selected by the agents could affect parties' outside options - and therefore their degree of co-specificity - at least one agent in the contract could be induced to select the investment which will affect parties' outside options, increasing the counterpart's competitors and/or reducing one's own competitors. In such a context each contractor could be induced to switch from the selection of efficient investments in the attempt to lock-in the counterpart to the contract by reducing endogenously his/her ex-post contractual power. This means that in an incomplete contract framework with specific investment, ex-post variation in parties' outside options could occur not only in response to exogenous contingencies, but also in response to agents' behaviour.

According to New Institutional economists, in an incomplete contract framework characterised by assets' specificity, the fundamental transformation acts only in one way: from a spot contract to a bilateral monopoly. There is no room, in such an approach, for the opposite "transformation" occurring from a bilateral monopoly to a spot contract. In other terms, once made – and enforced by private orderings – a bilateral monopoly will be always "protected" from any ex-post change of the parties' outside options. The new property rights school (mainly based on the "GHM approach"[2]) shares the same extreme confidence of the functioning of the enforcement devices given by the allocation of property rights on assets. The GHM approach has argued that a proper allocation of property rights on assets constitutes a sufficient condition to induce parties in a contract to make specific investments and hence to insure the enforcement of incomplete contracts. Assigning property rights on assets will induce then an efficient leve of the investments so that the technology adopted will be coherent with the initial distribution of property rights. Thus, the nature of the resources may entirely depend upon the property rights or the governance system adopted. However, we argue that the GHM approach shows three main limits.

The first one, is that it implicitly assumes that, for a given contract, any ex-post changes in the market will not have a remarkable impact on parties' outside options. In other words, any exogenous variation in parties' outside options will not be binding for their incentives to respect contractual obligation (Assumption 1: *variations of exogenous*

[2] We refer to the contributions from Grossman and Hart (1986) and Hart and Moore (1991).

outside options are never binding). A second weakness is given by the assumption that agent's skills and capabilities will not be affected by investments made in human capital. This means that the original substitutability or complementarities between agents will not change in response to the investments made by the parties, preserving the original incentive alignments from any ex-post distributional conflict (Assumption 2: *parties' outside options are not affected by the investment made*). Finally, according to the GHM approach, parties in an incomplete contract will invest in specific assets - or will increase the degree of assets specificity - only if they expect to gain the residual control right over the assets and/or residual income. It is thus assumed that a sufficient condition to induce each agent to invest in specific assets is to give him/her partial control over his/her assets, independently of the safeguards received by other agents in the contractual relationship. (Assumption 3: *safeguards received by investors are not affected by the safeguards received by their contractual counterparts*).

Assumption 1 is simply unrealistic. Exogenous shocks to the form of the market could destroy the initial agreement between agents when, for at least one of them, the outside option is binding (for example a new potential counterpart enters in the market and makes an offer). The only way to avoid any ex-post renegotiation of contractual terms, is to impose high switching penalties on the parties, as MacLeod and Malcomson (1993) have shown. Such a consequence seems to be unrealistic given the fact that legal authorities seem to be reluctant to enforce extremely onerous penalties for agents who switch to a counterpart's competitor. Exogenous variations in parties' outside options could then modify parties incentives to the contract.

Assumption 2 is controversial as well. The circumstance that the original substitutability or complementarities between agents will not be affected by the investments made implies that agents' skills and capabilities will not be affected by human capital investment. This requires, in turn, the absence of learning processes, which represent an essential characteristic of any investments in human capital. Still, if human capital investments involve agents' learning processes then their original substitutability or complementarities relationships will be inevitably affected by the investments selected. As a consequence, the original agents' heterogeneity could be destroyed and agents could substitute each other in the organization process. In other terms, when human capital investments involve learning process parties' outside options will endogenously vary in response to the

investment made. The endogenous change in parties' outside options could then destroy the initial agreement. Assumption 3 neglects that having residual control right on assets could not be a satisfying safeguard for some agents if counterparts could easily exit the relationship or if counterparts maintain a higher degree of the assets specificity. In the first case, having property rights on assets could be insufficient to enforce the contract; in the second case, if the most specific assets are possessed by counterparts, it will be efficient to give them all residual control rights (See conclusion 1 in the appendix). The main consequence of this argument is that, in order to be induced to invest in specific assets, an agent in an incomplete contract has to gain residual control rights. To gain residual control right, an agent should expect to possess the resources most specific to the relationship, otherwise, he/she may be induced not to invest at all. Therefore, for safeguards to be effective for the contractual enforcement by an agent, they do not have to be effective in absolute terms, but only with reference to the position held by the other agents in the contract. Still, in a bilateral contract, between agent *A* and agent *B*, if agent *B* is supposed to make the more specific investments respect to the ones made by agent *A*, and hence to gain residual control right over the relationship, this should polarise the choice of options open to agent A: *i)* not to invest at all; *ii)* to increase the degree of assets specificity in order to gain residual control rights.

This means that in an incomplete contract relationship one should expect two possible outcomes: a bilateral over-investment (the challenge to gain residual control rights) or a bilateral under-investment. A formal model is developed in the following sections.

2. Assumptions

Let assume a bilateral contract between a buyer *b* and a seller *s*. The joint surplus of agents *b* and *s* is given by the total amount of output S produced by the investment made by agents *b* and *s*. Agents payoffs are given by

$U_b\,(i^b, \mathbf{P}) = u_b(i^b) - p^C$, (buyer's payoff);

$U_s\,(i^s, \mathbf{P}) = u_s(i^s) + p^C$, (seller's payoff);

where $u_s(i^s)<0$ is the seller's production costs function, $u_s(i^s)=-c_s(i^s)$, $u_b(i^b)>0$ is the buyer's

utility, $u_b(i^b)=q_b(i^b)-c_b(i^b)$, where $q_b(i^b)$ is the value of the investment for the buyer and $c_b(i^b)$ represent the production costs of the buyer (pay-off is expressed in monetary terms and is transferable between *s* and *b*), with $u_j(i^j)$ strictly concave and twice differentiable; in the general case $i^j \in I$, with $I=[i^\circ, i^{\circ\circ}]$, $I \subseteq \Re^+$. It is assumed that agent made *self-investments* (MacLeod and Malcomson, 1993) and, in particular, specific investment:

specific investments $U_j(i^{j*}) > v_{j^\circ}$ for $j \in [b, s]$;

self-investments i^h does not affect $u_j(i^j)$ $\forall$ $j, h \in [b, s]$, $j \neq h$,

where v_{j° is the pay-off associated with generic investment (outside option).

