

Incomplete Contracts and Governance Structures:

Are Incomplete Contract Theory and New-Institutional Economics Substitutes or Complements? ⁺

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0. Introduction

Since Coase's contribution of 1937, economists have known that it is essential to grasp the nature of authoritarian coordination to be able to endogeneize the genesis of various types of coexisting coordination mechanisms in a decentralized economic system. For a long time, however, scholars were not primarily concerned with this challenge, and we had to wait until Williamson's contribution to benefit from a systematic analysis of authoritarian coordination (Williamson [1975, 1985]). This analysis relies on the insight that in certain circumstances it is either impossible or inefficient to design a complete contract. It is therefore necessary to create a mechanism that will complete the contractual incompleteness by monitoring the contractors. The resulting Transaction Cost Theory (TCT) relies on hypotheses that contrast with those of neoclassical economics, especially in the case of the agents' rationality. That is why Grossman & Hart [1986] initiated a new theoretical branch: Incomplete Contract Theory (ICT), whose stated objective was to explain authoritarian coordination in an "enlarged" neoclassical framework.

The purpose of this paper is to compare these two analytical frameworks. Indeed, although ICT draws its inspiration from Williamson's analysis and its stated objective was to modelize Williamson's essential insights, especially on vertical integration, it relies on different assumptions. Moreover, it progressively deviated from TCT by becoming a theory of the renegotiation schemes to be implemented to complete incomplete contracts. On the other hand, Williamson's TCT has been enriched by complementary analyses of transaction costs, such as the contributions by Barzel [1989] and North [1990], to become a theory of governance structures and institutions: New Institutional Economics (NIE) (North [1990], Williamson [1996]).

Two questions then arise. First, does ICT modelize NIE ? Second, are both theories relevant to deal with the same issues, and do they attempt to explain the same types of phenomena?

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To answer the first question, we will point out that contractual incompleteness does not originate from the same causes in the two analyses. In ICT, it is rooted in a certain type of bounded rationality of the entity that is responsible in the last resort for the enforcement of the contract. In NIE, it is due both to the bounded rationality of each individual involved in the economic system (and therefore it is not only due simply to the judge's bounded rationality), and to uncertainty.

This will lead us to answer the second question by pointing out that ICT focuses on the types of contract that can be implemented given the features of the pre-existing institutions (that are therefore not endogeneized in the analysis). NIE, we believe, thus greatly differs from ICT in that it proposes a logically consistent theoretical framework to endogeneize the forming of both institutions and governance structures. We will show a certain level of both incompatibility and complementarity between the two theories that nevertheless cannot be considered competitive.

To perform this comparative assessment, we will use a refined model of each theory to demonstrate what we consider as being their very nature. These models result from an attempt to synthesize the founding papers of both theories. We first present ICT by pointing out its focus on the impact of external enforcement mechanisms on contract design (§ 1). We then go back to the way NIE tries to endogeneize both the design of contractual arrangements and the design of the institutional framework (§ 2). We conclude by pointing out the scope and limitations of the two frameworks (§3).

1. Incomplete Contract Theory: an Analysis of some Impacts of Institutions on Contracts

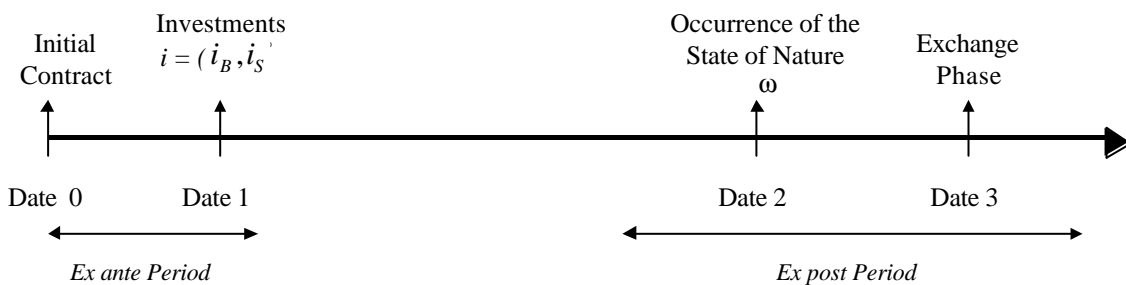
The declared intention of Grossman, Hart and Moore when they designed the first ICT model was both to modelize Williamson's insights, and to surpass them by stating an analytical framework able to simultaneously grasp the benefits and the disadvantages of hierarchical coordination (Grossman & Hart [1986] and Hart & Moore [1988]). This is why they developed a model in which the best response to the inability to set-up complete contracts led to a second-best result (under-investment in specific assets) (§ 1.1). Aghion, Dewatripont and Rey [1994] (ADR) showed, however, that it is possible to design incomplete contracts that generate first best results. But these ADR contracts are implementable only when strong assumptions are met regarding the nature of the device that ensures the enforcement of the contracts in the last resort (§ 1.2). ICT can thus be considered as a framework able to examine the impact of the institutional framework on the nature and performances of the implementable contracts. This is, however, problematic since, on the one hand, the institutional framework remained exogenous in the analysis, while on the other hand, the assumptions that are made regarding the agents' rationality (which is supposed to be perfect) can be contradictory with those that are made about the institutional framework (embodied in the person of the "judge" whose rationality is, in a sense, bounded) (§ 1.3).

1.1 Foundation of ICT

According to Williamson ([1975] [1985]), when a strong bilateral interdependence exists in a relationship, vertical integration enables one of the parties to protect its specific investments against the potential hold up that the other's opportunistic behavior could generate when contracts are incomplete. Following this line of analysis, Grossman and Hart [1986] (G&H) attempt to establish the formal basis for the studying of vertical integration. In their model, the property rights regime affects both parties' incentives to invest in specific assets. Basically, vertical integration suppresses the hold-up risk inherently linked to incomplete contracting. It therefore incites the integrator to efficiently invest in specific assets because the *ex ante* allocation of residual control rights affects its *ex post* ability to claim for the surplus generated by its efficient level of investment. On the other hand, the integrated party will not have the right incentives to invest because he will be "hold-uped" by the integrator, who benefits from the ability to share the surplus as he wishes. As a result, the G&H model shows how vertical integration mitigates, but does not suppress, the hold-up problem (and therefore under-investment) generated by incomplete contracting. We will develop below a model aimed at pointing out these essential results and, above all, at making the ICT reasoning more explicit¹.

