Contract Economics and the Renewal of Economics

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Abstract:

The concept of contract has become essential to economics in the last 30 years. Three main theoretical frameworks arose: "incentive theory", "incomplete-contract theory" and "transaction-costs theory." These frameworks have enabled scholars to renew their analysis of microeconomic coordination problems and yielded implications for Industrial Economics. Beyond this, analyses of the performance of "market" economies and of the institutional framework were also renewed. Though substantial progress has been made, new developments are needed, requiring a better grasp of Bounded Rationality and also of the interactions between contracts and institutions.

Key Words: Contracts, Institutions, Incentive theory, Incomplete-contract theory, Transaction-costs theory

To an economist, a contract is an agreement under which two parties make reciprocal commitments in terms of their behavior—a bilateral coordination arrangement. Of course, this formulation touches on the legal concept of the contract (a meeting of minds creating effects in law), but also transcends it. Over the course of the past thirty years, the "contract" has become a central notion in economic analysis (Section 1), giving rise to three principal fields of study: "incentives," "incomplete contracts," and "transaction costs" (Section 2). This opened the door to a revitalization of our understanding of the operation of market economies…and of the practitioner's "toolbox" (Section 3).

The goal of this book is to provide an overview of recent developments in these analytical currents, to present their various aspects (Section 4), and to propose expanding horizons (Section 5). The potential of these approaches, which have fundamentally impacted on many areas of economic analysis in recent decades, is far from exhausted. This is evinced by the contributions in this book, which draw on a variety of methodological camps and disciplines.

1. The Central Role of the Notion of the Contract in Economic Analysis

Even though the notion of the contract has long been central to our understanding of the operation of decentralized social systems, especially in the tradition of the *philosophie des lumières*, only recently have economists begun to render it justice. Following in the footsteps of Smith and Walras, they long based their analyses of the functioning of decentralized economies on the notions of market and price system. This application of Walrasian analysis, in which supply meets demand around a posted price, does not satisfactorily account for the characteristics of a decentralized economy (cf. Ronald Coase's contribution in this book, chap. 2). First, and paradoxically for a model of economic analysis, it does not account for the costs of operating the market. Next, it assumes the pre-existence of collective coordination (implicitly institutional)—the properties of the traded merchandise are fixed in advance, all market actors effectively participate in the tatonnement process, etc.—in contradiction with the idea that the market is truly decentralized. Finally, this model is unrealistic because, in practice, agents exchange goods and services outside of equilibrium and in a bilateral context, i.e. without knowledge of the levels and prices at which other agents are trading, and without knowledge of whether these prices clear the market.

Contract economics was born in the 1970s from a twofold movement of dissatisfaction vis-à-vis Walrasian market theory.

- On a theoretical level, new analytical tools were sought to explain how economic agents determine the properties, quantities, and prices of the resources they trade in face-to-face encounters. If these agents are subject to transaction costs, if they can benefit from informational advantages, or if there are situations in which irreversible investments must be made, then it is reasonable to expect that one will not see the same goods traded at the same price and under the same rules as on a Walrasian market. Price theory and, by extension, the analysis of the formation of economic

aggregates (prices, traded quantities and qualities, etc.), were fundamentally affected by the work of Arrow [1971], Akerlof [1970], and Stiglitz [1977], among others.

- On an empirical level, problems associated with the regulation of competition drove a renewal of economic thinking. The analysis of certain types of inter-firm contracts, such as selective distributorship agreements, long-term cooperation agreements, etc., was revamped. Previously considered anti-competitive, the beneficial welfare effects of these arrangements had been ignored. The devices available to public authorities for creating incentives and controlling producers of services of public interest were also subjected to a reexamination. Economic theory had not considered the possibility that either party could appropriate the rent from monopolistic operation of such services. Demsetz and Williamson, Baron and Laffont, to name a few, renewed the approach to these issues of "regulation."

This twofold origin explains the remarkable development of contract theory and its key contribution to a fundamental redesign of all areas of economic analysis, from the study of microeconomic interactions to that of macroeconomic aggregates (such as the labor market), passing by the various domains of applied economics, finance, international trade, industrial organization, etc.

This success is essentially attributable to the analytical power of the notion of the contract. On the one hand, the idea of the contract focuses attention on elementary social structures, those that regulate coordination at a bilateral level. On the other hand, despite its simplicity as a concept, the contract allows us to examine a number of key issues. We can point to at least four.

- First, the analysis of contracts allows us to reexamine the exact nature of difficulties associated with economic coordination, while deepening our understanding of the functioning and the basis of coordination mechanisms.

- Second, this approach illuminates the details of various provisions for coordination: routines, incentives, the authority principle, means of coercion, conflict resolution, etc.

- Third, analysis of the origins of contracts sheds light on how agents conceptualize the rules and decision-making structures that frame their behavior.

- Finally, studying the evolution of contractual mechanisms helps us understand changes in the structures that frame economic activity.

Thus, the contractual approach allows us to analyze coordination mechanisms within a simplified but rigorous framework. It not only illuminates the properties of contracts, but also those of other harmonization instruments, such as markets, organizations, and institutions (cf. Oliver Williamson's contribution in this book ; chap.3). These collective arrangements reveal mechanisms comparable to those typical of contracts (participation incentives, allocation of decision rights, provisions to give credibility to commitments, etc.).

It should be noted that the analysis of contracts must also be clear on the limits of this approach to economic activity. Specifically, this is true for organizations and institutions that are not reducible to the notion of the contract. On the one hand, organizations and institutions have a fundamentally collective character: an individual will join them without negotiating each rule governing the relations between members. Moreover, the evolution of this relational framework cannot be controlled by any individual acting alone. On the other hand, the properties of organizations' and institutions' collective arrangements do not derive uniquely from the content of the bilateral relationships linking each of their elements, but also from the communal articulation of these arrangements—in other words, the topology of the interaction networks.

The contractual approach is also relevant because of the exchanges it makes possible with other disciplines. These include law, of course, but also management, sociology, anthropology, political and administrative sciences, and philosophy. The notion of the contract is simultaneously broader in scope and more general than the notion of the market. This has allowed the economic analysis of the contract to export some of its results, notably the difficulty of creating perfect incentive mechanisms, the incentive-insurance dilemma, or the impossibility, under many conditions, of drafting complete contracts (cf. Alt and Shepsle [1990]). But the contractual approach has also provided a gateway for imports that have proven indispensable to advances in economic analysis (cf. Section 5). Other intellectual and methodological traditions have allowed us to extend the economics of contractual coordination. Legal analysis, for example, specifies the role of various mechanisms that ultimately guarantee the performance of contracts and brings to light their "embedding" into the general rules that give them meaning and complete them. Management sciences emphasize that economic agents concretely act on the complementary relationship between contracts and imperfect incentive provisions to resolve coordination problems (e.g. Koenig [1999]).