Bilateral specific investments produce for the agents involved in the contract an ex-post pay-off which is greater within the contractual relationship than outside if agents ex-ante contractual power (a, 1-a) will not be modified by ex-post renegotiation of contractual terms.

We assume that agent *j* outside option is affected by the investment made by agent *h*, $\forall$ $j, h \in [b, s]$, $j \neq h$, while the investment made by agent *j* will not affect his own outside option (such assumption will be removed later). In other terms, we assume that investments made by contractual parties will affect the potential competitors of the investor. Still, $v_j = v_j(i^h)$ is concave, differentiable, bounded, monotonic and decreasing for $I=[i^\circ, i^{\circ\circ}]$, $I \subseteq \Re^+$, with *j* and $h = (s, b)$ and $j \neq h$,and

$v_{j^\circ} = v_j(i^{h^\circ}) = \text{Sup}\{v_j(i^h)\}$

$v_{j^{\circ\circ}} = v_j(i^{h^{\circ\circ}}) = \text{Inf}\{v_j(i^h)\}$,

with $v_{j^\circ} > v_{j*} > v_{j^{\circ\circ}}$, where $v_{j*}=\{v_j(i^{h*})\}$ for i^{h*}: $[ES(\sigma)]/i^h = 1$, $\forall$ $h=(b,s)$.

In the most general case the investment vector is given by $I^j=[i^\circ, i^{\circ\circ}]$, $I^j \subseteq \Re^+$. We assume that each investment level i^j differ one another and is associated with a pair of utility and counterpart outside option value $[u^j(i^j), v^h(i^j)]$. Each investment level requires the same cost given by $k>0$ monetary units $k \subset K \subseteq \Re^+$. In order to simplify our formulation, we assume

that the investment set for each agents is a three variables vector $\mathbf{i^j}$= ($i^{j\circ}$, i^{j*}, $i^{j\circ\circ}$), where $i^{j\circ}\geq 0$ is the "generic" investment selected by agents in the status quo case (market transaction outside option) with $u^j(i^{j\circ})=v^{j\circ}\geq 0$; $i^{j*}>0$ is the "specific" investment which maximises $u^j(i^j)$, with $i^j \in I_j$, j = (s,b); $i^{j\circ\circ}>0$ is the "over-investment" which minimises counterpart outside option (who becomes specific to the transaction) i.e. $i^{j\circ\circ}$: min $v^h(i^j)$, with $i^j \in I_j$, j,h = (s,b) and $j\neq h$. So we have:

$i^{j\circ}$ fi $[v^{j\circ}, v^{h\circ}]$; ∀ investment level made by h, ∀ j,h = (s,b) and $j\neq h$

i^{j*} fi $[u^{j*}, v^{h*}]$;

$i^{j\circ\circ}$ fi $[u^{j\circ\circ}, v^{h\circ\circ}]$.

The trade-off between i^{j*} *and* $i^{j\circ\circ}$ is given by

$u^{j*}>u^{j\circ\circ}$ and $v^{h*}>v^{h\circ\circ}$.

We assume for simplicity that $v^{h*}=v^{h\circ}$. The joint surplus obtainable by parties within the contract is given by

$S = \max [(u_b + u_s) - (v_b + v_s)]; 0\}$ ∀ $j, h \in [b, s], j\neq h$

or,

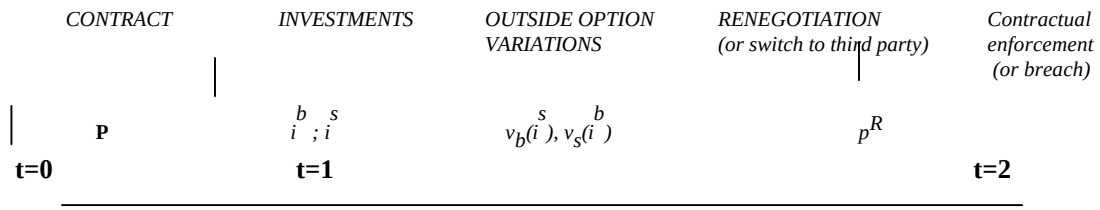
$S = \max \{[(u_j + u_h) - (v_j + v_h)] - (i^j + i^h)\}; 0\}$

and $S^*\geq S^{*\circ} > S^{\circ\circ}\geq S^\circ$, with $S^{*\circ}=S^{\circ *}$

The joint surplus S is maximised (S=S*) when both the agents in the bilateral contractual relationship select the efficient level of investment i*. Given that bilateral specific investments produce for the agents involved in the contract an ex-post pay-off which is

greater within the contractual relationship than outside, agents will be induced to select the efficient level of investment only if they will receive ex-post the expected ex-ante payoff. Rent division mechanism have to be specified at the start of the contract, because post-contractual renegotiation can modify parties contractual power so that each party – exposed to counterpart opportunism (hold-up) – could receive an ex-post payoff which is equal to his ex-post opportunity cost (which is lower than his ex-ante opportunity costs due to the specific quasi-rents generated by specific investments). Whenever renegotiation of contractual terms is possible the problem post-contractual opportunism will result in reduced incentives to select the efficient level of investments.

We assume, as in MacLeod and Malcomson (1993) that contractual parties sign a biperiodal contract **P**, in *t=0*, specifying the contractual price p^C and the switch penalty p^O. We assume therefore that given the contractual incompleteness, an external legal authority *A* can only verify in *t=2* whether contractual exchanges take place but it is not able to monitor and detect the nature of the investment made by agents. In *t=1*, investment decisions are made by parties. In *t=2* there will be (i) the enforcement of contractual obligations, (ii) the renegotiation of surplus sharing, or (iii) a breach of the contract.



We assume that there are always gains from trade, i.e. $\sup_{i \in I} - u_S(.) \leq \inf_{i \in I} u_b(.)$, and that agents *s* and *b* share perfect symmetric information.

3. Exogenous outside options with zero breach penalties

Let start by assuming that parties outside options are *not* affected by the level of investments made and that agents ex-ante contractual power ($\underline{a}$, 1-$\underline{a}$) is determined by the Nash bargaining solution (where $\underline{a}$ is the buyer's contractual power and (1-$\underline{a}$) is the seller's contractual power).