Let us assume a vertical relationship between a buyer (B) and a seller (S) that runs over two periods of time. During the first period (*ex ante* period), both parties sign an incomplete contract (date 0) and invest in specific assets, respectively i_B and i_S (date 1). This level of investment is non-contractible (because it is unverifiable by the judge). During the second period (*ex post* period), the two parties set up the efficient level of exchange (quantity and price, date 3) after the realization of a state of nature (date 2), which was unknown when they signed the initial agreement and invested in specific assets. The timing of the model is thus the following (Figure 1).

Figure 1: The Timing of Grossman & Hart's [1986] Model



Both parties decide *ex post* the quantities to be produced $q = (q_B, q_S)$ to maximize their utility, respectively $u_B = v(q, \mathbf{q}_B) - p$ and $u_S = p - c(q, \mathbf{q}_S)$, given the price p . Indeed, exchange is performed only at date 3, after

¹ This model does not attempt to present the details of G&H's reasoning because its analytical framework is closer to the model of Hart & Moore [1988]. We deal with the simple case in which the integrating party *ex post* captures all the surplus (and not only 50% as in the G&H model). This assumption generates an appropriate level of investment for the integrator, rather than an incentive to overinvest or underinvest. In both cases, the integrated party underinvests.

that the two parties were provided with an information flow $\Theta = (\mathbf{q}_B, \mathbf{q}_S)$ (such that $\mathbf{q}_B = \mathbf{y}(i_B, \mathbf{w})$ and $\mathbf{q}_S = \mathbf{y}(i_S, \mathbf{w})$), observable by both parties but not verifiable by a third party (**observable but non verifiable information hypothesis**). This information flow arises after the occurrence of a state of nature \mathbf{w} (date 2) and the investments in specific assets (date 1), and provides contractors with complete and accurate information about their economic situation.

Ex ante (date 0) the contract is incomplete. In this model this is due to two assumptions. On the one hand, specific investments are non-contractible because of high writing costs. On the other hand, the relevant variables of the contractual relationship (Θ, q, v, c, p) are not verifiable by a third party, and therefore non contractible.

Contractual incompleteness will generate all the results about the reasons for and the limits of vertical integration. Why does incomplete contracting generate inefficiencies? To answer this question, the outcome of an incomplete contract has to be compared with the optimal situation in which a complete contract can be drawn up (i.e. when Θ, q, v, c, p are contractible). In this latter case, the parties will design a complete contract that will maximize the *ex ante* social surplus:

$$\max W = E_{v,c} \left\{ [v(q, \mathbf{q}_B) - i_B] - [c(q, \mathbf{q}_S) - i_S] \right\}$$

choosing the first best level for i_B^*, i_S^*, q^* .

On the other hand, when a contract is incomplete, even if the parties can *ex ante* define the global surplus :

$$W(i_B, i_S) = E_{v,c} [\max \{v - c, 0\} / i_B, i_S] - i_B - i_S$$

Its sharing is dependent upon the *ex post* bargaining game. The analysis of this game can be reduced to two cases:

- either the negotiation fails and the exchange does not occur. Both parties then receive a guaranteed level of utility, qualified as *status quo* level of utility, $w_i = 0$ (because $q = v = c = 0$ when the negotiation fails);
- or the *ex post* negotiation about the surplus sharing leads to a Nash equilibrium. The *ex post* utility of each party is

$$u_i = w_i + \frac{1}{2}(v - c), \text{ and thus the } \textit{ex ante} \text{ utility of each party will be:}$$

$$U_i(i_B, i_S) = \frac{1}{2} \left\{ E_{v,c} [\max \{v - c, 0\} / i_B, i_S] - i_i \right\}$$

Since each party will only receive half of the *ex post* surplus, *ex ante* the first order conditions give:

$$\begin{cases} (1) \frac{1}{2} \frac{\mathcal{J} E[v / i_B^\circ]}{\mathcal{J} i_B} = 1 \Rightarrow i_B^\circ < i_B^* \\ (2) \frac{1}{2} \frac{\mathcal{J} E[c / i_S^\circ]}{\mathcal{J} i_S} = -1 \Rightarrow i_S^\circ < i_S^* \end{cases}$$

The induced investment (i_B°, i_S°) is less than the optimal level of investment (i_B^*, i_S^*) . This can be considered as a hold-up result, since both parties under-invest because each of them fears an *ex post* capture of its investment's rent by the other.

What does integration change in this? By allocating decision rights to one of the parties (for instance, the buyer) — i.e. the ability to set up the exchanged quantity q — vertical integration enables this party to *ex post* capture the entire surplus. The buyer's *ex post* utility is then equal to the surplus of the relationship: $u_B = (v(q, \mathbf{q}_B) - c(q, \mathbf{q}_S))$, and its *ex ante* utility becomes:

$$U_B(i_B, i_S) = E_{v,c}[\max \{v - c, 0\} / i_B, i_S] - i_B.$$

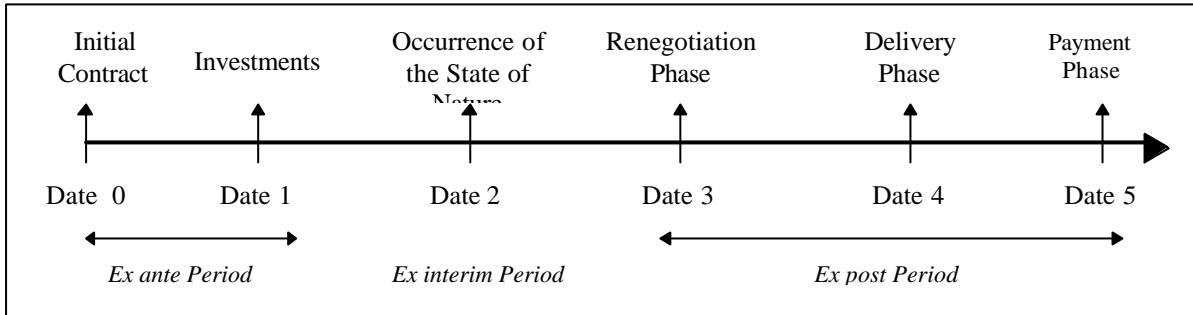
Since he captures the total marginal return on his investment, the buyer is then incited to invest at the optimal level ($i_B = i_B^*$). Do the contractors reach the *first best* result of the complete contract? No, because, *ex post*, the seller only receives the *status quo* level of utility ($u_B = 0$, in the case of integration by the seller). The *ex ante* maximization of its surplus $U_S(i_B, i_S) = E_{v,c}[0 / i_B, i_S] - i_S$ implies therefore that $i_S^* = 0$, and thus an under-investment result.

If the powerfulness of this G&H model is beyond doubt, lack of precision leaves the way the two authors justify the contractual incompleteness in the dark. Indeed, incompleteness is only exogenously explained in the model by the assumption that there are transaction costs. According to Tirole [1994], generating contractual incompleteness by using an *ex ante* transaction costs argument implies a tension between the substantive rationality that characterizes contracting parties according to G&H assumptions, and the bounded rationality that is necessary to justify the existence of such writing costs. This is why, in the model developed by Hart & Moore [1988] (H&M), this tension is canceled by relying only on the unverifiability hypothesis to construct a logically consistent framework able to explain how hierarchical coordination offsets the distortion on investment resulting from contractual incompleteness.

1.2 ICT and the various aspects of unverifiability

Following this “unverifiability” path, Hart et Moore [1988] (H&M) point out the existence of two causes for contractual incompleteness: (1) the judge's inability to verify the relevant state of nature; and (2) the incapacity of both parties to prevent *ex post* renegotiation. This way of grasping the contractual incompleteness affects the timing of the contractual relationship. It is now composed of three periods (figure 2).

Figure 2: The Timing in Hart and Moore's [1988] model



But the fundamental difference with the G&H class of models is due to the characterization of the *ex post* period. The determination phase (renegotiation) and various phases of completion of the exchange (delivery and payment) are differentiated. Indeed the ability of the judge to actually verify these various operations may or may not generate a first best result.

Thus, in opposition to the common interpretation arguing that the under-investment result of H&M would be due to too slack a renegotiation framework (i.e. a renegotiation framework that does not make it possible to give one party all the bargaining power), the central issue here is the level of verifiability by the judge. More precisely, H&M's underinvestment result can be explained by the fact that the judge cannot enforce the optimal level of trade. This unverifiability problem is justified by the choice of a particular class of analyzed contracts ("at will contracts").

In order to point this out, we compare the H&M approach with that of Aghion, Dewatripont and Rey [1994] (ADR) to show that the hold-up result is very sensitive to the degree of verifiability by the judge, the renegotiation process, verifiability constraint and class of contracts analyzed.

According to ADR the hold-up problem caused by unverifiability can be solved if the initial contract can create a renegotiation framework that will be sufficiently constraining *ex post* to avoid hold-up. This results from: (1) an extreme allocation of the bargaining power to one of the parties; and (2) a default option that guarantees a *status quo* outcome to the other (in case of renegotiation failure) that provides him with the right incentives to invest.

The main interest of the ADR model is that it makes explicit the necessary conditions to the settlement of contracts featured by characteristics (1) and (2) and enriches the set of implementable solutions when incomplete contracting problems arise. To obtain an *ex ante* and *ex post* efficient result, ADR show that two clauses are required: one of time limit for the delivery, and one of specific performance. Indeed, a penalty in case of late delivery makes it possible to generate characteristic (1), and a specific performance contract makes it possible to generate characteristic (2). Their combination creates a sufficiently constrained renegotiation framework to generate optimal investments and levels of exchange.

Let us first show that a penalty provision results in an extreme allocation of the bargaining power in the renegotiation. Assume that in the ex post period $q^* > \bar{q}$, i.e the efficient level of exchange is higher than the ex-ante contractualized quantity. In the renegotiation of the initial contract (\bar{q}, \bar{p}) , that begins at date 3, the seller is contractually guaranteed to obtain the (optimal) level of utility $u_S(i_S, \bar{q}, \bar{p}, \omega)$. He can therefore refuse any renegotiation proposition by the buyer and wait until the delivery phase (date 4) to impose the default level of exchange on the buyer $q = \bar{q}$. To avoid this renegotiation being blocked by the seller (which would prevent both parties from reaching the efficient level of exchange q^*) it is possible to incite him into accepting the buyer's proposition by implementing a penalty π^* for late delivery (delivery after a deadline). If this penalty is high then $u_S(i_S, \bar{q}, \bar{p}, \mathbf{w}, \mathbf{p}^*) < u_S(i_S, q^*, \bar{p}, \mathbf{w})$. Put another way, it is costly for the seller to bargain with the buyer by refusing all its successive bids. Thus, whatever the "take it or leave it" buyer's proposition is, $q^* \neq \bar{q} / u_S(i_S, q^*, \bar{p}, \mathbf{w}) \geq u_S(i_S, \bar{q}, \bar{p}, \mathbf{w}, \mathbf{p})$ just before the delivery deadline (date 4), the seller will agree. Thus, this implementation of a penalty for late delivery makes the seller impatient, and therefore provides the buyer with all the residual rights to settle the efficient level of exchange.

