

There is more to Contracts than Incompleteness: A Review and Assessment of Empirical Research on Inter-firm Contract Design

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ABSTRACT:

This paper aims at achieving a greater understanding of how contracts operate in practice through a review of recent empirical literature on inter-firm contract design. Our focus on the structure of contractual agreements differentiates this review from others that dedicated ample coverage also to the antecedents of the decision to contract and of the choice of contracting versus integration.

Our framework develops Stinchcombe's (1985) hypothesis that contracts are an organizational phenomenon. This allows us to uncover considerable but unevenly distributed evidence on a number of organizational processes formalized in relational contracts, which partially overlap with the processes that are observed in integrated organizations. It also enables us to describe contracts in terms of a larger number of dimensions than is commonly appreciated.

The paper summarizes the evidence by proposing a general and tentative framework to guide the design of relational contracts, discusses a number of lingering issues, and outlines directions for further research on contracts as an organizational phenomenon.

Keywords: contracts, governance, inter-organizational research, alliances, literature review

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1. Introduction

Contracts, in the sense of legally enforceable agreements, are a time-honored, fundamental institution of economic and social life that has become the object of systematic empirical investigation by economists and business scholars only little more than three decades ago. The economic theory of contracts has evolved from the failures of general equilibrium theory (Salanié 2005: 2). Subsequent developments, in the mid 1970s, marked a substantial effort to turn away from the abstraction of the general equilibrium model and take into greater account the complexity of the interaction between the contracting parties. Yet, the ‘theory of contracts’ that emerged out of this attempt, was still a highly stylized description, that pleaded for an “expanded theory of contract” (Goldberg 1976b), to match a parallel development in legal scholarship toward more realistic representations (Macneil 1974). By removing the assumption that actors have complete, unconstrained rationality, transaction cost economics (TCE) has imparted a considerable thrust to the movement toward analyzing actual contracts (Williamson 1975). Yet, the following years were punctuated with calls from legal scholars and economist alike to “establish, rather than assume” how contracts operate in practice (Macaulay 1985), to develop a more detailed understanding of how contracts operate in “a real-world setting” (Coase 1992), and to study “the actual formalized *documents* that we call contracts” (Suchman 2003: 96). This article aims at enhancing our understanding of real-world inter-firm contracts through a review of empirical literature on contract design, under the working hypothesis that contracts are an organizational phenomenon.¹

There are already a number of competent survey papers on the empirical analysis of contracts in inter-firm relations, which focus on different aspects within the broad issue of contracting. Some are concerned with inquiring into the validity of one particular theory of contracting (normally TCE), that is, of assessing how much empirical support there is for its testable propositions (Shelanski, Klein 1995; David, Han 2004; Boerner, Macher 2005). Others couple that focus with an inquiry into where TCE has been applied (Rindfleisch, Heide 1997) or restrict themselves to the evidence concerning the make-or-buy decision (Vannoni 2002, Klein 2005). Still others focus on an organizational form – hybrids – which when established between multiple legal entities often involves contractual governance (Menard 2004). Finally, Masten and Saussier (2002) cover a large spectrum of questions related to contracting (the decision to contract, the design of contractual agreements and contracting versus vertical integration), thus dedicating relatively limited coverage to each of them. In the last analysis, the Lyons (1996) study is that which is closer in focus to this review. However, while Lyons reports evidence from many different sources, including some which rely on quite aggregated data, we intend to review articles where

¹ The meaning of this expression will be made explicit in Section 2.

evidence relates to the actual formalized document. Moreover, our focus on contract design, that is, on the structure and content of contractual agreements, also differentiates us from most of the above mentioned works, where the bulk of the evidence relates to the choice between formal contracting and any other alternatives (informal contracts or integrated structures).

Unlike several previous surveys, this study does not limit itself to the evidence on relationships pointed out by a specific theoretical perspective. Rather, we identify a number of processes and dimensions and review whatever regularities have been uncovered, both in theory testing exercises and in exploratory investigations alike.

By design, much of the data presented here relate to the modest, microanalytic, intracontractual level. While the primary, direct implication of the evidence uncovered is the consolidation of a prescriptive contingency framework for contract design, we claim that as a whole, our findings indirectly challenge current research on contracting at quite a fundamental level. In particular, we aver that they question the taken-for-grantedness of the idea of contractual incompleteness with the associated emphasis on extra-contractual governance devices.

The plan of the paper is as follows. Section 2 develops a framework for conducting the review and Section 3 specifies the criteria of sample selection. Actual literature review is accomplished in the following two sections, which are dedicated respectively to substantive and procedural elements of contracting (Sections 4) and to dimensions of the contract as a whole (Section 5). Section 6 is dedicated to the assessment of our findings. Section 7 concludes and points to directions for further research.