Proposition 1 - bilateral underinvestment

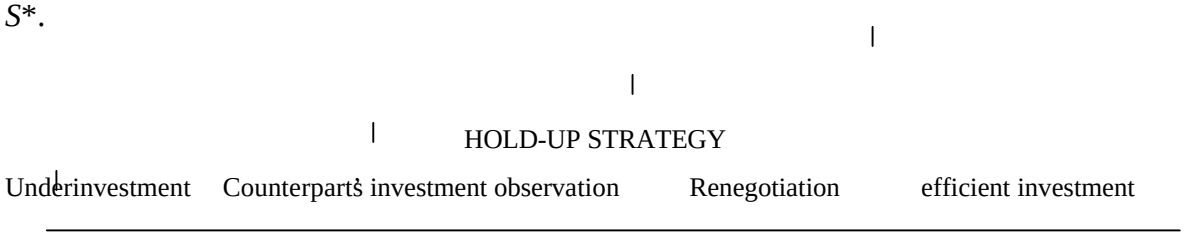
When it is not possible for agents *s* and *b* to sign a complete contract in *t=0* (and breach penalties are not enforceable ex-post, with $p°=0$), if $a > \underline{a}$ or $a < \underline{a}$, then the game in *t=1* will be characterised by a unique Nash equilibrium where both agents underinvest.

		Agent *b*
	$i_b°$,	i^*_b
$i_s°$	$v_s°$; $v_b°$ ***Status quo***	$(1-\bar{a})S^*$; $v_b°-c^*_b$ *hold-up*
Agent *s* i^*_s	$v_s°-c^*_s$; aS^*; *hold-up*	$(1-\underline{a})S^*$; $\underline{a}S^*$ *contractual enforcement*

□

Proof: straightforward calculations.

In the matrix above it is assumed that the selection of under-investment by agent *j* when the counterpart *h* made efficient investment will result in a hold-up strategy when agent *j* simply delays the selection of the efficient investment which generate the joint surplus *S**. Thus, for instance, the pay-off of the seller associated with (i_{s°, i_{b^*}) in the matrix represents the case of the seller's hold-up: the seller will delay any investment decision after having observed buyer's investments; once the buyer will be locked-in by the specific investment made, then the seller will renegotiate his participation to the contract, imposing a new surplus sharing on the counterpart and selecting then the efficient investment which generate the joint surplus *S**.



When contracts are incomplete, in order to prevent counterparts post-contractual opportunism (*hold-up*) agents are induced to underinvest in the absence of third party verifiability (ability to impose sanctions on the opportunistic behaviour). Hold-up strategies made by opportunistic agents will modify parties ex-post contractual power, extracting all the investors ex-ante contractual power. When hold-up is unavoidable, the expected ex-post payoff of the efficient investor will be determined by his best ex-post alternative outside the contract and the quasi-rent generated by specific investment will be appropriated by the opportunistic agent in the contract. In particular, in the case of seller's hold-up, the ex-post contractual power of the buyer will be given by

In this case the ex-post contractual power of the buyer is determined by his best post-contractual outside option which will be lower than the ex-ante outside option due to the irreversible costs of the specific investment. Thus, in the absence of third party verifiability

each agent in the contract will be induce to under-invest.

4. Standard efficient breach penalties and hold-up strategies

Suppose now that an external authority *A* is able to impose contractual sanctions to agents hold-up such that each investor will be compensated for the loss of specific quasi-rent. In the economic literature a breach of contract is efficient when the breaching promisor internalises the costs of his decision by compensating the promisee for losses caused by the breach.

Proposition 2 -standard efficient breach penalties

When it is possible for agents *s* and *b* to recur to an external authority *A* which is able to impose breach penalties over counterpart exit such that

(2) $p^{\circ} - c^{*}_{j} = 0$, (*standard efficient breach penalties*) with $j=(s,b)$

if

then agents will sign the contract in $t=0$ and the game in $t=1$ will be characterised by a unique Nash equilibria (bilateral underinvestment).

		Agent *b*
		I_{b}°,	i^{*}_{b}
Agent *s*	i_{s}°	v_{s}° ; v_{b}° ***status quo***	$(1-\overline{a})S^{*}-p^{\circ}$; $v_{b}^{\circ}+p^{\circ}-c^{*}_{b}$ *hold-up*
	i^{*}_{s}	$v_{s}^{\circ}+p^{\circ}-c^{*}_{s}$; $\underline{a}S^{*}-p^{\circ}$ *hold-up*	$(1-\underline{a})S^{*}$; $\underline{a}S^{*}$ *contractual enforcement*

Proof: straightforward calculations. □

In proposition 2, c^*_j represent agent *j* production costs associated with the efficient level of investment, where $c_j(i_j)=0$ if $i_S=i_S^\circ$, and $q(i_B^*)=0$ if $i_S=i_S^\circ$. We implicitly assume that when $p^\circ - c^*_j=0$ (i.e. agents impose *standard* breach penalties) agents strictly prefer to under-invest.

In the case of standard breach penalties investor are protected against counterpart post-contractual opportunism but each party in the contract is induced to delay investment decision if the standard penalty is such that hold-up strategies assign a payoff which is greater then the one associate with the efficient investment. In the case, for instance, of the seller's hold-up, the seller will induce an ex-post variations in the buyer ex-post contractual power such that

where $p^\circ - c^*_j=0$ and the seller's ex-post contractual power is lower than the one associate with zero breach penalties (the opposite case of buyer's hold-up is straightforward). From proposition 2 derives then the following conclusion.

Conclusion 1

In an incomplete contract with specific quasi-rents, in order to insure post-contractual enforcement it is not sufficient to compensate investors for quasi-rent losses if their counterparts could always exit the relationship at negligible costs.

5. Hold-up breach penalties

Efficient breach penalties have to satisfy two different conditions: to compensate investor quasi-rents and to impose high exit costs on opportunistic agents. The following proposition 3 show then how selecting a breach penalty level equal to investors quasi-rents implies that there is no room for any ex-post variation of parties contractual power, i.e. hold-up behaviours.