2. Three Principal Currents

2.1. Origins

While we can speak of "contract economics" in general, it is worthwhile to distinguish between several branches of contract theory, into which various analytical traditions have converged that were themselves renewed in the process. While these currents all sprang from dissatisfaction with the standard analytical model of the market, different methodologies gave rise to them.

One of the new models derives from the lineage of the standard model. Arrow's work on the functioning of insurance markets (Arrow [1971]), and that of Akerlof [1970] on the market for used automobiles, led to the theory of incomplete information. Challenging the assumption that all actors on a market have access to symmetrical, or identical, information, the authors drew attention to the consequences of one individual having an informational advantage. They emphasized the importance of implementing disclosure mechanisms to limit the ability of the "informed" to take advantage of the "under-informed." This line of research dates from the 1960s.

As early as the 1930s, however, other foundations of modern contract analysis were laid. Coase was the first to enunciate the idea that the existence of coordination costs on the market justifies resorting to various coordination mechanisms in a decentralized economy, especially hierarchical coordination within firms (cf. Coase [1937, 1988]). Some forty years later this analysis was taken up and expanded by Williamson.

But Coase was not the only influence on Williamson. The latter's early work in the 1960s represented the Carnegie behaviorist school, along with Cyert and March (Cyert & March [1963]). Here we find the lineage of theories of the firm whose formulation began in the 1930s, but whose full development occurred primarily in the 1950s. Managerial and behaviorist approaches to the firm (from Berle and Means [1933] to Simon [1947], passing over Hall & Hitch [1939]), as well as the controversies surrounding their development (cf. Machlup [1967]), permitted considerable advances in the understanding of non-price coordination. Starting in the 1970s, many of these advances were revisited by economists interested in the properties of contractual, organizational, and institutional means of coordination.

Another "school" had a profound influence on contemporary contract theory: property rights (Alchian [1961], Demsetz [1967], Furubotn & Pejovich [1974]). In a certain sense, Coase also laid the foundations for this approach with his analysis of the problem of externalities (Coase [1960]), which brought to light the implications of property-rights definitions for the issue of efficiency. This contribution then merged with further developments from the Chicago school. Comparative analysis of alternate property-rights systems revealed that the allocation of residual rights (the right to determine the use of resources and to appropriate the ensuing income) may, or may not, motivate an efficient use of resources. This approach yielded essential elements of theories of the firm and of contracts (Alchian & Demsetz [1972], Klein, Crawford & Alchian [1978]). Under certain types of relational arrangements, only a reallocation of property rights can overcome economic agents' propensity to be opportunistic. This school also focused economists' attention on the specific consequences of the manipulation of incentive systems.

Finally, it would be impossible to ignore the contributions of other disciplines. Economic analysis of the law has concentrated on certain aspects of contractual relationships. It is also noteworthy that one of the primary concepts in the economic analysis of contracts, the notion of the "hybrid form" proposed by Williamson [1985], drew directly on Macneil's [1974] socio-legal analysis. On another level, economic views of non-market coordination were profoundly influenced by developments in management sciences, by sociology and psycho-sociology, by administrative sciences, and by the history of organizations, as is evinced by the frequency of references to Simon, Barnard, and Chandler (Simon [1947], Barnard [1938], Chandler [1962]). As to the economics of institutions, which develops an analysis more concerned with the role of the institutional environment on the design and the performance of contracts, it traces its roots to history, to political science, and to ethnology (cf. North [1990], Eggertsson [1990]).

Arising from these precursors, three schools dominate the field of contract economics today: incentive theory (IT), incomplete-contract theory (ICT), and transaction-costs theory (TCT). These are distinguished by differences in their underlying assumptions,

leading them to emphasize different problems. The standard models of these three theories are described in the appendix to this chapter (by M'hand Fares).

2.2. Incentive Theory (IT)

Incentive theory draws on several of the traditional hypotheses of Walrasian economic theory. Notably, it assumes that economic agents are endowed with substantial, or Savage, rationality (Savage [1954]), that they possess complete information concerning the structure of the issues they confront along with unlimited computational abilities, and a complete and ordered preference set.

The information available to these agents is complete in the sense that, even though they cannot precisely anticipate a future that remains stochastic, they do know the structure of all the problems that may occur. What they cannot know, where applicable, is what issues will in fact arise, nor in what sequence. Thus, they envision the future on the basis of probabilities (objective or subjective). This links to the notion of risk, as described by Knight [1921] (even though Knight did not account for subjective probabilities). Given this theoretical framework, agents imagine the most efficient solutions as functions of the different possible states of nature and compute their expected values. These calculations are possible since agents are endowed with unlimited abilities in this area. In other words: calculating costs them nothing in terms of time or resources. Finally, since agents' preference functions are complete and stable over time, they effectively choose optimal solutions.

The assumption that diverges from the Walrasian universe is that the two contracting parties do not have access to the same information on certain variables. This is an evolution toward a more realistic conception. In a decentralized economy, there is no reason why one party should know, *ex-ante*, the private information of the other (such as his preferences, the quality of his resources, his willingness to pay, or his reservation price). Depending on whether the variable on which there is asymmetric information is exogenous—i.e. not subject to manipulation during the exchange by the party possessing it—or endogenous—i.e. vulnerable to such manipulation—we speak of models of adverse selection or moral hazard, respectively. Adverse selection, for example, is exemplified by a potential employer's uncertainty concerning a job seeker's level of competence, while moral hazard refers to uncertainty about the level of effort the latter will supply.

Incentive theory (IT) starts from a canonical situation in which an under-informed party—called the "principal"—puts into place an incentive scheme to induce the informed party—the "agent"—to either disclose information (adverse-selection model) or to adopt behaviour compatible with the interests of the principal (moral-hazard model). The incentive scheme consists of remuneration being conditional on signals that result from the agent's behavior (such as the choice of an option from a list of propositions considered a "menu" of contracts or as the visible result of the effort supplied when the effort itself is not observable).

The existence of such an incentive scheme relies on two key assumptions.

- While the principal is under-informed, not knowing the true value of the hidden variable, he does know both the probability distribution of this variable and the agent's preference structure. The principal can thus put himself "in the place" of the agent to anticipate the latter's reactions to the set of conceivable remuneration schemes, and then select the one he prefers from those acceptable to the agent.

- There is an institutional framework, hidden but competent and benevolent, which ensures that the principal respects his commitments. Thus, any proposition made by the principal is credible to the agent. Moreover, the proposed remuneration scheme is based upon "verifiable" information, i.e. observable by a third party.

The solution to adverse selection problems relies on the design of a "menu of contracts" that will induce self-revelation by the agent of her private information. The principal designs a set of optional contracts—i.e. a set of payment formulae linked to various counterparts by the agent. While he does not know the agent's private information, he knows the set of possible values it may take. Since he also knows her preferences, he is able to design a contract that maximizes the agent's utility for each possible value of that private information. When the agent faces the resulting set of possible options, she spontaneously chooses the contract that maximizes her utility, allowing the principal to infer private information. Of course, the principal's interest is to obtain this revelation in exchange for the lowest possible payment.