2. Organizing the literature review: a theoretical framework

The reliance of early economic theory on a rather abstract representation of contracting has brought about at least two consequences. One has been a relative disregard of the temporal dimension of contracts (Goldberg 1976b: 48). This tendency has interacted with the “legal centralist” assumption that courts work in “an informed, sophisticated, and low cost way” (Williamson 1983) and led to a relative neglect of the procedural aspects of contracts. By contrast, realizing that contracts may span over non-negligible time periods, at minimum fosters the appreciation that contractual terms may require adjustment. Moreover, if court adjudication is costly and imperfect, contracting parties may shift the locus of decision-making and adjustment (...) from the courts to the transactors” (Masten 2000: 34) and fill the contract with aspects traditionally pertaining to enforcement. The concept of ‘relational contract’ (Macneil 1974) captures these and other objections to the traditional notion of contract. Following Macneil’s groundbreaking

contribution the concept of relational contract has gained currency within the economic and managerial literature (see, for example, Crocker and Masten 1991). However, to the best of our knowledge, we lack a systematic account of the main processes encompassed by relational contracts. Moreover, the popular notion of relational contract emphasizes extra-contractual means to complement the contract, rather than processes admitted to contractual specification (Grandori 2006).

A second consequence has been that contracts have been thought of as rather low-dimensional constructs. In addition to realizing that contracts have longer or shorter durations, until recently the economic and managerial literature seemed to measure the heterogeneity of contracts only in terms of higher or lower completeness.

There is one perspective that may help us appreciate both the procedural aspects of contracts and their multidimensionality. Setting out from the observation that contracts are often observed when TCE would expect integrated structures, Stinchcombe (1985) argues that contracts perform the same functions as integrated structures.² Integrated organizations, he argues, have elements that create structures that perform functions amid certain types of uncertainty. Having to serve the same functions, he further contends, contracts can be expected to incorporate, at least to some extents, the same elements of integrated structures. A shorthand way of expressing this idea is that contracts are an organizational phenomenon, in the sense that contracts may specify not just pricing provisions – which can be thought of as expressions of market governance – but also mechanisms that are more frequently observed in organizations, like norms, rules, negotiation, voting, authority, etc.. In turn, since those mechanisms differ ‘in kind’, and are employed to perform different functions, they need not correlate with a single contractual dimension, say, completeness. Thus, contracts partake in the complexity of organizations and their dimensions need to be systematically analyzed.

Here two qualifications are in order. That the governance of inter-firm relationships is high on coordination and procedural aspects has been well known to the organizational literature on inter-firm networks (e.g. Grandori 1997b, Ménard 2004, Nooteboom 2004). However, while acknowledging that contractual and procedural coordination are not orthogonal (Parkhe 1993) organization theory has treated them as quite separate aspects of inter-firm relationships (e.g.: Sobrero, Schrader 1998). Thus, the novelty lies in the claim that *the contract itself* contains aspects of coordination. The second qualification is that while we sympathize with Stinchcombe’s contention, we shall not claim that all inter-firm contracts always need to score high on coordination: in many situations contracts akin to the discrete contract archetype may work

² Throughout his exposition Stinchcombe referred to ‘hierarchies’. We assume that he borrowed the term from TCE itself, without implying that the organizations that are substituted by contracts necessarily score high on hierarchical intensity. For this reason we prefer to use the terms ‘integrated structures’ or ‘organizations’.

perfectly well. Thus, what needs to be studied is under which conditions procedural coordination becomes a significant component of contracts.

As witnessed by the articles mentioned before, a review of empirical literature on contracting may be organized in several alternative ways. Here we shall categorize the empirical evidence in a way that addresses the two gaps just mentioned. We propose first of all that contracts consist of a *transactional* part and of *procedural* elements. Within the first term we designate those sections where the parties commit to undertake specific performance in exchange for reciprocal undertakings of the counterparty. Commitments on tasks, resources, outputs and remuneration provisions are the main items in the transactional part. With the second, we designate rights and processes that are intended to serve purposes of dynamic adaptation, integration and preservation of a shared understanding. Among the procedural elements, we identify processes of *decision-making*, to discover the actions that the parties have to undertake to produce the quasi-rent, or to adjust them, if they were envisaged from the outset; rules, or *restraints*, that infuse predictability in the relationship; rights that underpin the *enforcement* of promises through the manipulation of payoffs; *monitoring*, that is instrumental to both enforcement and decision-making. Other elements that possibly might be encompassed within this procedural section are goal statements and term definitions, which delineate the meaning shared by the parties. While certainly important, in the review section we shall not discuss these two items due to a dearth of coverage in the extant empirical literature.

The contrast between transactional and procedural elements parallels the opposition between ‘substantive’ and ‘procedural’ (Simon 1976). We claim that that contrast is also rooted in Macneil’s (1974) distinction between promise and non-promissory processes, though not made perfectly explicit therein. Finally, we find similarity also with the framework employed in Brousseau (1995) who summarizes the main functions of contracts in the coordination of actions, the enforcement of promises and the sharing of the quasi-rent of the cooperation, and assign each function to a different governance ‘mode’ (coordination, enforcement, and remuneration mode). Clearly the first two are related primarily to adaptation and integration, while the last one corresponds to our transactional section.