Proposition 3 –hold-up breach penalties

When it is possible for agents *s* and *b* to enforce *hold-up breach penalties* such that

(6) $p° = u_b(*i^b) - p^c - v_b°$ (*seller's hold-up*)

(7) $p° = u_s(*i^s) + p^c - v_s°$ (*buyer's hold-up*)

then, agents ex-post contractual power will be unaffected by agents investments. A contract in *t=0* will be signed and the game in *t=1* will be characterised by a unique efficient Nash equilibrium (bilateral efficient investment).

		Agent *b*	
		$I_{b°}$,	i^*_b
Agent *s*	$i_{s°}$	$v_{s°}$; $v_{b°}$ ***status quo***	$v_{s°}$ -$p°$; $\underline{a}S^*$ *hold-up breach penalty*
	i^*_s	$(1-\underline{a})S^*$; $v_{b°}$-$p°$ *hold-up breach penalty*	$(1-\underline{a})S^*$; $\underline{a}S^*$ *contractual enforcement*

Proof:

In the expression (5) when, then $p^{\circ} = u_b(*i^b) - p^c - v_{b^{\circ}}$ (*seller's hold-up*) the seller's ex-post contractual power will be equal to his ex-ante contractual power. This means that the penalty that the seller will be obliged to pay to the buyer for the breach of the contract fully compensates buyer's quasi-rent. Given that hold-up payoffs are given by counterpart quasi-rent appropriation, if $p^{\circ} = u_b(*i^b) - p^c - v_{b^{\circ}}$ then the surplus extraction will be zero (the same argument could be reversed for buyer's hold-up). When *hold-up breach penalties* are enforceable, no renegotiation occurs in *t=2* and the opportunistic agent will receive a payoff given by $v_{j^{\circ}} - p^{\circ}$ while the efficient investor will be fully compensated by receiving a side-payment equal to his ex-ante quasi-rent. The efficient Nash equilibrium is then reached given that each agent will be induce to select an efficient investment in *t=1*.

□

The condition given by proposition 3 could be represented by the following

(8) $\quad v_{s^{\circ}} - u_s(i^{*s}) \leq p^c - p^{\circ} \leq u_b(*i^b) - v_{b^{\circ}}$

where in the case of buyer's hold-up $= -[p^c + u_s(i^{*s}) - v_{s^{\circ}}]$, while in the case of seller's hold-up $p^{\circ} = -[u_b(i^{*b}) - p^c - v_{b^{\circ}}]$.

The conditions recalled above imply that in order to enforce incomplete contracts with specific quasi-rent it is necessary to impose *hold-up breach penalty* as defined above. Only an hold-up breach penalty will insure that no renegotiation occurs in *t=2*. However a necessary condition in order to impose a hold-up breach penalty is that parties should have a perfect knowledge on the relevant terms of contract or that outside options expected variations are zero (either fully anticipated in t=0).

Let assume now that $p^{\circ}=0$ and that the contract **P** specifies only contractual price p^c. The expression (1) above, becomes then:

(9) $v_s(i^b) - u_s(i^s) \leq p^c \leq u_b(i^b) - v_b(i^s)$.

If both agents involved in the contract **P** select the efficient level of investments then we have:

(9.1) $v_{s^\circ} - u_{s^*} \leq p^c \leq u_{b^*} - v_{b^\circ}$.

6. Specific investments, zero-breach penalties and endogenous outside options

Let assume now, for instance, that the seller selects $i^{s^{\circ\circ}}$ (overinvestment level) [which realises a seller's cost given by $u^{s^{\circ\circ}}$ and a buyer outside option given by $v^{b^{\circ\circ}}$], while the buyer selects i^{b^*} (efficient investment) which realises a buyer's value given by u^{b^*} and a seller's outside option given by v^{s°. The expression (8) becomes then

(10) $v_{s^\circ} - u_{s^{\circ\circ}} \leq p^c \leq u_{b^*} - v_{b^{\circ\circ}}$

where the left side and the right side in (10) are greater than the corresponding expression in (9). This means that the range of price variation is switched upward and the seller is induced to propose a renegotiation in *t=2*. Under a vector of the investments given by $[i^{s^{\circ\circ}}, i^{b^*}]$ the buyer in *t=2* presents a greater degree of specificity to the contractual relationship than the expected value, given that his ex-post outside option is lower than the expected one, $v_{b^{\circ\circ}} < v_{b^\circ}$.

Denote with , the ex-ante contractual power of the buyer defined as

(11)

which implies the following contractual price

(12) .

If the vector of the investments selected by contractual parties in *t=1* is given by [$i^{s\circ\circ}$,i^{b*}] then the seller is induced to propose a renegotiation of contractual price in *t=2* where the new price level is given by

(13) .

A renegotiation of contractual price implies thus an increase of the ex-post contractual power of the seller ( ) – in the case of a vector [$i^{s\circ\circ}$,i^{b*}] – with .

If the ex-post renegotiation between the buyer and the seller realises a contractual price given by

(14)

then and all the ex-post contractual power is gained by the seller who receives in a payoff given by

(15) U_s $S^{*\circ} - {}_{b\circ\circ}]$

while the buyer receives a payoff given by $_b = S^{*\circ} - [S^{*\circ} - v$ v

The opposite case, with a vector of the investments given by [i , $i^{b\circ\circ}$], will assign all the ex-post contractual power to the buyer if

(16)

and the agents payoffs will be given by $U = v_{s\circ\circ}$ and $U_b=[S^{*\circ} - v$

default point [v , $v_{b\circ\circ}$] in the case of a vector of the investments given by [$i^{s\circ\circ}$, ^{b*}] is indicated by D' and the ex-post bargaining area is given by the triangle B'D'C. If , then ex-post renegotiation will select a surplus sharing point like A", where the seller receives a payoff given by while the buyer receives a payoff given by If , then the ex-post surplus sharing point will be given by B'

Fig.1

unilateral overinvestment by the seller –in the case of efficient investment by the buyer - relies upon the possibility that at least in A'the seller receives a net payoff which is greater than the one associated with the efficient investment, or

(17) .

In fig.1, a surplus sharing point like A'implies a renegotiation price given by

(18) .

In our model, given the assumptions made above ($S^{*\circ}=S^{\circ *}$) if it is rational for agent j to overinvest when h invests efficiently, then it will be rational for agent h to overinvest when j invests efficiently (where $j, h = (s, b), j \neq h$).