The canonical moral-hazard problem occurs when one relevant dimension of the agent's input is not observable by the principal—one that is costly to the agent, and while it affects the principal's welfare. For instance, an employer cares about an employee's productivity. However, he cannot deduce the efforts she actually supplied from the observed productivity, because the productivity of a single agent depends on many other variables that are not under her control and not observable to the principal (coworkers' efforts, the productivity of capital, randomness in the production process, etc.). To incite the agent, the apparent optimal remuneration mechanism would be to linearly index her wage on her observed productivity. However, if the agent is risk averse, she will not accept such a payment scheme, as it could provide her with negative or very low remuneration, even when the poor outcome would not be attributable to her own level of effort. Because of risk aversion, the agent would prefer to be paid a fixed wage. However, in that case she would not be motivated to provide her best effort. To solve this "incentive vs. insurance" dilemma, the optimal payment scheme combines a fixed base pay and a variable bonus indexed on the observed result; yielding a nonlinear payment scheme.

Into this analytical framework, which was formulated during the first half of the 1980s, many refinements were subsequently incorporated that considerably extended its reach (cf., for example, Salanié [1997]). First, the theories of adverse selection and moral hazard were combined. Subsequent extensions included teaming one principal with several agents, letting informational asymmetry apply to several variables, repeating interactions over time, etc. In this issue, the article by Eric Malin and David Martimort provides a good overview of the analytical strength of this theoretical framework (chap. 10).

2.3. Incomplete-Contract Theory (ICT)

Incomplete-contract theory is the most recent of the three theories. Its initial purpose was to model some of Williamson's propositions about vertical integration (Grossman & Hart [1986]), but subsequent developments led it in different directions. ICT thus came to examine the impact of the institutional framework on contract design, though its roots lay in the study of the effect of property-rights allocations on the distribution of the residual surplus between agents and on their incentive to invest.

In terms of its assumptions, ICT is also close to "standard" neoclassical theory. In particular, agents are deemed to possess Savage rationality. However, it is distinguished from both Walrasian theory and incentive theory by a key hypothesis. ICT postulates that complete contracting of agents' future actions is impossible when no third party can "verify," *ex post*, the real value of some of the variables central to the interaction between the agents. Here the institutional framework is no longer implicit. On the contrary, the issue here is that the "judge," symbolizing the authority that ultimately ensures the performance of the contract, is incapable of observing or evaluating some relevant variables—such as the level of effort or of some investments. It follows that contracting on unverifiable variables is useless, and other means must be found to ensure efficient coordination.

To focus on the issues arising from non-verifiability (failure of the institutional framework), ICT assumes that there is no asymmetry in the parties' information. Both observe all the available information during each period of trade, while the "judge" cannot verify some of it, which is therefore non-contractible. Uncertainty arises because each agent has to act on the non-contractible variable in the absence of complete information on the outcome of his behavior since he cannot anticipate with certainty what the other will do. Formally, this is represented by contracting over two periods. During the first period the agents realize non-verifiable investments. The second period is devoted to trade, the characteristics of which, in terms of price and quantity, are the only verifiable variables. This generates a dilemma: since it is only possible to contract on verifiable variables, agents can only commit on the characteristics of their trade in the second period. Now, the level of investment realized by the parties in the first period depends upon this contracted level of trade. However, once the actual level of the investments is known by the end of the first period, along with the state of nature in which the trade will take place, the *ex ante* contracted level of trade is no longer optimal. *Ex post*, it would thus be optimal to renegotiate the amount of the trade. But, if the agents anticipate this renegotiation, they will no longer have an incentive to efficiently invest *ex ante* (since the contracted amount of trade is no longer credible).

The solution to this coordination dilemma consists of signing a commitment constraining the scope of the *ex post* negotiations in order to provide an incentive to each party to invest optimally *ex-ante*. This arrangement assigns a unilateral decision right to one of the parties to determine the effective level of trade *ex post*, while a default option protects the interests of the second party by establishing a minimal level of trade. Two families of models have been created deriving from this framework. The first is represented by the work of Hart and Moore [1988]. An efficient level of investment is not obtained from the

beneficiary of the default option, since this option is insufficiently sophisticated to motivate him to invest at the optimal level under all conditions. The *ex ante* inefficiency follows from the fact that the default option is contingent on the state of nature that materializes. The second family is an extension to the work of Aghion, Dewatripont and Rey [1994], who postulate that the default option may provide an incentive for the beneficiary to invest optimally. They assume that the judge will be capable of verifying, and of rendering enforceable, default options of great complexity and that he will oppose any renegotiation of these provisions.

ICT thus establishes a direct link between the ability of judicial institutions to observe or evaluate the nature of implementable contracts and their efficiency. When some variables are unobservable, contracts are incomplete. Thus, the capabilities of judicial institutions determine the level of sophistication of the default clause, which motivates efficient behavior on behalf of the party that does not benefit from renegotiation rights (i.e. the right to decide and to the residual surplus).

Though ICT has been the subject of a vast literature it remains less well developed than IT. This is partly attributable to the dispute between its proponents (especially Oliver Hart) and those of IT (especially Jean Tirole) and TCT. Tirole [1999] points out a logical inconsistency between the assumption of agents' perfect rationality and their inability to implement a revelation mechanism, *ex ante*, that will force them to reveal to the judge the true level of their investments, *ex post* (thus *de facto* eliminating non-verifiability). Hart, and other advocates of ICT, reject this criticism. For such a revelation mechanism to work, it should not be renegotiable *ex post*. They maintain further that if it were, this would be tantamount to imputing verification abilities to the judge that he generally lacks. As to transactions-costs economists, they acknowledge the usefulness of the analytical framework suggested by ICT, but emphasize that it does not draw all the conclusions implied by the rationality constraints imputed to the judge. If the judge's rationality is irremediably bounded, as ICT *de facto* assumes in postulating that he is unable to verify certain variables, why assume that the contracting parties' rationality escapes from similar limitations? It would be more consistent to resort to a hypothesis of bounded rationality for all the actors—the parties and the judge—as is the case in the TCT (Brousseau & Fares [2000]).

The paper by Oliver Hart in this volume (chap. 11) nicely points out how ICT considerably enriches the economic analysis of the firm and provides stimulating insights into law and economics since it is able to account for the impact of the institutional framework upon the economics contractual practices. The paper by Philippe Aghion and Patrick Rey (chap 12) focus on the allocation of control rights under various circumstances among parties facing wealth constraints. They point out how participation constraints interact with efficiency considerations in designing optimal incomplete contracts.

2.4. The New-institutional Transactions Costs Theory (TCT)

TCT is based on the assumption of non-Savage rationality. This rationality is "bounded" in the sense of Simon [1947, 1976]. This means that agents have limited abilities to

calculate, but also that they operate in a universe in which they do not know, *a priori*, the structure of the set of problems that may arise. These agents are confronted with "radical" uncertainty (in the sense of Knight [1921] or Shackle [1955]), rendering them unable to compose complete contracts.