We shall apply this framework to the review of literature that analyzed contracts at the level of individual contractual clauses. As to those studies that focused on the dimensions of contracts, that is, on measurable characteristics of the contract as a whole (or, at least, on characteristics that are largely separable from individual contract terms), we shall organize them according to the four constructs of *duration*, *complexity*, *specificity* and *contingency planning*. While the first two require no comments, the others may sound unfamiliar. We shall argue that they are more adequate labels

for two distinct dimensions that are often referred to as ‘completeness’. Potentially, several other meaningful dimensions could be defined, as pointed out by Suchman (2003) who proposes asking also how ‘flexible’, ‘permeable’ or ‘durable’ a contract is. However we restrict ourselves to those on which empirical investigation have actually been conducted. But before we start the review, we shall briefly specify the criteria we adopted for sampling the literature.

3. Sampling criteria

As already mentioned in the Introduction, the focus of our review will be on empirical studies of formal contract design in inter-firm relationships. Making it explicit that we restrict ourselves to ‘formal’ contracts is by no means redundant, since a number of studies have addressed informal, not legally enforceable agreements and revealed that they can be effective governance structures in industries as diverse as rail freight or lobster catching (Shelanski, Klein 1995).

As to restricting our investigation to studies of ‘contract design’, this is intended to leave outside the scope of our survey those empirical investigations where the explanandum is the choice between discrete governance alternatives, like ‘pooling contract’ vs. ‘joint venture’ (Sampson 2004), ‘formal contract’ vs. ‘trust’ (Woolthuis, Hillebrand, Nooteboom 2005) or between discrete contract forms like ‘company-owned’, ‘lessee-dealer’ and ‘open-dealer’ (Shepard 1993). Stated differently, it means that we require that in the studies we review contract terms be considered as a design variable.³ On the opposite end of the spectrum, this leaves out also those studies that take a contract term for granted and focus instead on the *level* of one or more variables where the decision is assigned by contract to the parties.⁴ Additionally, focus on inter-firm relationship leaves out other fairly well investigated fields, notably, that of employment contracts.⁵ A further qualification is that by ‘empirical studies’ we mean those based on observation of real-world contracting, either by means of contract analysis or by questionnaire survey. Hence, we shall not review the testing of contracting theories based on experimental approaches.⁶ Finally, we shall focus our search preferentially on articles written in the last decade, making exceptions when we feel that particular contractual processes are underrepresented in recent literature. Although we are not particularly concerned with achieving comprehensiveness, we trust that not many important articles strictly fulfilling the above-stated criteria have escaped our search. A reader interested in

³ Indeed, this requirement wipes away the bulk of the TCE-inspired empirical literature on contracting and restricts the target population to a few dozen articles.

⁴ For clarity’s sake, this means neglecting essentially those studies in the specialized literature on franchising that have investigated the antecedents of variables like the level of the ‘initial fee’, ‘royalty rate’, etc.. The interested reader may refer to Lafontaine and Slade (1998) for an excellent review of the empirical literature on franchising.

⁵ We neglect also some specialized literature, like that on public debt and agricultural contracts.

⁶ Readers interested in this kind of studies may refer to a paper by Keser and Willinger (2002).

comprehensiveness may complement this article with the reviews mentioned above, though their focus is partially different.

4. Transactional and procedural elements of contracting

Our review begins with the presentation of the empirical evidence concerning the contracts' transactional part and procedural elements, while in Section 5 it will focus on the evidence concerning various contractual dimensions. Based on our framework, commitments on tasks, resources and outputs belong to the transactional section of the contract. Yet empirical investigations that are relevant to these items normally focus on the specificity of contractual terms in general and on the extent to which they are expressed in contingency form. Thus, due to the different level of analysis we shall review evidence on these items in the section of contract dimensions.

4.1. Transactional elements: remuneration and risk allocation

Remuneration provisions are one contractual mechanism through which many goals are simultaneously pursued. Through compensation mechanisms the parties share the quasi-rent of the collaboration, provide incentives to adopt efficient behaviour, allocate risk, promote efficient adaptation and balance different types of hazards. During the life of a contract, the remuneration of the parties may require adaptation. However, since price-adjustments have often a zero-sum quality (Williamson 1979), revisions are effected rarely, often in a formulaic way, so that in the ultimate analysis, what is subject to adaptation is not the contractual provision per se, but the actual remuneration. On account of their salience and their relative stability, remuneration provisions may be regarded as a substantive aspect of the contract, its core, and contrasted to other, more procedural parts. Indeed, this motivates the almost exclusive attention dedicated to them by early studies of contracting⁷.