Proposition 4 –bilateral over-investments with joint rent dissipation

Given the assumptions made above, if both the buyer and the seller over-invest $[i^{s\circ}; i^{b\circ}]$, then and the contractual parties will share a joint surplus $S^{\circ\circ}$ with $S^{\circ\circ}<S^{*\circ}<S^{*}$, with a joint rent dissipation given by $(S^{*}- S^{\circ\circ})$ respect to the efficient configuration. When $(S^{\circ\circ}-S^{\circ})\leq 0$, then agents will dissipate all the expected joint rent.

Proof: straightforward calculations.

□

Proposition 5 - bilateral over-investments as endogenous enforcement device

Given the assumption made above (with $S^{*\circ}=S^{\circ *}$) if for both agents *s* and *b*

(19) $[S^{*\circ} - v_{b}^{\circ\circ}]>(1-\underline{a})S^{*}$

(20) $[S^{\circ *} - v_{s}^{\circ\circ}]>\underline{a}S^{*}$

and

(21) $(1-\underline{a})S^{\circ\circ}>v_{s}^{\circ}$

(22) $\underline{a}S^{\circ\circ}>v_{b}^{\circ}$

then in *t=2* the investments selected by the parties will generate two Nash equilibria (bilateral under-investment and bilateral over-investment)

Proof: given the assumptions made above, and the expressions (19)- (22), it easy to show that the following one shot game will be characterised by two opposite Nash equilibria (bilateral under-investment and bilateral over-investment).

		Agent b		
		i°_{b}	i^{*}_{b}	$i^{\circ\circ}_{b}$
		under-investment	*efficient investment*	*over-investment*
Agent s	i°_{s}, *under-investment*	v_{s}° ; v_{b}°	v_{s}° ; $v_{b}^{\circ} - c^{*}_{b}$	v°_{s} ; $v_{b}^{\circ} - c^{\circ\circ}_{b}$
	i^{*}_{s} *efficient investment*	$v_{s}^{\circ} - c^{*}_{s}$; v_{b}°	$(1-\underline{a})S^{*}$; $\underline{a}S^{*}$	$v^{\circ\circ}_{s}$; $S^{*\circ}-v^{\circ\circ}_{s}$
	$i^{\circ\circ}_{s}$ *over-investment*	$v_{s}^{\circ} - c^{\circ\circ}_{s}$; v_{b}°	$S^{*\circ}-v^{\circ\circ}_{b}$; $v^{\circ\circ}_{b}$	$(1-\underline{a})S^{\circ\circ}$; $\underline{a}S^{\circ\circ}$ □

Proposition 5 shows – in sharp contrast with the main contributions of the relevant literature[3] on incomplete contracts which implicitly assume perfect competition markets – that under the assumptions made (endogenous outside options) bilateral specific over-investment represents a possible outcome in an incomplete contract characterised by specific

[3] See Williamson, 1979, 1985; Klein, Crawford and Alchian, 1978; Grossman and Hart, 1986; Hart and

investments. Still, if (21) and (22) hold, bilateral over-investment could act as an endogenous enforcement device and the ex-post rent dissipation (S^*-$S^{\circ\circ}$) – given by the extra-cost of over-investment - represents the enforcement costs sustained endogenously by economic agents in order to prevent post-contractual opportunist. In fig. 2, the bilateral over-investment equilibrium is reached in K, and the segment A"K represents the quasi-rent loss sustained by the seller for the enforcement of the contract. Notice that the ex-post default point D" is lower than the ex-ante default point D. This means that even if the ex-post joint rent is lower than the expected one, the ex-post quasi-rent might be unaffected by over-investment choices, given that parties ex-post outside options are lower than the expected ones.

Fig. 2

If the assumption of perfect symmetric investment between the seller and the buyer is removed, then the following propositions hold.

Proposition 6 ÞBilateral under-investment

Given the assumption made above if for agent *s*

Moore, 1990.

(19) $[S^{*\circ} - v_{b}^{\circ\circ}] > (1-\underline{a})S^{*}$

while for agent *b*

(20) $[S^{\circ *} - v_{s}^{\circ\circ}] \leq \underline{a}S^{*}$

and

(21) $(1-\underline{a})S^{\circ\circ} \leq v_{s}^{\circ}$

(22) $\underline{a}S^{\circ\circ} \leq v_{b}^{\circ}$

then in *t=2* there will be a unique Nash equilibrium (bilateral under-investment).

Proof: straightforward calculations.

□

Conclusion 2

In order to obtain the bilateral under-investment as a Nash equilibrium in an incomplete contract framework (as it is assumed by NIE's economists when incomplete contract are characterised by specific investments), it is necessary to assume that at least for one agent it is impossible to affect (decrease) counterpart's outside options.

Given that parties' outside options represent their next best alternative in the market, this means that each agent involved in a contractual relationship will not affect through his actions the behaviour of competitors in the market or that competitors are able to instantaneously compensate every action made by the agents involved in the contract, so that parties' outside options are unaffected by the investment selected. Still, if we introduce *standard efficient breach penalties* in this a framework, then the unique Nash equilibrium will be characterised by bilateral specific overinvestment.

Proposition 7 - standard efficient breach penalties and specific overinvestment

Let assume that the economic agents involved in a contract are able to enforce standard efficient breach penalties, $(p^{\circ} \geq \max(c^{j*}, c^{h*}))$. Given the assumption made above (with $S^{*\circ}=S^{\circ *}$) if for both agents *s* and *b*

(19.1) $[S^{*\circ} - v_{b}^{\circ\circ}] > (1-\underline{a})S^{*}$

(20.1) $[S^{\circ *} - v_{s}^{\circ\circ}] > \underline{a}S^{*}$

and

(21.1) $(1-\underline{a})S^{\circ\circ} > v_{s}^{\circ} - p^{\circ}$

(22.1) $\underline{a}S^{\circ\circ} > v_{b}^{\circ} - p^{\circ}$

then both the agents are induced to overinvest in assets specificity.

Proof: given the assumptions made above, and the expressions (19.1)- (22.1), it easy to show that the following one shot game will be characterised by a unique Nash equilibria (bilateral over-investment in assets specificity).