Contractual incompleteness in TCT can be considered "strong," since it has another source: institutional failure (Williamson [1985, 1996]). As is the case in incomplete-contract theory, institutions that are ultimately responsible for ensuring the performance of contracts cannot enforce those clauses that pertain to unverifiable variables. Moreover, judges are also prisoners of their bounded rationality. They may take a long time before pronouncing judgment, refuse to rule, make mistakes, etc. Thus, the performance of contracts is not guaranteed by external mechanisms.

Consequently, the bounded rationality of agents and judges combine to explain the acceptance of contracts that remain incomplete. To ensure coordination despite the incompleteness of their contracts, agents must, on the one hand, make provision for procedures to dictate the actions of each, *ex post*, and, on the other hand, implement means to ensure the *ex post* performance of their commitments. In this case the contract allocates decision rights to: a) one, or b) both of the parties (negotiation procedures), or c) to a third party (distinct from the judge). It also puts into place a series of supervisory and coercion mechanisms to ensure that the parties respect their mutual commitments. The contract thus creates a "private order," by virtue of which the parties will be able to ensure each other's cooperation *ex post*.

TCT facilitates analysis of how economic agents combine commitment constraints—designed to guarantee the realization of specific investments—with flexibility constraints—needed because of the impossibility of perfectly foreseeing the coordination modes that would be optimal *ex post*. In this volume, Olivier Favereau and Bernard Walliser (chap. 14) draw on an analysis formulated in terms of option values to propose an innovative rereading of the "commitment-flexibility" dilemma originally presented by Simon [1951]. TCT, however, assumes a broader approach, in that it simultaneously deals with the efficiency of adjustments *ex post* and constraints on the performance of contracts.

- TCT insists on safeguards to protect each party from the potential for opportunistic behavior on behalf of the other and to provide incentives to commit to the transaction. In this regard, it emphasizes the manipulation of the costs of breaking the agreement—using security deposits ("hostages") or irreversible investments—and the length of the commitment.

- The longer this duration, the more difficult it becomes to predict efficient future adjustments. It thus becomes necessary to redefine the parties' obligations over the course of the performance of the contract. We here observe a paradoxical aspect to contractual incompleteness with respect to the credibility of the commitment: since the parties know that revisions are possible in the future, they are less inclined to violate their commitments when the contract does not provide them with an efficient (or satisfactory) outcome.

- Finally, TCT insists on private conflict resolution mechanisms. Since commitments are open-ended and specific, conflict resolution cannot be efficiently ensured by outside authorities. Under these conditions, the contracting parties must agree beforehand on bilateral procedures for resolving disagreements.

However, owing to the bounded rationality of the agents who design and implement them, all these bilateral coordination devices remain imperfect. They are also costly to devise and manage, so the contracting parties will, as much as possible, fall back on collective provisions emanating from the institutional framework. This latter plays two essential roles.

- First, it provides a basic set of coordination rules, freeing agents from the need to invent, or reinvent, all of them within their contractual relationships. For example, external technical standards eliminate the need to compose a voluminous specification manual, while "common knowledge" specific to a profession dispenses with the requirement to formally describe the criteria defining certain characteristics, or behavior, as "standard" or "fair".

- Second, the institutional framework lends credibility to sanctions guaranteeing the performance of contractual obligations. Reputation, the self-regulating systems of some professions, and public authorities' power to regulate and coerce all provide further support for the contracting parties.

This has important consequences for the analysis of contracts. On the one hand, the nature of implementable contractual arrangements is highly dependent on the real characteristics of the institutional framework, particularly on the makeup of its failings. On the other hand, the institutional framework cannot be reduced to its public components, such as the legal environment and the judiciary. Formal collective institutions (such as professional codes of conduct or "self-"regulations" enforced by corporations or professional associations) join with their "informal" analogs (including behavioral rules imposed by relational networks such as professions, social and ethnic groups, etc.) to flesh out the full complement of relevant properties of the institutional framework (North [1990]).

2.5. The Three Base Models and Their Ramifications

The three base models (IT, ICT, TCT) can be represented schematically and juxtaposed with the Walrasian model (WT for Walrasian Theory).

Table 1: Schematic Representation of the Different Approaches

Theory	Rationality	Contracting parties' Information	External Institutions	Principal Issue
WT	Savage	Complete and Symmetric	Perfect (precluding deviations from the announced plans)	Centralized and simultaneous establishment of all equilibrium prices and traded quantities
IT	Savage	Complete and Asymmetric	Perfect (guaranteeing the performance of commitments)	Disclosure and incentives ensured by payment scheme
ICT	Savage	Complete and Symmetric	Imperfect (unable to verify some variables)	Allocation of decision rights and residual surplus to motivate non-contractible investment
TCT	Simon	Incomplete and Asymmetric	Very imperfect (unable to verify some variables and subject to bounded rationality)	Creation of a procedure for decision making *ex post* and of a mechanism to render the commitment enforceable

These three alternatives to the Walrasian approach have given rise to various offshoots or hybrids. In applied economics, in particular, the nature of the issues dealt with have often made it necessary to move away from the canonical forms of the three theories. While these theories are somewhat competitive, they should also be viewed as complementary to the extent that they do not emphasize the same dimensions of contracts. To simplify, IT focuses on remuneration schemes, ICT relates to renegotiation provisions that are framed by default clauses, and TCT deals with how rights to decide, control, and coerce are allocated between the parties. Sometimes a combination of several approaches is called for to explain a real phenomenon, as was demonstrated by the work of Holmstrom and Milgrom [1994] on the internal governance of firms.

Positive agency theory (Jensen & Meckling [1976], Fama [1980]) constitutes one of the archetypes of these hybridizations. As Gérard Charreaux points out (chap.15), this theory aims to analyze relationships within organizations on the basis of assumptions that are quite realistic. Thus, it shares with TCT the notion that efficient (rather than optimal) coordination results from the combination of several imperfect contractual and institutional mechanisms. However, positive agency theory emphasizes the coordination of the allocation of decision rights and the mechanisms governing remuneration and the assignment of residual incomes (in the tradition of the analysis of Alchian & Demsetz [1972]) and thus also draws on incentive theory.

3. Many Fields of Application

The application of contract theory to various branches of economic analysis has generated a multiplicity of results: on the microeconomic level for the analysis of different types of contractual practices (Section 3.1); in macroeconomic reexaminations of the properties of a truly decentralized economy (Section 3.2) and, finally; for the regulation of interdependence in relationships between individuals within a given institutional environment (Section 3.3).

3.1. A Rereading of Microeconomic Interactions

Recognition of the contract as an object of economic analysis was expanded by the study of different categories of contractual relations. These studies allowed the theory to be extended so as to better characterize the coordination regimes effective in certain industries and to clarify the choices of some economic decision-makers. In management, for example, studies on efficient methods of coordination with suppliers, partners, or distributors are legion (cf., for example, the *Strategic Management Journal*). In economics, this research has accompanied the redesign of public policy, especially related to competition and the regulation of services of general interest (also known as "public services" or "utilities").