Understandably, due to their centrality remuneration provisions have been the object of a large amount of investigation, which would be quite hard to summarize here satisfactorily. Accordingly, we shall rely on the reviews by Lyons (1996) and by Masten and Saussier (2002) to provide a concise account of the findings concerning the sharing of risk and the provision of incentive to effort, while we shall focus on those contracting problems that arise from the existence of specific investment.

⁷ "Previous literature [focused] only on the strictly 'monetary' aspects of the contracts" (Arrunada, Garicano, Vazquez 2001: 257). "Empirical transaction-cost research on contract design has looked primarily at three types of provisions: incentive provisions, pricing structures and price adjustment methods" (Masten, Saussier 2002: 285).

With regards to *risk sharing*, Lyons summarizes the extant theories by saying that the contracted payment scheme should reflect the parties' relative attitudes to risk, and that risk sharing, via royalties or profit sharing, is more likely if risks are large. However, the empirical literature he surveys provides no support for both hypotheses, even in sectors, like franchising and agriculture, where sharing, respectively through royalty payments and sharecropping, is the norm. A practice that is consistent with risk sharing is payment on a cost-plus basis, which is sometimes observed in large projects between the general contractor and its subcontractors. However, Lyons notices that since this practice requires open-book accounting, it may be equally a device to extract the full gains from trade, rather than to absorb risk.

As to *effort incentives*, the main testable proposition of the extant theories is that when effort by one party affects the costs or benefits of the other, contracts should include explicit incentives, through trading off incentives against inefficient risk-bearing by the agent. Here the evidence available is more consistent with the theory. For example, franchising royalty rates across franchises tend to vary with the importance of the effort of the parties. However, Lyons (1996) reports also evidence by Bhattacharyya and Lafontaine (1995) who observe that in profit sharing contracts, payment rules tend to be simple and linear (unlike the complex incentive schemes of the theory) and quite stable across time and across agents of the same principal. Finally Lyons (1996) observes limited use of incentive contracts outside particular business relationships like franchising, Japanese keiretsu's and technological licensing. His hypothesis is that in order to attribute value added to a particular relationship, one party has to be uniquely dependent on the other, but this condition is rarely obtained. More commonly, the effort input is surrounded by 'noise' that confounds the measurement of the quality output. This hypothesis has been confirmed in a recent study by Kalnins and Mayer (2004) that in the context of IT service contracting found that greater incentive intensity is associated with a reduction in measurement problems.

When transactions are backed by substantial specific investments, durations tend to be long, and pricing structures may be used *to promote efficient adaptation*. A notable example of research in this stream is found in Masten and Crocker (1985). Based on a database of natural gas contracts, the authors analyze the antecedents of 'take-or-pay', or minimum-bill provisions, which require purchasers to pay for a contractually specified minimum quantity of output. As better explained in Crocker and Masten (1988), these clauses can be interpreted as penalties for efficient breach of contract, mechanisms that set appropriate incentives for contractual performance and provide flexibility in long-term contracts while reducing the number of clauses that are liable to

misinterpretation or deception.⁸ Masten and Crocker's findings are that the percentage of 'take' obligation varies significantly, and in the predicted direction, with characteristics that affect the value of the commodity in alternative uses. The lesson to be drawn here is that the need to strengthen the incentives for contractual performance decreases with conditions that alleviate the 'small number' situation facing the party which has invested in specific assets. According to Masten (2000: 36) these findings support an "incentive interpretation over the alternative view that take-or-pay provisions serve distributional or risk-sharing purposes".

In long term contracts pricing structures may need to be chosen also with an eye on *balancing different types of hazards*. A study by Crocker and Reynolds (1993) is normally presented as an attempt to prove that the degree of contract completeness is endogenous to the relationship, but it tells a lot also about how to choose between alternative pricing provisions.⁹ In the setting they analyze (military equipment procurement), contracts are very structured and compensation provisions can take five alternative arrangements differing in the degree in which they allow for ex-post adaptation. Fixed-price complete contracts, that put risks on the supplier while giving him high-powered incentives, are susceptible to maladaptation. Conversely, in the pricing solution where ex-post negotiation is less constrained and risk is shared, the parties face the possibility of hold up. The data Crocker and Reynolds analyze relate to 45 airplane engine procurement contracts. Expected opportunism of the supplier is found to be conducive to higher incentives and less risk sharing, while task uncertainty is found to favour an opposite arrangement. Incidentally, a negative relationship between uncertainty and incentive intensity has been found also in the above-mentioned study by Kalnins and Mayer (2004) on a much larger dataset with 394 observations.¹⁰ One lesson from Crocker and Reynolds (1993) is that 'opportunism' is not to be assumed; rather, in real-world contracting situations it is a trait of character that the parties try to gauge based on available information.¹¹ The second lesson is that as contractual performance increasingly involves unforeseen or nonquantifiable contingencies, if both parties can make a contribution to reduce it through continuous negotiation of specifications, the efficient contracting solution is an agreement entailing risk-sharing.