		Agent b		
		i°_{b},	i^{*}_{b}	$i^{\circ\circ}_{b}$
Agent s	i°_{s},	v_{s}° ; v_{b}°	$v_{s}^{\circ} - p^{\circ}$; $v_{b}^{\circ} + p^{\circ} - c^{*}_{b}$	$v^{\circ}_{s} - p^{\circ}$; $v_{b}^{\circ} + p^{\circ} - c^{\circ\circ}_{b}$
	i^{*}_{s},	$v_{s}^{\circ} + p^{\circ} - c^{*}_{s}$; $v_{b}^{\circ} - p^{\circ}$	$(1-\underline{a})S^{*}$; $\underline{a}S^{*}$	$v^{\circ\circ}_{s}$; $S^{*\circ} - v^{\circ\circ}_{s}$
	$i^{\circ\circ}_{s}$,	$v_{s}^{\circ} + p^{\circ} - c^{\circ\circ}_{s}$; $v_{b}^{\circ} - p^{\circ}$	$S^{*\circ} - v^{\circ\circ}_{b}$; $v^{\circ\circ}_{b}$	$(1-\underline{a})S^{\circ\circ}$; $\underline{a}S^{\circ\circ}$

□

Proposition 8 -standard efficient breach penalties and unilateral overinvestment

Let assume that the economic agents involved in a contract are able to enforce standard efficient breach penalties, ($p^{\circ} \geq \max(c^{j*}, c^{h*})$). Given the assumption made above (with $S^{*\circ} = S^{\circ *}$) if for both agents *s*

(19.2) $[S^{*\circ} - v_{b}^{\circ\circ}] > (1-\underline{a})S^{*}$

and

(20.2) $[S^{\circ *} - v_{s}^{\circ\circ}] > \underline{a}S^{*}$

while

(21.2) $(1-\underline{a})S^{\circ\circ} \leq v_{s}^{\circ} - p^{\circ}$

(22.2) $\underline{a}S^{\circ\circ} \leq v_{b}^{\circ} - p^{\circ}$

then the one shot game shown above will be characterised by two Nash equilibria (unilateral over-.investment).

Proof: straightforward calculations.

□

Proposition 9 – standard efficient breach penalties and efficient bilateral overinvestment

Let assume that the economic agents involved in a contract are able to enforce standard efficient breach penalties, ($p^{\circ} \geq \max(c^{j*}, c^{h*})$). Given the assumption made above (with $S^{*\circ}=S^{\circ *}$) if for both agents *s*

(19.3) $[S^{*\circ} - v_{b}^{\circ\circ}] \leq (1-\underline{a})S^{*}$

or

(20.3) $[S^{\circ *} - v_{s}^{\circ\circ}] \leq \underline{a}S^{*}$

and

(21.3) $(1-\underline{a})S^{\circ\circ} \leq v_{s}^{\circ} - p^{\circ}$

(22.3) $\underline{a}S^{\circ\circ} \leq v_{b}^{\circ} - p^{\circ}$

then the one shot game shown above will be characterised by a unique Nash equilibria (bilateral efficient investments).

Proof: straightforward calculations.

□

Conclusion 3

Standard efficient breach penalties are able to enforce efficient bilateral investments only when overinvestments involve full rent dissipation. By contrast, when the cost associated

with overinvestment implies only a partial rent dissipation, then standard efficient breach penalties will be ineffective to enforce efficient bilateral investments. In such a context the economic resources spent to overinvest represent the extra-costs of contractual enforcement sustained by agents to reach a second best configuration.

7. Specific and general purpose investments with endogenous outside options and zero breach penalties

Let assume that the buyer and the seller are able to select not only specific self-investment (which generate quasi-rent and decrease counterpartś outside options) but also general investment (which generate quasi-rent and increase investorś outside options).

We assume that:

(*i*) there is perfect symmetry between the buyer and seller in the sense that the expected endogenous variations of their own outside options is the same for both the buyer and the seller and is at least equal to the expected ex-ante quasi-rent;

(*ii*) the cost of general over-investment is the same for the buyer and the seller and it is equal to the cost associated with the specific over-investment and is given by $k>0$ monetary unit, $k \in K \subseteq \Re^{+}$;

(*iii*) Each agent is supposed to select the investment choosing among four possible levels of investment $i^j = (i^{j\circ}, i^{j*}, i^{j\circ\circ}, \;)$: under-investment $i^j = (i^{j\circ})$, efficient investment $i^j = (i^{j*})$, specific over-investment $i^j = (i^{j\circ\circ})$ and general over-investment $i^j = (\;)$, where general over-investment is equal to argmax $v^j(i^j)$, $i^j \subset I_j$, j,h = (s,b) . Each investment selected by agent j affects $u^j(i^j)$, $v^j(i^j)$, and $v^h(i^j)$, as defined above, $j=(s,b)$. In particular, assuming = °° the investments selected by agent j will determine the following values:

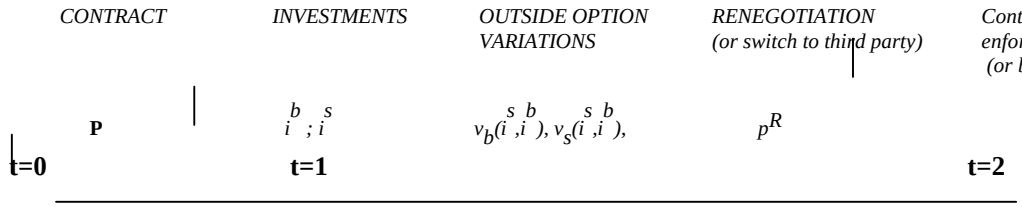
$i^j =$

where $u^{j*} > u^{j\circ\circ}$ and and $j,h=(s,b)$, $j \neq h$.

The joint surplus associated with such investments is given by:

where[4] $S^* \geq S^{*\circ} > S^{\circ\circ} >$ $\geq S^{\circ}$ and $S^{*\circ} = S^{\circ *}$,

The timeline of this new strategic context is given below, where in *t=1* the outside options variations are affected by the investments selected by both the buyer and the seller.



The expression (2) becomes

(23) $v_S(i^b, i^s) - u_S(i^s) \leq p^C \leq u_b(i^b) - v_b(i^b, i^s)$.

Consider the case of a seller selecting a general over-investment, as $\rightarrow$ and a buyer selecting an efficient specific investment $i^{b*} \rightarrow [u^{b*}]$. The (23) becomes:

(24) $-$ $\leq p^C \leq$.