Let us now show that the fixing of a default quantity \bar{q} enables the design of a contract that will provide the two parties with the incentives to optimally invest. To do this, let us first define all the *ex post* utilities that each of the two parties can take away from the renegotiation.

The quasi-rent generated by the renegotiation making it possible to reach the efficient quantity is

$$\mathbf{V} = [v(i_B, q^*, \bar{p}, \mathbf{w}) - c(i_S, q^*, \bar{p}, \mathbf{w})] - [v(i_B, \bar{q}, \bar{p}, \mathbf{w}) - c(i_S, \bar{q}, \bar{p}, \mathbf{w})];$$

and $\bar{s}(i) = [v(i_B, q^*, \bar{p}, \mathbf{w}) - c(i_S, q^*, \bar{p}, \mathbf{w})]$, is the surplus generated by the renegotiation phase.

The *ex post* utilities of each party depend upon their bargaining power. If α is the seller's bargaining power, then the seller's utility is $u_S(\cdot) = \alpha \mathbf{V} + (p - c)$. Put another way:

$$u_S = \alpha [\bar{s}(i) + \bar{p} - v] + (1 - \alpha) [\bar{p} - c].$$

Following the same method one can compute the *ex post* buyer's utility:

$$u_B = \alpha [v - p] + (1 - \alpha) [\bar{s}(i) - p + c].$$

The incentive effect of allocating all the bargaining power to the buyer ($\alpha = 0$) is obvious. Indeed, its *ex ante* utility is:

$$U_B(\cdot) = E[u_B] - i_B = E[\bar{s}(i)] + E[c(i_S, \bar{q}, \cdot)] - p - i_B \Rightarrow \frac{\int E[\bar{s}(i)]}{\int i_B} = 1 \Leftrightarrow i_B = i_B^*$$

This means that because he has all the bargaining power, he is able to capture the whole quasi-rent, and thus capture the whole benefit of his investment.

What are the seller's incentives to invest? His *ex ante* level of utility is:

$$U_s(i_s) = E[u_s] - i_s = -E[c(i_s, \bar{q}, \bar{p}, \omega)] + \bar{p} - i_s \Rightarrow \frac{\partial U_s(\cdot)}{\partial i_s} = 0 \Leftrightarrow \frac{\partial E[c(i_s^*, \bar{q}, \bar{p}, \omega)]}{\partial i_s} = -1.$$

This means that a medium quantity $q = \bar{q}$ exists that incites him to invest at the optimal level i_s^* because it is the best response to i_b^* for the default level of exchange (\bar{q}, \bar{p}) .

This requires quite a strong constraint of verifiability (and actually a much stronger verifiability constraint than in the H&M model) because the judge needs to know the delivery and the payment date in order to observe them to be sure that he would be able to impose the performance of the contract.

Because of this information assumption and the *ex ante* specification of a penalty (that becomes credible because it is enforceable by the judge), a simple contract enables the parties to renegotiate the default quantities *according to a bargaining rule that cannot be modified during this process*. This ensures the credibility of the initial commitments and, therefore, the optimal levels of specific investment by each party.

In short, the ADR model does not only show that an optimal contract can be implemented in incomplete contracting, but also that the unverifiability hypothesis — i.e. the limited rationality of the authority in charge of enforcing the contract — is relevant. This hypothesis is relevant because it presents a consistent way to give a foundation to contract incompleteness, and because it allows an analysis of the legal framework of contractual implementation.

1.3 Tirole's Criticism, and the analytical boundaries of ICT

Some scholars, especially Tirole [1994], are not convinced that contractual incompleteness can be consistently endogenized on the basis of the unverifiability hypothesis. Indeed, he rejects the idea that *ex post* transaction costs (verification costs) can explain the incompleteness of contracts because he considers the hypothesis of "observable but non verifiable" information to be senseless. In this case, the parties can always complete an incomplete contract by implementing a revelation mechanism that makes the information observable by the parties verifiable by the judge. This mechanism thus makes the contract contingent on the occurrence of states of nature. This brings a complete contract result.

As pointed out by Moore [1992], the class of contractual mechanisms proposed by Tirole has some limitations. It requires the implementation of a very high default penalty together with a credible commitment by both parties not to renegotiate this penalty. Indeed, the implementation of the contracts suggested by Tirole implies the deletion of the

possibility for the parties to renegotiate the initial contract. It is therefore implicitly and paradoxically assumed that the parties will not be sophisticated enough to benefit from an *ex post* mutually profitable renegotiation² (Hart [1995]).

On the other hand, taking into account this renegotiation ability leads to the acceptance of the notion of “observability without verifiability”, because it will be impossible to implement a revelation mechanism that would enable contractors to transform any observable information into verifiable information. As a result, the unverifiability hypothesis makes it possible to found a consistent formalization of contracting in incomplete contracts.

If ICT evades the criticism of logical inconsistency, the unverifiability assumption stands out as being “ad-hoc” because the institutional framework (reduced to only the “judge”) that makes the contract enforceable remains exogenous in the analysis. Avoiding this second criticism, NIE distinguishes itself from ICT along two lines.

First, the judge is not the only participant of the system to be endowed with a rationality that is bounded (corresponding to the unverifiability hypothesis), because all the participating parties involved in a contractual process are assumed to be boundedly rational. This generalized recourse to the bounded rationality assumption lead to the idea that each single coordination mechanism designed and run by agents whose rationality is bounded is imperfect, and therefore has to be combined with other imperfect mechanism to perform more efficiently. Complementarity among the various coordination devices (like contracts, organizations and institutions) is therefore endogeneized.

Second, NIE does not assume, as ICT does, the pre-existence of institutions (and, more generally, of devices those make contracts enforceable). It tries to endogeneize them. Put another way, agents have to build all the coordination devices necessary to perform economic coordination. This leads to a great variety of mechanisms involved in the management of economic coordination.