⁸ Hubbard and Weiner (1986) have also interpreted take-or-pay provisions as efficient responses to the need for adjustment in long-term contracts. DeCanio and Frech (1993) show how an efficiency interpretation of take-or-pay provisions in natural gas supply is more convincing than alternative arguments based on market-power, and provide an estimation of the efficiency gains entailed by vertical contracts with minimum bill provisions.

⁹ We shall discuss the implications of this study for contract 'completeness' in section 5.4.

¹⁰ This study also found that contracts associated with lower incentive intensity tend to be chosen as prior relationships between the parties (measured at the site level) increase.

¹¹ In Saussier's (2000) reading of this article Crocker and Reynold's decision to focus on the probability of each contracting party to behave opportunistically was due to data limitations that did not allow measuring asset specificity.

A similar balancing of different risks through the pricing mechanism – though in more discrete form – is also visible in the context analyzed by Corts and Singh (2004). These authors investigated the two typical pricing solutions (turnkey and dayrate) that are commonly observed in contracts for offshore oil-drilling, a context characterized by task uncertainty and asymmetric information. The first one is essentially a fixed price contract, which ties the actual compensation of the contractor to their ability and effort to reduce the cost of works. Obviously, a turnkey contract also places the risk of the project entirely on the contractor's shoulders. The flipside of this risk allocation arrangement is that empirically observed turnkey contracts require “carefully enumerating many contingencies and detailing the project specifications ex ante, making it very costly to change the project specifications once the project is underway”. The alternative solution corresponds to the cost-plus contract in the construction industry and entails an agreement that “is simpler to write and gives the buyer more flexibility in altering the specifications as the project proceeds; however, this flexibility comes at the cost of introducing a moral hazard problem, as the agent may bill the principal for excessive materials and labor” (Corts, Singh 2004: 231). This is case-study evidence that in order to work properly, pricing provisions require that the formality of the contract takes certain values. In particular, high powered incentives require a low level of ambiguity in the specification of tasks. The authors analyzed a database of 1874 oil-drilling projects, coded from secondary data, and found that task uncertainty and the frequency of interactions on prior projects between the contracting parties reduce the probability that the high-powered incentive solution (turnkey) is chosen. The interest of this study lies in the fact that it reveals that empirically the adoption of high-powered incentives forces the parties to trade safeguards in a socially inefficient way. In fact one party is induced to offer the other better safeguards in the form of a higher programmability of the task (greater detail of project specifications) although this clashes with their own cognitive limits, thereby increasing the risk of contract maladaptation.

In the context analyzed by Corts and Singh as well as in all the typical profit sharing contracts, profits and risks are shared based on an allocation scheme defined ex-ante. However, the sharing of profits and risks can also be agreed ex-post. In this case the common wisdom would be that the sharing be based on each party's marginal productivity. In reality also a ‘democratic’ solution is feasible. In the case studied in Dekker (2004) where the collaboration investigated had team production characteristics, the sharing of the surplus was based on a rule that being open to the

possibility of some manipulation, due to its implementation technicalities, also needed the ex-post mutual agreement of the parties to ensure medium term viability.¹²

In sum, the studies reviewed support the idea that in situations characterized by some form of reliance on the counterparty, the flexibility of the specification of remuneration performance is sensitive to the conditions of behavioral and task uncertainty, and requires a comparable flexibility in the specification of task obligations. Studies on compensation provisions in contracts involving joint-action are rare and stimulating, and sometimes they reveal quite unconventional arrangements on this, most focused upon, contractual mechanism.

4.2. Procedural elements

4.2.1. *Decision making*

When contract duration is non-negligible, the terms agreed may require adaptation. In certain cases, the contracted over matter is so uncertain that performance requirements cannot be defined at the outset and the contracting parties must establish mechanisms for substantial “post-contractual planning” (Macneil 1974). In either case contracts may require decision making. One theoretical perspective that has implicitly stressed the importance of decision-making in relation to contracts is the incomplete contracts theory (ICT) (Hart 1995). However, while ICT emphasizes the optimality of concentration of decision rights (unless the assets under each party’s control do not affect the other’s marginal return on investments (Hart 1995: 45-6), actual contracts exhibit various patterns of allocation.

In long term contracts price adjustments are often effected through *negotiation*, not necessarily as a consequence of conduct designed to evade performance, but as a result of processes enshrined into contract language. The antecedents of the resort to negotiations have been investigated by Crocker and Masten (1991) in the context of natural gas supply and in the above-mentioned article by Crocker and Reynolds (1993). The former study finds that in contracts with longer duration and higher rigidity in other provisions, the price adjustment process switches from redetermination (adjustment by formula) to renegotiation.¹³ The latter finds that as task uncertainty increases and the supplier’s proclivity to opportunism decreases, the pricing mechanism becomes increasingly less specified, and for extreme values of those variables, price is determined through an

¹² “For cost reductions in operating and maintenance activities, which are difficult to measure with RIB’s [company name] cost data, the partners in good faith simply agreed to ‘negotiate a reasonable estimate’ of the savings, to come to a fair division of the alliance’s financial benefits” (Dekker 2004).