Given that , the contractual price has to be renegotiated in order to satisfy the (24). This means that the ex-post contractual price depends on the extent of the variation of seller's outside options.

[4] Even if the extra-cost of specific and general overinvestment are both equal to k, quasi rents in the case of specific over-investment are greater than the case of general over-investment which reduces outside options.

Fig. 3

Selecting then a general over-investment , the seller increases his own outside option until the new default point is reached in D' (in fig. 3). If the default option is greater then D' (on the segment D'B") then the new bargaining are will be given by the triangle B"D'A". If the default options is given by B" then the seller will make a take-it-or-leave-it offer to the buyer which will transfer to the seller all the ex-post joint surplus given by the triangle B"D'A", which corresponds to a seller post-contractual power equal to 1.

However, if the buyer selects a specific over-investment (which reduces the outside option of the seller), then the expected increase in the seller's outside option will be compensated by the investment made by the buyer. In this case, the joint rent generated will be equal to $S°^$ which is lower than $S*^$ given the extra-costs sustained by agents in the case of over-investment.

If we assume that the variation induced by agent *j* on his own outside option is fully compensated by the opposite variation induced by agent *h* specific over-investment, then the default option will not be affected by the investments made by contractual parties. The joint rent dissipation –as the case shown above –represents then the cost of the endogenous enforcement of the contract. In this case the surplus sharing will be given by the point G in fig. 4.

Fig. 4

However, if the buyer and seller select both a general over-investment the ex-post default point, will be given by H in fig. 4 with a negative joint surplus.

In such a case "market exchanges" assign to the agents a payoff which is greater then the one obtained within the contractual relationship, so that agents select their outside options (escape).

Elsewhere (Nicita A., 1999b, 1999c) we have denoted such an institutional context *cross competition* to indicate an institutional order in which each agent tries to reach a monopolistic position *vis-à-vis* their counterparts by "destroying" direct competitors and/or by "encouraging" counterpart competitors.

Now, assume that:

(a) contractual parties are *balanced* (if agent *j* selects a specific general-investment, agent *h* selects a specific over-investment which fully compensates the effect generated by counterpart's investment on outside options);

(*b*) the extra-cost generated by a (specific *or* general) over-investment will never result in a total ex-post rent dissipation: .

Thus, we have the following proposition.

Proposition 10 - Cross competition equilibria

Given the assumptions made above and under the conditions (a) and (b), the one-shot game in the matrix

		Agent b			
		i°_b,	i^{*}_b	$i^{\circ\circ}_b$	
Agent s	i°_s,	$v_{s^{\circ}}$; $v_{b^{\circ}}$	$v_{s^{\circ}}$; $v_{b^{\circ}} - c^{*}_b$	v°_s ; $v_{b^{\circ}} - c^{\circ\circ}_b$	
	i^{*}_s,	$v_{s^{\circ}} - c^{*}_s$; $v_{b^{\circ}}$	$(1-\underline{a})S^{*}$; $\underline{a}S^{*}$	$v^{\circ\circ}_s$; $S^{*\circ} - v^{\circ\circ}_s$	v°_s ; $S^{*\wedge} - v^{\circ}_b$
	$i^{\circ\circ}_s$	$v_{s^{\circ}} - c^{\circ\circ}_s$; $v_{b^{\circ}}$	$S^{*\circ} - v^{\circ\circ}_b$; $v^{\circ\circ}_b$	$(1-\underline{a})S^{\circ\circ}$; $\underline{a}S^{\circ\circ}$	$(1-\underline{a})S^{\circ\wedge}$; $\underline{a}S^{\circ\wedge}$
			$S^{\wedge *} - v^{\circ}_b$; v°_b	$(1-\underline{a})S^{\wedge\circ}$; $\underline{a}S^{\wedge\circ}$	

Will be characterised by two Nash equilibria: bilateral specific over-investment and bilateral general over-investment..

Proof: straightforward calculations.

□

9. Conclusions

In the neo-classical ideal-type, a contractual performance is insured by market discipline and judicial or public ordering. The only competition costs in a neo-classical world are the costs necessary to take part in market exchanges. They are then determined by market dimension rather then by strategic actions. Starting from the neo-classical ideal-type, and relaxing the assumption that the enforcement structure is exogenous and given by *public orderings*, as is generally assumed by the literature on incomplete contracts, the enforcement costs become non-negative. Indeed, in order to enforce transactions, especially those characterised by specific assets, agents have to incur in complex negotiations to build effective *private orderings*. Agents involved in a contract would spend an amount of economic resources, as enforcement costs, which exceed those required by perfect competition in order to insure contractual performance, particularly, when incomplete contracts involve specific investments

When both the assumptions of zero competition and enforcement costs are removed from the perfect competition configuration, agents involved in market transactions will spend an

amount of economic resources, in excess of those they would spend in the case of *perfect competition*, to enforce contractual performance and/or preserve their contractual power or market share. Agents might also lock-in counterparts to the transaction (one might also think of "agents" as firms preserving their market share by protecting their contractual power *vis-à-vis* their customers). Parties in a contract will enhance the contractual enforcement by decreasing counterpart's ex-post exit options - i.e. deterring potential opportunism inside the transaction – or by decreasing ex-ante entry options of rivals in the market - i.e. deterring potential competitors in the market.

In order to maximise contractual power in a transactional exchange and/or to keep market share, agents will then be induced to invest a greater amount of economic resources than the neo-classical ideal-type requires. Bilateral enforcement mechanisms are thus affected by the actions selected by agents in order to deter a competitor's entry, and viceversa, competition strategies are affected by the economic incentives promoted by parties for the enforcement of contractual obligations.

As Commons (1924) has stressed, in such a complex strategic context – labelled here *cross competition*[5] - the outcome of a transaction - even when specific assets are involved - is always a complex interaction among four representative agents, the two parties involved in a transactional exchange and the best competitor of each.

Cross competition occurs, when, given the absence of an efficient external enforcement structure, economic agents try to enforce a transactional exchange (*i*) by reducing the ex-post outside options of the counterpart in the contract (which in turn requires to minimise a competitor's threat) and/or (*ii*) by increasing his own ex-post outside options (which requires to maximise the potential competitors of the counterpart from a competitor).