Issues relating to industrial organization have motivated the greatest number of such studies. In a break with traditional approaches, which focused on anti-competitive consequences of bilateral relationships, systematic investigation of inter-firm contracting practices have sought to illuminate their contributions to economic efficiency.

One of the most-studied practices has undoubtedly been contracting between firms and their suppliers. Subsequent to the landmark case of the relationship between General Motors and Fisher Body—one of its suppliers in the 1920s (Klein, Crawford & Alchian [1978]; cf. also Benjamin Klein's article in this volume (chap.4) and the *Journal of Law and Economics* (Volume XLIII, Number 1, April 2000) that dedicates several papers to this case)—contemporary industries, especially automobile manufacturing, have seen their contractual practices repeatedly scrutinized (e.g. Aoki [1988]). These analyses have differentiated between various categories of subcontracting and partnership relationships and have examined their impact on firm and industry competitiveness. During the 1990s comparative analysis of the vertical-integration decision and partnership contracts provided the frame of reference for tracing the evolution of corporate practices: be they outsourcing policies resulting from a refocusing on the core business, or the development of industrial partnerships to increase flexibility in production and follow the acceleration of the pace of innovation (e.g. Deakin & Michie [1997]).

The determinants and consequences of long-term contracts have been researched in other industries, notably those belonging to the energy sector. They have provided a better understanding of the economics of negotiation mechanisms and of private conflict resolution, as well as of the comparative efficiency of contractual adjustment mechanisms in various contexts. Moreover, the analysis of long-term contracts—often associated with the initial phase of the deployment of transportation networks and the exploitation of new mineral deposits—has yielded a better understanding of the feasibility of liberalizing network industries once the initial investment has been recuperated or the interconnections have multiplied (Joskow [1983]). Three important results have been obtained in this area. First, contrary to intuition, many long-term contracts are relatively flexible (Goldberg & Ericson [1987], Croker & Masten [1991]). Second, these contracts are central to the provision of those utilities that are indispensable to modern economies—water, gas, electricity, etc. Third, to some extent these contracts have proven compatible with other modes of coordination (such as spot markets), allowing flexibility, security and freedom of choice to coexist.

Distribution agreements linking manufacturers, wholesalers or the creators of commercial concepts with distributors have also stimulated a large body of work, especially on franchising. The franchisor, having created a business model distinguished by a brand, delegates the actual implementation of this model to others (the franchisees). Horizontal externalities are generated between the distributors (since the behavior of each impacts on the shared brand image) as well as vertical externalities between the franchisor and the franchisees (either of whose actions affect the level of sales). The franchise system is designed to internalize these externalities as much as possible. This results both from the specific form of each contract, as well as from the general architecture of the contractual network, as is underlined in the contribution by Francine Lafontaine and Emmanuel Raynaud (chap. 18).

Distribution agreements also encompass looser relationships between manufacturers or wholesalers and distributors—comprising the wide array of "vertical restrictions." They are so designated to the extent that these vertical contracts do not limit themselves to an agreement on the unit price of the goods traded, but also impose *de facto* behavioral constraints on the buyer, i.e. the distributor. Price constraints (regressive pricing, systems of rebates and volume discounts, binding retail prices, etc.) or "non-price" restrictions (service requirements) implemented in vertical contracts allow various pricing issues to be resolved (the double-marginalization problem): provision of services related to sales (consulting, after-sales service), management of competition between points of sale and between networks. Klein and Saft [1985] and OECD [1994] provide interesting summaries underlining the complex impact of these practices on social welfare and on the division of surpluses between distributors and their partners. In this book, Benito Arrunada provides an opportune reminder that the distributor himself may impose constraints upstream, which may be designed to increase economic efficiency and not necessarily reveal a desire for more market power (chap. 19).

Another very interesting family of contracts deals with trade in technology and, more generally, intangibles. In an economy increasingly based on knowledge and information, arrangements for immaterial transactions become essential. The specific interest of the case of technology licensing agreements is that it applies to resources that are complex and imperfectly protected by the body of law governing intellectual and industrial property rights. The implementation of efficient contractual mechanisms requires recourse to specialized collective devices that simplify and secure such transactions (cf. Bessy & Brousseau [1998]). The analysis of the dynamics of trade in technology allows us to understand how these market infrastructures are progressively assembled. In this volume, the contribution of Ashish Arora and Andrea Fosfuri (chap. 21) provide an account of such a dynamic in the chemical industry. The experience acquired by the contracting parties, the appearance of intermediaries, and the standardization of practices explain the fall in transaction costs and the multiplication of agreements that foster the dissemination of information over time.

Agreements governing interconnections between network operators also merit attention because of their implications for the organization of markets and for competition. As Godefroy Dang N'Guyen and Thierry Pénard emphasize in their contribution (chap. 20), these agreements raise issues pertaining to the financial management of externalities

(interconnection tariffs) arising from the allocation of property rights to operators. These questions are now being asked in all networked industries, but they have a wider relevance since they apply to interdependence between producers of complex product-services. Production organized as the assembly of elementary components is gaining ground in many industrial sectors (e.g. computers, automobile) and services (tourism, banking and insurance).

Finally, a great deal of attention has been paid to the delegation, or concession—interpreted as contractual (Goldberg [1976])—by public authorities to private operators of the production of certain goods or services in a noncompetitive environment (armaments, infrastructure, public goods). Baron & Myerson [1982], Baron & Besanko [1984], and especially Laffont & Tirole [1993] bolstered the study of regulation by emphasizing the informational asymmetries between public trusteeship and regulated firms, galvanizing a search for new regulatory practices. Confronted with the difficulty of implementing efficient regulations (cf. the contribution of Matthew Bennet and Catherine Waddams Price ; chap. 23), there has been a movement toward opening the provision of these services to competition. In some cases, however, establishing competition between operators has proven a difficult task, owing to either the the degree of specialization of the required investment (degree of "specificity"; Williamson [1976]) or to the necessity of maintaining a direct, centralized coordination between the supply of, and the demand for, these services (Glachant [1998]). Public authorities must then contract efficiently with service providers in a monopoly position. In their paper on urban water supply systems, Claude Ménard and Stéphane Saussier analyze the profusion and complexity of choices that arise (chap. 24).

All in all, given that contracts are tools of coordination whose flexibility and adaptability allow them to be tailored to the exact conditions of their use, contract analysts have been able to raise doubts about the applicability of traditional theoretical approaches and the policies they support. The relevant level of analysis is more sub-microeconomic than traditional microeconomics, because it examines in detail the management of transactions. The unit of analysis is no longer the market or the industry, but the transaction. This change in perspective has enriched industrial economics and, more recently, inspired a renewal in law and economics.