¹³ Methodologically this study deserves mention for proper econometric handling of the *simultaneity* of dependent and independent variables (values for ‘duration’ and ‘take or pay’ estimated from separate regression and fed as independent variables into the model of price adjustment).

almost totally unstructured ex-post negotiation. Overall, these findings are consistent with known properties of negotiation, which is viable even under high informational complexity and conflict of interests. Moreover, they indicate that negotiation may complement other contractual means to supply contracts with the required flexibility.

It is useful here to mention another of the studies already reviewed which investigates the adjustment of remuneration through options to exercise rights of *unilateral decision*. In the context of natural gas supply, Masten and Crocker (1985) find that the higher the factors alleviating the supplier's dependence, the less constrained the decision rights granted to the buyer are.

Third party decision-making is also not unheard of in contracts. For example, Stinchcombe (1990: 225-6) mentions that contracts for construction and large engineering projects “quite often contain language to the effect that the contractor is to accept the orders of a specified person (... typically called “the Engineer”...) on all change orders”. Resolution of disagreements on technical issues through industry experts is provided for rather routinely also in pharmaceutical biotechnology contracts (Furlotti and Grandori 2007). Unfortunately, we do not know of any study that tackled this issue systematically.

A number of investigations concerning the allocation of decision rights in contracts have drawn inspiration from ICT, and have focused on the lopsidedness of the allocation of control rights between the contracting parties. To the extent that these studies focus on the concentration of decision-making, they can be considered as investigations on the use of *authority* in contracts.

One study in this perspective, Lerner and Merges (1998), is also an early example of an empirical investigation through large-sample quantitative analyses of a large number of clauses of R&D contracts.¹⁴ The main discovery of the exploratory section of the paper is that control rights are parsed finely. “Practitioners suggest no single control right stands out as critical. Rather, it is the accumulation of rights to control contingencies that makes an alliance particularly favorable to the R&D or to the financing firm” (Lerner, Merges 1998: 134). After the exploratory section, the analysis shifts to the investigation of the antecedents of the *total number* of control rights, and it is framed as a test of Aghion and Tirole's (1994) control model. Consistent with the model, the results confirm that the allocation of rights is strongly affected by the relative financial conditions of the contracting parties, an aspect often underplayed by the ICT tradition. The empirical findings also seem to contradict Aghion and Tirole, inasmuch as they show that in alliances negotiated at early

¹⁴ Strictly speaking the data analyzed are not exclusively contract clauses since the variables are coded from information collected by a specialized industry analyst that relies on a variety of sources, besides contracts.

stages of the discovery process, when the input of the R&D firm is supposedly more critical, R&D firms are allocated fewer control rights.¹⁵

Kaplan and Strömberg (2003) analyze the actual contracts between venture capitalists and entrepreneurs, with the expressed purpose of “informing theory”. Venture capital contracts set up an ongoing relationship that is supposed to last for a long period. Accordingly much of their contractual provisions do not relate to a specific task. Rather, they allocate particular control rights, set up governance structures and establish procedures that are supposed to steer the company through many unforeseeable contingencies. The authors regroup these variables in four major groups of rights: residual cash flow, board, voting, and liquidation rights.¹⁶ The major finding of their analysis is that various rights are allocated separately (as found also by Lerner and Merges, 1998), and are not perfectly correlated: ownership and decision rights need not be perfectly aligned. This supports a view that control is more multi-dimensional and continuous than commonly thought, and that it can be established contractually. Rights are distributed approximately as predicted by the major extant theories, in particular by the classical principal-agent and by control theories. In particular, in the control model of Aghion and Bolton (1992) the project yields both monetary benefits that are verifiable and transferable to the financier, and private benefits that are non-verifiable and go only to the entrepreneur. This introduces a conflict of interest. The model predicts that the higher the profitability of the project and the lower the conflicts of interest, the more control moves from the investor to the entrepreneur. Kaplan and Strömberg’s findings are consistent with this model, inasmuch as in ventures with greater initial uncertainty about viability, the venture capitalist receives more board and voting control and the entrepreneur receives less.¹⁷

Kaplan and Strömberg further carry on their investigation in a later paper (2004). Here the analysis focuses on the *antecedents* of selected incentive and control mechanisms (e.g.: founder cash flow incentives, board rights, staging of funds), modelled independently from one another. The difference with the previous paper is that in order to measure the independent variables the authors rely on a wholly different source of information: the venture capitalists’ own assessment of risk.¹⁸ One reason of interest lies in the fact the study provides a rare test of *task complexity*

¹⁵ Given the puzzling nature of these results, it is a bit unfortunate that the authors did not discuss in detail the issue of endogeneity since it is perfectly conceivable that the financial strength of the R&D firm is affected by the number of patents it holds, the proxy for project maturity.