When both agents in a contract try to make endogenous enforcement strategies they could promote competition on the opposite side of the market, i.e. the side of the counterpart's competitors. This joint mechanism could, in turn, promote a bilateral monopoly, in which, a part of the expected joint rent will be dissipated by *cross competition* strategies, or it could enhance market competition by raising the number of ex-post competitors of each party in a contract. The latter strategy will reduce ex-post contractual power of each contractual party, causing a full rent dissipation equal to the amount of competition and enforcement costs

spent by each party. Alternatively, when an agent in an incomplete contract wins the *cross competition* challenge *vis-à-vis* the transactional counterpart, he/she will gain a monopolistic position. Thus, in a *cross competition* context, rent dissipation represents the amount of endogenous enforcement costs - in terms of competition and enforcement costs - sustained by agents to make the contractual performance effective.

The simple formalisation above shows - in sharp contrast with the main contributions in incomplete contract literature - that in order to enforce incomplete contracts in a *cross competition* context, the agents involved might even *overinvest* when their outside options are affected by the investment selected.

Elsewhere we have provided some examples of alternative cross competition equilibria, as the case of the Japanese Firm versus the German industrial System (Nicita, 1999b). An application of cross competition strategies has been employed in order to explain market dominance strategies in PC operating systems industry, particularly with reference to the Microsoft case (Nicita, 1999d, 1999e).

References

Aghion P., Dewatripont M., Rey P.,(1996), "Renegotiation Design Under Unverifiable Information", *Econometrica*, 62 (2), pp. 257-282.

Bernheim and Whinston (1995), "Incomplete Contracts and Strategic Ambiguity", Mimeo, Harvard University.

Bowles, S., (1985) "The production process in a competitive economy: walrasian, neo-hobbesian, and marxian models" in Putterman, L., (1986), *The Economic nature of*

[5] See Nicita A. (1999b)

the firm. A reader, Cambridge University Press, Cambridge.

Bowles, S.; Gintis, H.(1993), “Endogenous Claim Enforcement and the Efficiency-Equity trade-off”, mimeo, Workshop on Economic Theory and Inequality, Stanford University.

Chung, T. Y., (1991), "Incomplete Contracts, Specific Investments and Risk Sharing", *Review of Economic Studies*, pp. 1031-42.

Chung, T.Y., (1994) "Commitment through Specific Investment in Contractual Relationships", University of Western Ontario, mimeo.

Chung, T.Y., (1996), “On Strategic Commitment versus Investment”, *American Economic Review, Papers and Proocedings*, pp. 437- 441

Coase, R., (1937), "The Nature of The Firm", *Economica*, 4, pp. 386-405.

Coase, R., (1960), "The Problem of Social Costs", *Journal of Law and Economics*, 3.

Edlin A., Reichelstein S., (1996), “Holdups, Standard Breach Remedies and Optimal Investment”, *American Economic Review*, Vol.86, n.3, pp.479-501

Hart, O., (1995), *Firms, Contracts and Financial Structure*, Oxford University Press, Oxford.

Hart, O. and Moore, J., (1988), “Incomplete Contracts and *Econometrica*, 56, pp. 755-785.

Hart, O. and Moore, J., (1990), “Property rights and the Nature of the Firm”, *Journal of Political Economy*, 98, pp. 1119-1158.

Hodgson, G., (1988), Economics and Institutions: A Manifesto for a Modern Institutional Economics, Polity Press e basil Blackwell, Cambridge/Oxford

Holmstrom, B. and Milgrom, P., (1991) "Multitask Principal Agent Analyses: Incentive Contracts, Asset Ownership, and Job Design", *Journal of Law, Economics and Organization*, Vol. 7, pp. 24-52

Jensen, M.C., Meckling W. (1976), "Theory of the Firm: Managerial Behaviour, Agency Costs and Ownership Structure", *Journal of Financial Economics*, 3., pp. 305-60

Klein, B.Crawford, R. and Alchian, A., (1978), "Vertical Integration, Appropriable Rents, and The Competitive Contracting Process", *Journal of Law and Economics*, 21, pp. 297-326.

Leitzel, J., (1993), "Contracting in Strategic Situations", *Journal of Economic Behavior and Organization*, 20, pp. 63-78.

MacLeod, B. and Malcomson, J., (1993), "Investments, Hold-up, and the Form of Market Contracts", *American Economic Review*, 83, pp. 811-837.

Osborne M.J., Rubinstein A. (1990), *Bargaining and Markets*, Academic Press, San Diego CA

Nicita A. and U. Pagano (1999a), *The Evolution of Economic Diversity*, Routledge, London, *forthcoming*

Nicita A. (1999b), “The Firm as an Evolutionary Enforcement Device”, forthcoming in A. Nicita and U. Pagano Eds *The Evolution of Economic Diversity*, Routledge, London.

Nicita A. (1999c), “Incomplete Contracts Enforcement and Market Foreclosure: Commitment, Hold Up, Lock-In, Escape”, forthcoming in *Quaderni del Dipartimento*, Università di Siena.

Nicita A.(1999d) “What’s Wrong with Microsoft? Innovation, Imitation and Antitrust Concerns in PC Operating Systems Industry”, mimeo.

Nicita A. (1999e) “Assets Specificity, Network Effects and Market Dominance: Delimiting

Pagano, U., Rowthorn, R., (1996), *Democracy and Efficiency in the Economic Enterprise*, Routledge.

Pagano U. (1999), “The Origin of Organisational Species”, forthcoming in A. Nicita and U. Pagano Eds *The Evolution of Economic Diversity*, Routledge, London.

Salop, S.C., Scheffman D.T., (1983) “Raising Rivals’ Costs”, *American Economic Review* 73, pp- 267-71

Schelling, T., (1960), *The Strategy of Conflict*, Harvard University Press,Cambridge, Ma.

Shapiro C., Stiglitz, J. E. (1984) “Unemployment as a Worker Discipline Device”, *American Economic Review*, 74, pp. 433-44.

Tirole, J., (1994), "Incomplete contracts: where do we stand?", mimeo, IDEI, Toulouse.

Williamson O., (1985), The Economic Institutions of Capitalism. Firms, markets, Relational Contracting, The Free Press, New York

Williamson. O., (1988) "Corporate Finance and Corporate Governance", *Journal of Finance*.