- In industrial economics, we are freed from a conception of behavior exclusively dictated by the structure of the market or of the industry. Conceptualizations of the nature of the limits of the firm have been overthrown, and traditional assumptions about the primacy of technological determinants vigorously contested. A new type of organizational arrangement has been identified: the “hybrid form.” Relationships between firms are no longer exclusively market based, but may also draw on a private order, which is relatively stable and organized in networks (e.g. Ménard [1996]).

- Studies in the area of law and economics were energized as traditional beliefs about the efficiency of seeking redress in court, and by extension in the legislature, in legal rulings and in judges, were called into question in light of the concepts of bounded rationality and transaction costs. Several alternative systems of law are now recognized for the implementation of and enforcement of contracts. The efficiency of

recourse to the law and the judge is now challenged by that of recourse to "private orders" and private conflict-resolution mechanisms.

This renewal of theoretical analysis has extended even into the domains of economic decision making and of public policy design. For example, Victor Goldberg emphasizes how legal principles must draw on economic reasoning to evaluate the legitimacy of some contract clauses that may appear unorthodox at first glance (chap. 8). But not only contract law is impacted—similar changes have swept competition policy. The contribution by Michel Glais provides an opportune reminder that the definition of pertinent regulatory exemptions remains open in European Community law (chap. 22). We could enumerate other areas of law and public policy, such as insurance, health and environmental protection, etc., to which the economic analysis of contracts can be applied…not to mention many dimensions of management.

3.2. The Analysis of the Functioning of a Decentralized Market Economy

The contractual approach to coordination has had repercussions far beyond the analysis of bilateral interactions. It is at the root of a renewed analysis of the functioning of a decentralized economy. Efforts have been made to comprehend the consequences of substituting the concept of a Walrasian market model with one in which agents meet and contract in a truly decentralized manner. The economics of labor and employment constitute the preferred field of application of these new approaches, which are particularly suited to explaining the rather paradoxical operation of the labor "market" (e.g. Shapiro & Stiglitz [1984]). The theory of implicit contracts prepared the way, followed by several other approaches—notably the efficiency wage and labor market segmentation—explaining the disequilibria in labor markets on the basis of incentive contracts.

The theory of implicit contracts (Azariadis [1975]) signaled the abandonment of the idea that economic agents could design a complete system of contingent markets to cover all eventualities in future states of nature. The wage relationship is understood as a risk-sharing contract between employees and employers. This implicit contract establishes wage and employment levels that do not correspond to those of competition market equilibrium. Despite its flaws, this theory deserves credit for opening a breach in the preceding orthodoxy.

The theory of efficiency wages represented a second wave beginning in the early 1980s (Akerlof [1984], Yellen [1984]), which ultimately provided new foundations for labor economics and modern macroeconomics. In the presence of informational asymmetries between employers and workers, firms cannot rely exclusively on competition or on internal controls to attract the best professionals and guarantee the required levels of effort and quality. Incentive contracts fulfil this role by paying an informational rent to the employee to resolve issues of adverse selection and moral risk. It follows that the price of labor is higher than its Walrasian value (equal to the marginal productivity of labor) and that, consequently, labor demand is below supply. This generates an endogenous disequilibrium in the market on the basis of microeconomic behavior that is

perfectly rational. These results were reinforced by theories of labor market segmentation.

Not only the labor market experiences spontaneous disequilibria, but also markets for goods and services. This is reinforced when they are characterized by imperfect competition owing to a concentration of industries, to differentiation strategies, or to price discrimination. The New Keynesian Economics (Mankiv [1990], Romer [1991]) traces from inter-individual interactions to the formation of global equilibria and macroeconomic aggregates in order to analyze the properties of market economies and to generate consequences for economic policy. In general terms, since markets do not spontaneously move to equilibrium, they appear to have Keynesian properties that, under certain circumstances, may justify public intervention in order to alleviate the shortfall in global demand. The great contribution of contract economics is to underline that price formation at a bilateral level may prevent spontaneous market adjustment. This failure to adjust is not attributable to external constraints (of a regulatory nature), but rather to the decentralization of decisions. This is not to suggest, of course, that regulations and public intervention are exempt from any distortionary effects.

3.3. The Analysis of Institutions and of the Institutional Environment

Another field stimulated by the economic approach to contracts has been the analysis of institutions. Contractual relationships develop in the presence of ground rules that facilitate their appearance and stability and determine the modalities and the conditions of their efficiency. These institutions, which define the "rules of the game" and its frame, constitute what the New Institutional Economics calls the "institutional environment."

Agents enter into contracts on the assumption of the upstream existence of laws that establish their ability to contract. Consequently, a favorite extension of contract analysis is the study of the nature and diversity of property-rights regimes. The study of these regimes' attributes extends well beyond simple legal or administrative rules. It covers all provisions contributing to the definition of the characteristics of rights of use (measure) or responsible for limiting access to resources to authorized economic agents (enforcement) (cf. Barzel [1989]). As pointed out and illustrated by Gary Libecap in this volume (chap. 9), contract analysis and property rights analysis can be matched according to two different approaches. On the one hand, the delineation and distribution of property rights provides an explanation for why contracting sometimes does, and sometimes does not, lead to an efficient outcome under various circumstances. On the other hand, contract analysis sheds light on the circumstances under which a decentralized process can enable economic agents to establish an efficient allocation and delineation of property rights. Such analyses are essential for a better understanding of how to manage economic reforms (e.g. agrarian reforms) and design property-rights regimes for new economic resources (e.g. contents in the digital world).

The study of contractual relationships also relies on the analysis of institutions designed to assist in their enforcement, be they formal (administration, legal system, but also professional associations), or informal (culture, traditions and customs). Here economic

analysis joins with other disciplines, especially law, sociology, administrative and political sciences.

One of the great empirical questions revolves around the viability and efficiency of transposing contractual arrangements into institutional environments of a fundamentally different nature. These transpositions may result from expansion of industrial or financial operators beyond the boundaries of their home countries, or from a transformation of the institutional environment (i.e. the implementation of the single-market regulatory framework in the European Union, or the institutional reconstruction of the countries of the former Communist Block). One of the fields that has been most subject to empirical examination is that of regulated activities (telecommunications, water, electricity, etc. (e.g. World Bank [1995], Levy & Spiller [1996], Glachant & Finon [2000]). Based on the analysis of reforms to the electricity sector in various countries, two contributions to this book nicely review the issues at stake in the design of so-called "deregulation" processes (that should more precisely be qualified as "liberalization" processes). Paul Joskow (chap. 26) emphasizes the idea that the efficient outcome of such processes relies mostly on the design of an institutional framework able to limit contractual hazards. Indeed, self-regulation by competitive pressure cannot be sufficient in these industries characterized by huge fixed costs (and therefore concentration) and interoperability constraints (resulting in interdependencies and coordination needs among operators). Guy Holburn and Pablo Spiller address the problems raised by the need to design such an efficient institutional frame (chap. 25). Since the instances in charge of regulating industries are part of a broader institutional set that comprise formal and informal institutions, the design of devices aimed at monitoring and supervising an industry (or the competitive process) has to be consistent with the institutional framework within which it is embedded. Optimal "deregulation" can therefore vary widely across countries, and at the same time may require broad political or social reforms.