¹⁶ Clearly only some of them relate to decision-making.

¹⁷ Consistent with the predictions of agency theory (Holmström 1979), the paper also found that the pay-performance sensitivity of entrepreneur’s remuneration decreases as asymmetric information about venture quality declines.

¹⁸ Since the variables come from a variety of documents - not just from the contract - and are often common between successive contracts, it can be said that the unit of analysis is the *deal* rather than the contract.

(operationalized as “difficulty of execution risk”) as a predictor of contractual clauses.¹⁹ The results of the analysis are supportive of the idea that internal risk (hidden information, hidden action, disagreement, and hold-up) is a powerful predictor of contractual characteristics. In particular it is associated with a greater allocation of authority to the venture capitalists (VC) in the form of board control.²⁰ Conversely, task complexity is not significantly correlated with greater authority to the VC, while it impacts positively and significantly on contractual terms that are intended to reduce the entrepreneur’s incentive to leave.²¹ In our opinion this suggests that authority is powerless in the face of ‘epistemic’ uncertainty and the remedy is to be expected from mechanisms that lock-in the human assets and preserve the continuing association of resources.

Another contractual setting where authority has been found to be quite important is franchising. Franchising contracts are most often analyzed with principal-agency theoretical lenses. Therefore one would expect that their contracting problems can be solved through the arrangement of a proper set of incentives. However Arruñada et al. (2001) find that in that setting authority also plays a non-negligible role. In particular, they observe that franchising contracts in automobile distribution assign the manufacturer various “completion rights” that allow him to “render more precise and to adapt to environmental changes the obligations of the parties” (Arruñada et al. 2001: 259).²² The authors posit that the allocation of authority to the car manufacturer should be positively related to horizontal network externality, that is, to the possibility for the dealers to damage brand reputation through improper behavior; and to the principal’s reputation, probably the main protection dealers have against principal’s opportunism (Arruñada, Garicano, Vazquez 2005). The authors find that these hypotheses are supported by the evidence offered by a database of 23 franchising contracts.

One motive of interest in this study lies in the fact that it carries out an investigation of the complementarities among contractual clauses. Through the analysis of conditional correlations, some pair-wise complementarities are uncovered. In particular authority is found to be complementary with termination rights, which suggests a complementarity between decision-

¹⁹ In this paper subjectivity in the measurement of this and other independent variables clearly could be an issue. To circumvent this problem the authors supply readers almost literally with each sentence in the investment analyses documents that relate to the focal independent variable, and the way it was coded.

²⁰ “Higher internal risk is associated with more VC control, more contingent compensation to the entrepreneur, and more contingent financing in a given round (...) Overall, we interpret these results as very positive for the agency theories (...) External uncertainty is also related to many contractual features. Like internal risk, higher external risk is associated with more VC control and more contingent compensation (...) with increases in VC liquidation rights (...) These findings are highly inconsistent with optimal risk sharing between risk-averse entrepreneurs and risk-neutral investors” (Kaplan, Strömberg 2004: 2199).

²¹ “Execution risk is significantly positively related to founder time vesting provisions and negatively related to contingent compensation and VC liquidation rights” (Kaplan, Strömberg 2004: 2200).

²² Just to mention a few, the manufacturer has the authority to decide the sales targets, the size and décor of the show room, to set the maximum authorized price, etc.

making and enforcement mechanisms. While this analysis represents a progress over studies investigating provisions in isolation, the method adopted does not allow us to see whether contractual clauses are bound together in wider patterns.

To summarize, even in inter-organizational relations that do not involve the creation of legal entities, the parties may become subject to the ‘fiat’ of some actor, as a result of the contractual governance.²³ The power to fiat may be assigned to either party, to both parties, to both parties jointly and also to third parties. Contractual adjustment through joint decision making tends to increase when the rigidities in the contract are greater, the task uncertainty higher and the history of the parties of past litigations lower. Contractual assignment of rights of unilateral decision is more generous the less consequential those decisions for the party subject to them are. Control rights assigned contractually can be parsed almost at will. A party that is assigned enough of them can exercise actual control, regardless of the ownership of assets. The distribution of rights among the parties is sensitive to efficiency consideration: fewer rights are assigned to the party with a conflict of interest. However, the actual allocation of control is also significantly influenced by the parties’ respective bargaining power at the time of entering the agreement. Finally, assignment of decision rights to one party seems to be complementary with the simultaneous assignment of means of enforcement to that party.

4.2.2. *Enforcement*

“Economic theories of contracting for the most part give little specific attention to enforcement issues; the presumption being that the courts will make sure (subject only to verifiability constraint) that whatever terms contracting parties arrive at are fulfilled” (Masten 2000: 26). If this portrait of economic theories of contracting is accurate, we can say that at least in this respect empirical studies are making a significant contribution to the advancement of our understanding, inasmuch as some studies have undertaken to investigate if and to what extent contracts set up mechanisms for self-help.