The two positions enable NIE to endogeneize the formation of diverse types of imperfect coordination mechanisms. Their imperfections and associated transaction costs can be reduced through the complementarities among them. The diversity and the complementary of the governance mechanisms enable economic agents to perform less costly coordination.

2. Incompleteness and New-Institutional Economics

To point out the essential features of the NIE framework, we will begin by going back to Williamson’s analyze (Williamson [1975, 1985]) on the causes of contractual incompleteness in NIE (§ 2.1). This will enable us to explain the

²Two arguments, however, justify making this assumption. From an analytical point of view, the renegotiability of contracts comes from the opportunistic behavior of agents, which implies that they cannot commit themselves by not renegotiating the initial contract (Hart et Holmström [1987]). From an empirical point of view, the applied literature points out that judges generally do not force the parties to apply the wording of a non-renegotiable contract if the two parties agree to renegotiate it (Jolls [1997]).

very nature of governance structures (§ 2.2). Following North's analysis (North [1990]), we will then see how NIE coherently grasps the solving of coordination problems at an interindividual and at a collective level (§ 2.3), and endogeneizes the design of contracts and institutions (§ 2.4).

2.1 Incompleteness causes: Bounded rationality and Radical Uncertainty

In NIE, contractual incompleteness is not only due to the judges' bounded rationality. It is also caused by the contracting parties' bounded rationality. As pointed out by Simon [1982, 1987], the bounded rationality hypothesis implies that, unlike the Savageian axioms (Savage [1954]), economic agents do not know all the solutions to the problems they face, are unable to calculate the possible outcomes of these solutions, and cannot perfectly arrange these outcomes in order in their space of preferences. With regard to contracts, this means that they are unable to design the optimal solutions (behavioral rules) taking into account every relevant contingency without high, and sometimes prohibitive, costs and delays.

If one assumes that decisions are time-consuming and costly, that agents can make mistakes, and that they are victims of strong information asymmetries (because they do not share a common vision of their present and future economic positioning), one recognizes additional reasons explaining why a complete contract cannot be settled. None of the contracting parties can put himself in the other's place as the principal does in incentive theory (when he enforces the participation and incentive compatibility constraints) or as the party endowed with the bargaining power does in the ADR model (when he calculates the default level of exchange that will incite the other to optimally invest).

A last reason justifies contractual incompleteness: radical uncertainty in the sense of Knight [1921] and O'Driscoll & Rizzo [1980]. Agents cannot imagine the characteristics of the future. It has to be made clear that this is different from the risk in the sense of Knight [1921] or even from the so-called Bayesian uncertainty. Indeed, in both cases the possible characteristics of the future are known by the agents. They are only uncertain about what will actually happen and this is formalized by an (objective or subjective) probability function. Because with radical uncertainty agents do not know the possible characteristics of the future states of the world, they cannot set contingent contracts that will efficiently fit every future situation.

2.2 The intrinsic nature of Governance Structure: Authority and Enforcement

Agents therefore design incomplete contracts that do not implement an ex-ante designed complete set of (possibly contingent) behavioral rules that will *ex post* solve all coordination problems. They rather design decision-making devices that *ex post* will state the required behavior by contractors to ensure the possible most efficient coordination and to guarantee the enforcement of mutual commitments.

These decision-making devices rely, first, on the recognition by contractors of an authority and subordination principle. They delegate decision rights (that can be bounded or not) to the decision-making device, and ipso-facto agree to follow its instructions *ex post*. The decision-making device can be one of the contracting parties (this is the case in hierarchical governance structures), a negotiation structure (as in many hybrid forms) or a third party. In most coordination mechanisms there is a mix of coordination thanks to *ex ante* designed rules and authority. Decisions, and therefore decision devices, are required when the *ex ante* designed set of rules of mutual behaviors is not applicable (because it does not correspond to the present state of the world), or is inefficient. The relative share of each of these two complementary ways of stating both parties' required behaviors is, however, different from one type of governance structure to another. Contracting parties' behaviors are principally driven by *ex ante* designed rules — put another way, by contracts that tend to be complete — in what is qualified by Williamson [1985] as the market. These behaviors are mainly managed by authority — linked to incomplete contracting — in hierarchies.