This backdrop to contracts is important because institutions determine the rules of the game for each relationship. It is also important, however, because contractual coordination is incomplete by construction. Neither the formation of agents' capacity to contract, nor their provisions for negotiating, formalizing, or implementing contracts could exist without the support of other coordination modes. Contractual relationships rest on informal and incalculable arrangements, such as convention (Orléan [1994]), as well as on rules or norms controlled by formal institutions. On the whole, contracts do not constitute a closed universe, and an essential element of the interplay in contractual relationships comes from their institutional environment (e.g. Ménard [2000]).

This broadening of perspective lends some legitimacy to a rehabilitation of public intervention in the management of relationships between economic agents. It is not a matter of substituting for them, as was sometimes the case in the past, but rather of developing efficient infrastructures to promote these interactions. In these matters conceptions of the role of the public authority have also evolved, since contractual approaches have contributed to underline the capacity of actors to adapt and organize themselves. The government should not treat all the structures emanating from agents' actions as arrangements to be subverted or nationalized, but rather as provisions with efficiency aspects that should be promoted and deleterious aspects to be curbed (e.g.

collusion). The contribution by Alan Schwartz (chap. 7) outlines the vast research program opened up by that perspective.

4. Different Theories, Different Methods

Extensions to these various approaches to the field of contract economics have followed diverging paths. Essentially more hypothetical and deductive, IT and ICT primarily strive to develop a formal view of the relationships between contracting parties using the most generic models possible. TCT was developed more from empirical work. However, there have been several formalizations of TCT, and some tests of IT. Developments in modeling (Section 4.1), on the one hand, and in empirical work (Section 4.2), on the other, thus raise issues addressing all economic approaches to contracts.

4.1. Differences in Methodological Perspective

Given their foothold in perfect rationality, IT and ICT have not presented any significant obstacles to the construction of formal models representing the interactions between agents and the manner in which they conceptualize payments or renegotiation schemes to resolve issues of asymmetric information or incomplete contracting.

Progress in modeling IT has primarily consisted of refining tools that are increasingly generic (moving from discrete to continuous cases, moving from models separating adverse selection and moral hazard to models associating them, moving from models in which asymmetries pertain to a single variable to multitask models with asymmetries on several variables, moving from two-party models to models of a principal, an agent and an intermediary-supervisor, etc.). In general terms, the evolution of these models has revealed that the more complex the problem to be solved, the more complicated the optimal incentive scheme, leading to second-best solutions very distant from the first-best (i.e. the amount of the informational rent abandoned to the agent increases). As Arrow pointed out in 1985, this result is surprising since, in practice, incentive schemes that are actually used are relatively "rustic" compared to those in the theory. Moreover, from a normative perspective, these complex schemes are not easily implementable in the real world. Thus, assumptions have been explored that generate theoretical contracts closer to observed incentive schemes and that generate simpler recommendations. This is the goal, for example, of the article by Holmstrom & Milgrom [1991] on the fixed wage.

ICT followed a different path. In an effort to replicate the predictions of Coase and Williamson concerning the vertical-integration decision on the basis of Savage rationality, it was initially constructed on a collection of purely *ad hoc* hypotheses. It later evolved around the search for more generic assumptions that could generate the results of contractual incompleteness and optimality. This process gave rise to a theory very different from Williamson's.

TCT was built on a different methodology, being more inductive. It proceeded by categorization, identifying different classes of solutions to coordination problems. Thus, three generic categories came into being: "markets," "hierarchies," and "hybrid forms," but also a multitude of subcategories of contract classes (cf. above). The value of this method is well-known, and it underlies the "empirical success story" that is TCT,

according to Williamson. The theoretical propositions of TCT are constructed on the basis of empirical observations, facilitating the subsequent elaboration of propositions that are testable on observable variables. However, it also harbors concealed flaws. On one hand, there is a proliferation of categorizations and typologies unique to each author, sometimes creating a certain conceptual ambiguity. On the other hand, TCT must assume that observed contracts are subject to selection processes that obey the theory's conjecture—the minimization of transaction costs. This underlies the claim that the contract types observed most frequently under given circumstances are those that are relatively most efficient. Now, to be rigorous, it would be necessary to substantiate the contention that the selection process is capable of eliminating forms of coordination that generate excessive transaction costs.

Two principal reasons can be given for the methodological features of TCT. First, it does not rest on a definition of bounded rationality that would allow the decisions of the contracting parties to be axiomatized. Rationality in TCT is only defined as an absence of Savage rationality. In this matter the theory remains inductive. Also, TCT does not derive from a detailed analysis of selection processes that could compensate for the absence of a specific decision-making model while accounting for the behavior of a representative agent subject to a selection process, as is the case with evolutionary economics.

4.2. Empirical Verification: Case Studies, Econometrics, and Experiments

While Hart & Holmstrom [1987] expressed regret at the absence of empirical verification of the economics of contracts, such studies have in the meanwhile proliferated to the point of making an exact count impossible. In 1995, a survey by Shelanski and Klein counted over 150 papers dealing exclusively with the field of transaction costs (cf. also Coeurderoy & Quélin [1998]). The two principal characteristics of these empirical verifications are the coexistence of econometric tests and case studies, and the large proportion dedicated to the issue of transaction costs.

Questions that have been tested econometrically can be grouped into three families (cf. the contribution of Scott Masten and Stéphane Saussier (chap. 16), as well as that of Crocker & Masten [1996]). First is the issue of contracts other than those defining a "pure" commercial transaction. A variant on this approach isolates the duration of the contract as the relevant variable: Why contract for a non-null duration? for several successive transactions rather than for only one? Second, the "make or buy" issue is examined: Why have a good or service supplied internally rather than from an external source? Finally, econometric tests are also applied to the determinants of the variety of clauses in contracts: price formulas, guarantees, attribution of decision or supervision powers, conception of arbitrage mechanisms, etc. Overall, TCT has presented the largest number of testable propositions for these three types of empirical verification. For the aforementioned methodological reasons, it is sometimes the only theory with anything to say on the subject. Moreover, so far its propositions have successfully withstood many attempts at econometric refutation. IT, however, has yielded explanations of the incentive effects of different forms of land rental (i.e. farming vs. sharecropping; Stiglitz [1974]) or remuneration provisions in franchise contracts (while at the same time finding its

propositions pertaining to the risk-aversion hypothesis discredited). Salanié [1999] presents the econometric literature, of which there is still a dearth, on IT. These differences between the treatment of TCT and IT are attributable to the restrictive assumptions of the latter, which make it difficult to formulate testable assumptions on empirical data. As to ICT, so far it has only been the object of a handful of tests, limited exclusively to the issue of vertical integration. There, again, very strict assumptions render econometric testing delicate.