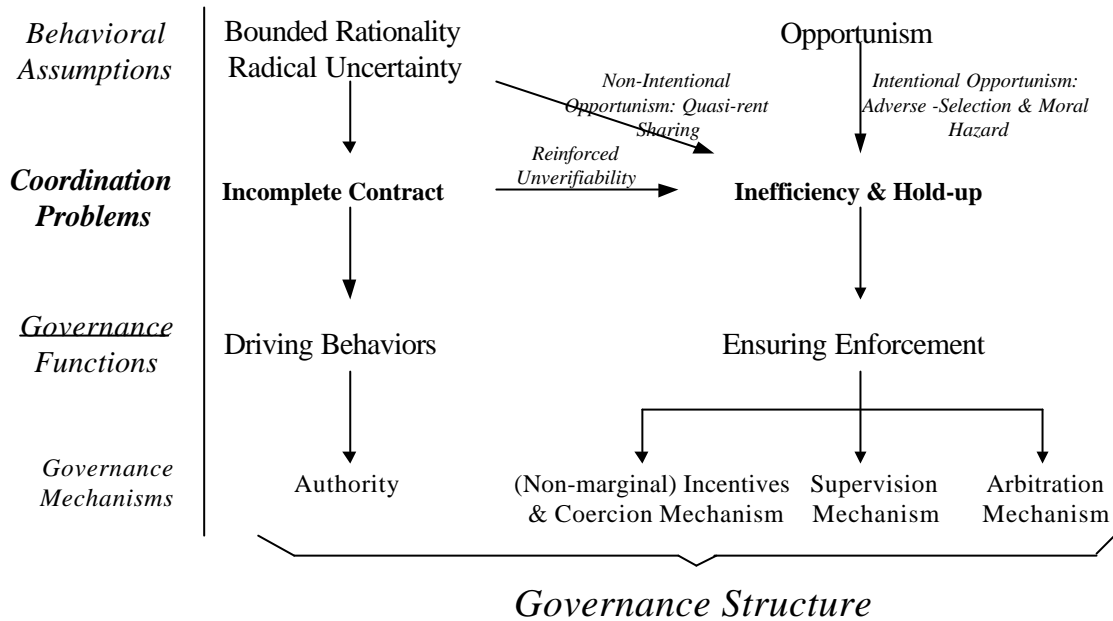
The implementation of mechanisms aimed at stating contractors' behavior is, however, not sufficient to ensure coordination. Indeed, rules and orders have to be enforced to guarantee the credibility of contractual commitments. Having recourse to the judicial system to have commitments enforced is problematic when they are settled by incomplete contracts. By definition, incomplete contracts implement rather vague commitments whose enforcement is hard to verify. More precisely, an incomplete contract implements an authority mechanism. Stating whether contractors' behaviors reach the requirements of this mechanism is difficult not only because of the standard problems of access both to the relevant information and to the relevant knowledge (cf. Incentive Theory), but even more so due to the difficulty in assessing whether the authority mechanism's instructions are actually enforced by the parties because they can be informal (like a verbal order) and therefore difficult to verify. Moreover, incomplete contracts often implement behavioral principles (like requiring cooperative behavior from the parties; see Williamson [1985]), rather than a precise set of required actions. The former are much more complex to verify than the latter, because they do not state a precise set of actions whose completion has to be certified (or not) by the supervisor. In the case of behavioral principles, the supervisor has to analyze the many aspects of the contractors' behaviors and to interpret whether they globally fit the commitment. This obviously enables contractors to adopt sophisticated forms of opportunism. As a result, besides the boundaries of the legal system (described by Williamson [1985] and acknowledged by the ICT framework), contractual incompleteness *per se* generates enforcement problems. This is why economic agents have to implement **self-enforcing mechanisms** in the governance structures they construct.

Self-enforcement relies on the implementation of three classes of mechanism.

- First an **incentive and coercion scheme** designed to incite contractors to follow the behaviors required, or, on the contrary, to dissuade them from adopting behaviors opposed to their commitments. As compared to incentive theory, NIE's incentive mechanisms cannot be based on marginal remuneration. They are rather based on the sharing of the outcome of an efficient co-operation (relational quasi-rent; Cf. Alchian & Woodward [1988]) and the logic of deterrent. Cooperative behaviors generate a right to some type of profit-sharing (that can be actually performed following very different rules) which, however, does not correspond to a remuneration at margin since, by definition, it is impossible to precisely state the marginal contribution of each factor when a quasi-rent is generated (Klein, Crawford & Alchian [1978]). Moreover, the informational environment of agents and their bounded rationality does not enable them to accurately calculate marginal productivities. On the other hand, non-cooperative behaviors are punished by severe penalties that can take diverse forms: cuts in the remuneration forecast, depreciation of specific assets due to contractual breach, taking of hostages, etc.
- Second, **supervision devices** have to be designed to verify whether parties enforce their commitments by implementing the contractually settled rules or the decision made by the decision-making device. As in the case of decisions regarding agents' behaviors, supervision rights can be allocated to one of the parties, to a bilaterally-run entity, or to third party.
- Third an **arbitration mechanism** is necessary to resolve conflict. Indeed, as pointed out by Alchian & Woodward [1988], the non-enforcement of contractual commitments can result from divergent assessment of the same situation by partners that are both of good faith. This divergence is due to the inability of agents facing radical uncertainty and whose rationality is bounded to exactly assess the actual transfers performed during the transaction. This results in "involuntary" opportunistic behaviors. They are involuntary since the parties can violate their commitments without deliberately choosing to be unfair to the other. They, however, have the same type of destructive impact as voluntary opportunistic behaviors because they ruin the credibility of contractual commitments since hold-up can occur. Whatever the shape, this generates inefficiencies because *ex post* resources are spent in conflicts, and *ex ante* parties underinvest or do not provide the optimal level of effort. A dispute resolution device has therefore to be designed to avoid such disadvantages. This is based on the allocation of rights to state what the actual situation of the pair is, and therefore the actual rights and duties of the parties when conflicts occur. These rights can be devoted to one of the parties (the employer in the labor contract), to a negotiation device (a joint committee in many interfirm contracts), to a third party (such as the experts involved in the management of jointly owned assets in the petroleum industry; Cf. Williamson [1985]).

In sum, a governance structure articulates a behavior-driving mechanism (“technical governance”) aimed at defining the actions that the parties have to undertake to efficiently achieve coordination, and an incentive/coercion scheme, a supervision device and an arbitration mechanism that together ensure the self-enforcement of the contractual arrangement (that designed them). Figure 3 schematizes this.

Figure 3: A schematization of the Endogenization of Governance Structure by TCE



2.3 The Articulation between Collective and Interindividual Governance

Interindividual Governance Structures (IGS) are set up by agents to complete the incompleteness of *ex-ante* set contractual obligations and ensure their self-enforcement. However, the theory acknowledges that the function of governing the transactions is never completely performed by these IGSs (Williamson [1985, 1996], North [1990]). Put another way, the governance of interindividual transactions is performed both at the bilateral level by an IGS and at a collective level by Institutions. IGSs and Institutions are complementary means of coordination and agents balance the advantages of the two in their effort to reduce transaction costs.

When they build an IGS, economic agents’ behaviors are already constrained by collective or institutional mechanisms that exist *ex ante*³. Agents can therefore lean on those collective devices to simplify inter-individual coordination (as pointed out by Granovetter [1985] and North [1990]). Indeed, designing and running *ad hoc* IGSs are costly. Collective governance makes it possible in some cases to economize on the governance costs they bear⁴. Moreover, since their rationality, but also their ability to act, are bounded, agents cannot design and run IGS that will work in every state of the

³ Indeed, the Institutional Environment is endogeneized in NIE, but the analysis assumes that when two agents set up an interindividual governance structure, the institutional framework already exists.

world. They can therefore try to compensate for the potential failures of their IGSs by relying on Institutions. For instance, civil imprisonment can be used to compensate for the bounded enforcement power of agents.

However, at the same time, NIE develops the idea that the collective governance that is exercised by Institutions is incomplete and imperfect (North [1990]). This is due to three main reasons. First, Institutions are partly unintentionally designed to perform the governance of economic interactions. Indeed, institutions partly proceed from political logic and are designed to capture and secure power. Moreover some institutions — the so called conventions (Lewis [1969]) — result from path-dependent processes of decentralized interactions and adoption of behavioral rules concerning non-economic interactions. Second, Institutions are designed and run by agents whose rationality is bounded. As pointed out in the example of the judges that can be unable to efficiently ensure the enforcement of a contract, institutions can provide inefficient solutions. Third, Institutions are necessarily shaped to the lowest common denominator shared by a set of transactions. They cannot therefore perfectly fit the specificities of each relational situation (misadaptation costs). As a result, some governance has to be exercised at the Interindividual level by IGS to attempt to complete the incompleteness and correct the imperfection of collective governance.

This explains why agents' mutual rights and duties are never perfectly delineated and enforced either at the collective level or at the Interindividual level. Institutions and IGS are complementary and agents choose to have recourse to them with various intensities depending on the features of the transactions. Indeed, Williamson's market governance refers to a case where the governance is intensively performed at a collective level (by the legal system and the competitive process), while hierarchical governance refers to cases in which the governance is essentially performed through IGSs.

2.4 An Endogeneization of Complex Governance Systems

Since the institutional framework is imperfect and incomplete, agents have to implement interindividual governance structures to achieve coordination. However, they can also participate in the creation of collective governance structures that are therefore not entirely given. Indeed, agents have a certain ability to shape the institutional framework. North [1990] develops the idea that the incompleteness of the institutional framework provides agents with some freedom that they use to create IGSs. These IGSs can have an impact on the institutional framework by pushing it to evolve, either because they reveal its weaknesses (e.g. the inability of the legal system to solve a certain category of conflicts and contractual infringements), or because more efficient IGS make some institutional solutions obsolete. But recent analyses of the organization of various industries has also pointed out that agents directly design collective

⁴ Indeed, as pointed out by Brousseau [1999] and Bessy & Brousseau [1998], collectivization of governance can, first, generate economies of scale, scope and learning, second, affect the allocation of governance costs (for instance, the judicial system is paid by all the tax payers, not only by the agents that have contractual conflicts).

governance structures that fit the coordination needs of the community they belong to (e.g. Ménard [1995], Bessy & Brousseau [1998], Brousseau [1999]).

Institutions (North [1990, 1991]) or institutional frameworks (Davis & North [1971], Williamson [1996]), are made up, on the one hand, of rules that prescribe behaviors to agents in particular circumstances, and on the other hand, of decision-making mechanisms that are responsible for managing these rules (e.g. Courts, standardization committees, parliament, a civil service in charge of implementing the law, etc.). These decision-making devices complete the incompleteness of the rules (since they make decisions when rules do not apply), design them⁵, and ensure their enforcement. They can be qualified as “Institutional Organizations”. Institutions are therefore a combination of rules and institutional organizations.

Additionally, public institutions have to be contrasted with private ones. Public institutions rest on the violence monopoly of the State, and therefore its power of last resort. Public rules and public institutional organization’s decisions are enforceable without caring about the free will of agents because the State is endowed with an unbounded power of constraint over the economic agents that are under its sovereignty. On the other hand, some institutions rely on the freedom to join. This means that individuals or organizations agree to follow the rules designed by the corresponding organizational institutions⁶, or to obey their instructions because they estimate that membership and its associated constraints are preferable to other alternatives. The law and the legal system are examples of components of public institutions. Standards and standardization committees are examples of respectively private rules and private institutional organizations (since most standards are voluntary and not mandatory).

When economic agents have to solve a coordination problem, they have to balance between the decrease in the private transaction cost they bear when they coordinate through a collective device (i.e. institutions), and the necessary misadaptation of this device to the specificities of the transaction in question. They can play, however, on the Institutions’ ability to deal more efficiently with their specific coordination difficulties. Since they cannot easily directly impact on public institutions (see North [1990], Alston [1998]), they take them for granted and voluntarily create private (specialized) collective governance structures and rules. They therefore create intermediary levels of governance

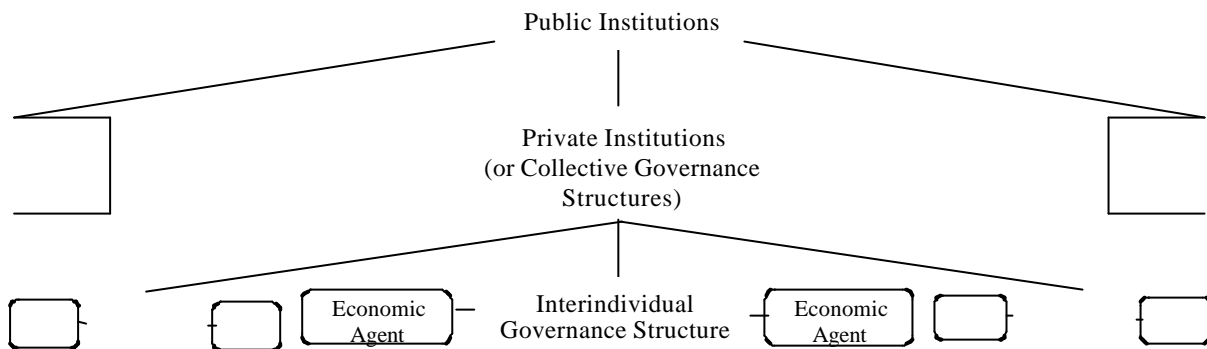
⁵ However, if some collective rules are explicitly constructed to ensure economic coordination, some other rules make economic coordination easier even if they have not been designed for that purpose and spontaneously emerge. The latter fit Lewis’ notion of convention (Lewis [1969]).