The difficulty of formulating testable propositions is only one of the problems encountered when testing theories of contracts. Gathering data is also a significant obstacle. First, obtaining information on in-force, or recently ended, contracts is hampered by issues of confidentiality. Next, constructing the databases presents methodological difficulties specific to the coding and normalization of the descriptions of the contents of contract documents. Finally, econometric tests are stymied by the poor quality of available data, be it on the contracts themselves or their explanatory variables. Such are the reasons why case studies continue to play a role, universally recognized as irreplaceable, in empirical verification. Given this context, legal scholars and managers, being anchored in the practice of case studies both in their academic training and in the day-to-day functioning of their professions, have occupied a prominent position with their work.

It should be noted that econometrics is not the only discipline capable of subjecting theoretical propositions to rigorous protocols of empirical verification. The controlled nature of investigations conducted by the practitioners of experimental economics lends itself to testing conjectures arising from very strict hypotheses like those of IT. Thus, Claudia Keser and Marc Willinger (chap. 17) demonstrate that most contracts presented in experimental tests do not respect the incentive constraint as conjectured by IT, either in single-period or repeated principal-agent interaction simulations. These results do not contradict the optimization assumption, but rather reveal the presence of other motives in the contract relationship, such as equity and reciprocity (suggesting the principles of contract law evoked in Jacques Ghestin's contribution ; chap.6).

5. Perspectives

The future of the economic analysis of contracts is contingent on progress in four areas: the measurement and collection of data (Section 5.1); modeling bounded rationality (Section 5.2); analysis of the institutional framework (Section 5.3) and, finally; collaboration with professionals and scholars in other disciplines (Section 5.4).

5.1. Measurement and Data Collection

Significant improvements are expected in the availability of empirical data. One key limitation that has hampered the evolution of the economic analysis of contracts to date is that of collecting data appropriate to the issues it raises. Official statistical agencies are focused on measuring phenomena whose scope are macroeconomic or pertain to the microeconomics of markets or industries. The sub-microeconomic level, that of the contract and the transaction, is not recognized and will not readily be recognized because of confidentiality issues (trade secret). A further issue of "measurement" is that

dimensions useful for the analysis of contracts are not part of the available accounting or statistical standards. Until now, gathering the appropriate data has largely relied on individual investigations and the voluntary participation of a few firms. The cost of these collections and their near cottage-industry character explains the small size of the available databases as well as their heterogeneity. In the future a more efficient compilation could come from: first, recovering individual series already identified in official statistical data-sheets of a microeconomic nature; second, gaining access to databases used for voluntary inter-firm benchmarking or antitrust purposes; third, developing and using trade-specific databases maintained by private or public foundations or professional associations. These types of advances can already be seen when a scientific evaluation of professional practices is required in response to challenges under evolving regulations.

5.2. Modeling Bounded Rationality

The formalization of different elements of the economic analysis of contracts and, consequently, the generation of testable propositions, is still deficient. A major shortcoming in this field is the modeling of bounded rationality. In the absence of models adapted to the specification of the rationality of the contracting parties, formalized analytical constructs rely on assumptions of hyper-rationality to deal with behavior originating from semi-strong rationality. In this process, however, the observed behavior and the stylized facts that should be explained are largely eliminated. An important aspect of the future of the economic analysis of contracts thus depends on the eventual development of models of bounded rationality. Two possible avenues present themselves. One begins with the standard model of rationality and proceeds to explore various aspects of the degeneration of rationality. The work by Bentley McLeod (chap. 13) provides a good example of this type of approach. The other approach explores the way in which actors' rationality is formed and how deductive reasoning ties into collective and social patterns of behavior to model their choices, values and routines. Here, the contributions of psychology, sociology and anthropology are mobilized along with the more traditional methods of economists. Simon's work constitutes an essential reference.

Reverting to current models of rationality will provide for a better understanding of how contracts are conceived and evolve over time under the influence of learning and selection processes. Special focus should be placed on the coordination difficulties that are solved by contracts, as this will facilitate a rigorous analysis of the design and consistency of the various contractual mechanisms. These are, indeed, "systems" that we have not yet been able to consider with sufficient rigor (for a first attempt at this, see Brikley [1999]).

5.3. Selection Processes

As pointed out by North [1990], and earlier by Alchian [1950], the processes according to which viable contractual or institutional forms are selected is of importance as well. While the design of contracts and institutions depends upon agents' behavior,the competitive process validates or invalidates agents' choices. IT, ICT and TCT implicitly (for the two former) or explicitly (for the later) assume that selection is perfect and eliminates less efficient (or more costly in terms of transaction costs) coordination

devices. As demonstrated by advances in evolutionary theory, both in economics and in biology, evolution and selection processes lead neither to a unique and final equilibrium, nor to an optimum. Economics in general, and contractual economics in particular, lack a satisfactory approach to selection processes, though such a theory of selection would be essential to the definition of some efficiency criteria that would be more realistic than the standards "maximizing revenues, minimizing costs". Indeed, "efficient" could also mean "flexible," "favorable to innovation," "remediable," etc. In a sense, the contribution by Erik Furubotn (chap.5) is a good example of the broadening of perspective needed to build a more satisfactory analytical framework for the study of the properties of a truly decentralized economy and for identifying strategies that are both sustainable and preferable in terms of individual or collective welfare. There are however, other research directions to be explored. The analysis of competition among alternative contractual and organizational forms, innovation in contract design, learning by governing and learning about governance mechanisms, (etc.) thus open quite a wide research agenda. This is pointed out by Ronald Coase in his paper (chap.2).

5.4. Institutional Framework and Enforcement

Significant progress is also expected from a better understanding of the effects of the institutional framework on contract choices. A program of work along those lines has already been initiated (cf. Section 3.3, but also Aoki [2001]). More generally, a multiplication of comparative studies conducted on the variety of contracts governing the same professions within the same industry in different institutional environments can be expected. These will doubtlessly allow a better identification of those characteristics of the environment relevant to the conception of contractual arrangements, as well as an analysis of factors influencing the relative performance of these arrangements. In exchange, such analyses will open the door to the design of institutional frameworks that are more efficient…while respectful of current practices.

5.5. Cross-Disciplinary Fertilizations

Finally, theoretical developments remain highly dependent on a better understanding and grasp of empirical reality. The economic analysis of contracts should benefit from closer and more promising collaborations with professionals and scholars in other disciplines. Many professionals, in business as well as consulting, but also working in national and international institutions, seek such exchanges ("will perform analysis in exchange for access to data"). An entire sector, that of the legal professions—representing an operational rather than an academic discipline, Law—is expressing a growing demand for economic analysis of legal cases and offering the basis for a joint labor in "Law and Economics"." Research in management, political science, administrative science, sociology, and history should also stimulate the economic analysis of contracts by suggesting both propositions and hypotheses…or as a source of building blocks, empirical evidence and issues to be addressed.

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