⁶ To a large extent these devices resemble the IGS. Their authority follows from the free-will of the agents that create them, but they can also rely on some public institutions — e.g. the judicial system — to decrease the cost of governance. The main difference between IGSs and these private institutions is that the former are bilateral while the latter are collective. Although everything is negotiated in a bilateral agreement, many of the components of a collective one are “take it or leave it” clauses, since they have been previously accepted by the community. As a result, everything is not negotiable (and negotiated) in the arrangement that sets up a private institution (while it is for a governance structure).

between IGS and public (and general) institutions. By being more specialized than public ones, private institutions provide agents with more efficient collective coordination means.

In sum, economic agents have the possibility of assigning the various governance tasks to various entities according to the respective nature of these tasks and ability of these entities. This enables them to play on the complementarities among public institutions, private institutions, and interindividual governance structures to try to obtain the lowest possible transaction costs. NIE is thus able to explain the co-genesis and the joint properties of interindividual (contractual) governance structures and institutions (collective governance structures) (Figure 4).

Figure 4: The various level of Governance in NIE



3. Conclusion

In this paper we demonstrate that these two theories of contractual incompleteness differ considerably both because of their basic assumptions and the issues they try to deal with. Indeed, in ICT, contractual incompleteness is only due to the bounded rationality of the judge who is supposed to personify the institutional framework, and the various levels of the judge's rationality impact on the negotiation and enforcement mechanisms that can be implemented. The issue is therefore to analyze how the legal framework responsible for the last resort enforcement of contracts impacts on their design. In NIE, incomplete contracting occurs because of the cognitive boundaries of economic agents, of the difficulties in forecasting all relevant future events, or of institutional failures that prevent parties from committing themselves on certain variables. Moreover, institutions are not given, and are imperfectly designed in the sense that they do not enable agents to transact at zero cost. These assumptions lead to the idea that coordination devices (contracts and institutions) are always imperfect in that they do not guarantee successful and costless coordination. Economic agents play on the complementarities among various types of governance devices to try to reduce transaction costs. However, since their rationality is bounded they never reach perfect solutions, but enhance them by learning from and benefiting from selection processes. The main issue in the NIE framework is therefore to compare the relative costs generated by various combinations of coordination devices in various contexts.

These two frameworks are thus more complementary than substitutable. They are not really in competition since the issues they deal with differ noticeably. Moreover, if NIE is efficient when it deals with the comparison of (discrete) alternative combinations of (interindividual and collective) governance devices, its performances are weaker when it deals with individual contract design. The precise analysis of contractual mechanisms provided by ICT is in this case much more powerful. On the other hand, ICT is unable to grasp the fact that agents combine diverse types of governance mechanism because they realize a tradeoff between collective governance that benefits from economies of scale, scope and learning, and interindividual governance that is customized to the specific requirements of transactions. Moreover, both frameworks face analytical weaknesses that prevent us from considering one of them as being definitively more powerful and more general than the other. ICT can be criticized because it is either logically inconsistent (in the G&H version), or because it relies on an ad-hoc assumption (in the H&M and ADR versions). While NIE has to be credited for its stronger logical consistency, it has to face formidable methodological difficulties. It is indeed quite difficult to draw and test conjectures from the bounded rationality assumption because rationality can be bounded in many different ways, because it has a wide set of impacts, and because these elements vary for each individual. Furthermore, the main cause of the powerfulness of NIE — its ability to endogeneize various level of embedded governance devices — is also its methodological Achille's heel since, in practice, scholars often study only one level of governance (and consider the other as given) in order to face simpler testable causal relationships between coordination problems and governance solutions. Although interactions among the various levels of governance are actually grasped by the community of NIE scholars, these interactions are not really studied in individual pieces of research.

NIE's methodological difficulties have, however, to be balanced out with the fact that NIE relies on a strong empirical basis as pointed out by Williamson [1996] who qualifies TCE as an “empirical success story”. Indeed, beyond the numerous case studies performed by new-institutional economists (for instance, in Williamson's and North's contributions as well as in most other papers quoted above), many conjectures have been econometrically tested (see the surveys on econometric tests by Klein & Shelanski [1995], Crocker & Masten [1996]). On the other hand, there is only one piece of research in which ICT is tested: Hansen [1995]. Methodological difficulties do not therefore mean inconsistent results!

The following table sums up our arguments.

	Analytical Assumptions	Purpose	Main Contributions	Analytical Boundaries
ICT	<ul style="list-style-type: none"> * Rationality: <u>-Substantive</u> for the agents. -Bounded for the Judge. * Risk (Complete Information). * Pre-existing Institutional Framework. 	<ul style="list-style-type: none"> * Design of Contractual Renegotiation and Enforcement Mechanisms (as a static process). * Assessment of the Optimality of Solutions. 	<ul style="list-style-type: none"> *Rigorous analysis of the impact of the Institutional Framework on Contractual Performances. 	<ul style="list-style-type: none"> *Logical Inconsistency or *Ad-hoc Assumption about the Bounded Rationality of the sole Judge
NIE	<ul style="list-style-type: none"> * Bounded Rationality for all the Participants. * Radical Uncertainty (Incomplete Information). * Initial Autonomy of Economic agents. 	<ul style="list-style-type: none"> * <u>Design</u> of Governance Systems (articulating inter-individual and collective governance) as a dynamic process (evolutionary reasoning). * Assessment of Transaction Cost level. 	<ul style="list-style-type: none"> *Endogeneization of the diversity of Governance Modes. *Analysis of their complementarities and interactions. 	<ul style="list-style-type: none"> *Methodological Difficulties due : - to the <u>generalization</u> of the Bounded Rationality Hypothesis - and to the Endogeneization of all coordination devices.

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