The mechanisms examined in the above-mentioned study by Arruñada et al (2001) are second-party termination rights.²⁴ The rationale for considering termination rights a mechanism for enforcement is provided by Klein and Leffler (1981), who argued that the existence of a flow of quasi-rent, coupled with the threat of termination, is sufficient to assure performance if the parties

²³ Here we are using the term ‘fiat’ simply in the sense of a right to make decisions, even against the will of the counterparty. Following Williamson (1991) it could be argued that in a contractual relationship such a right is qualitatively different from that of an internal organization, since “courts will refuse to hear disputes between one internal division and another” over technical issues (Williamson 1991: 274). However, such a difference is no longer clear if the parties waive their rights – as they often do (Ryall and Sampson 2003: 14, Grandori and Furlotti 2007: 29) – to bring disputes to courts.

²⁴ Arruñada et al. (2001) also consider monitoring rights. We shall treat monitoring as a separate dimension and report their findings later.

perform repeat transactions. The authors find that in the context of automotive dealership franchising, manufacturers' termination rights are positively and significantly related to variables proxying the horizontal externalities arising from dealers' shirking and, as seen before, that termination rights are called for (complementary with) by the presence wider decision rights of the franchisor.

Lerner and Malmendier (2005) investigate enforcement mechanisms in the context of biotechnology research agreements. They observe that contracts in this setting often assign unilateral termination rights coupled with expanded access of the financing firm to the intellectual property of the alliance. The authors propose a model that interprets this feature of biotechnology R&D contracts as a way for the financing firm to achieve a higher expected payoff from the collaboration than in the alternative case of contracts without such option, when the research output is non contractible and the R&D firm is cash constrained.²⁵ The rationale for this explanation is that the parties may remedy the shortcomings of contractual incompleteness (meant as the impossibility to contract over the exact nature of certain tasks and to prevent that the partner engages in multitasking) by assigning decision rights that govern the actions of the other party. The authors underline that this represents a departure from previous models that emphasized the allocation of firm ownership.

The empirical part of the paper tests propositions developed in the theoretical model.²⁶ The findings indicate that non-contractible output, a proxy for contract incompleteness, significantly affects the probability that the R&D contract contains termination and intellectual property reversion rights. The authors also discuss at some length how the results can be better reconciled with their property-rights explanation rather than with alternative stories based on uncertainty and asymmetric information.

Contractual hostages are one particular type of contractual enforcement mechanisms that operates in a pre-emptive way, that is, that does not require ex-post affirmative action, unlike termination rights. Helm and Kloyer (2004) analyze the bonding function of hostages in the context of R&D interfirm cooperation. In such setting, they argue, the R&D exchange supplier faces a double risk. The first and foremost is that the buyer insights into his own knowledge foster the creation of a competitor. The second risk is that the potential for supplier's return on his (largely

²⁵ It must be noticed that the contract the authors focus upon only improves the payoff of the financing firm, not the overall surplus. Therefore the allocation of property rights it establishes is profit-maximizing for the financing firm only if it is assumed that the R&D firm is financially constrained, hence unable to compensate the financier for agreeing to a different arrangement.

²⁶ The dependent variable is operationalized in two alternative ways. All the operationalizations deliver approximately the same results. The operationalization of the main independent variable (non contractibility of output) takes advantage of a particular feature of biotechnology research, where it is easy to classify projects according to the fact that a lead product candidate is specifiable or not at the time of the agreement.

intangible) specific investment is threatened by his dependence on the buyer and by the uncontractibility of a basis for shared revenues when the R&D exchange concerns early stages of the research process. As suggested by TCE, Helm and Kloyer posit that those risks could be controlled by contractual hostages supporting an option for the supplier to negotiate a share of continuous returns when the prospects for producing a marketable product become clearer. Further, the authors analyze an array of contract clauses that could play the role of hostages thanks to the possibility they entail in blocking or impeding the production and marketing of a final product.²⁷ Using a database of 98 questionnaire observations, Helm and Kloyer show that empirically some such hostages are perceived to be effective by the R&D suppliers that actually had them included in a contract, the more so the higher the uncontractibility of research output.

In the context of business-format franchising, Bercovitz (1999) investigates post-termination non-compete covenants that, she argues, enhance the credibility of the franchisor's threat to seize (or render worthless) the hostages posted by the franchisee. Her findings are that the strength of these type of safeguards increases positively and significantly as the free riding hazard rises.²⁸

One study by Ryall and Sampson (2006) focuses on the antecedents of the inclusion of enforcement mechanisms in the contract, without asking which of the parties controls them. These authors have developed a scheme to code variables from actual content of technology alliance contracts, and have measured two items relating to penalties.²⁹ In a sample of 52 such contracts that involve actual joint development Ryall and Sampson find that every item of penalties is present at least in 11% and at most in 32% of contracts. The salience of these means of enforcement is increased by the fact that in the majority of the contracts in their sample the parties waive rights to court access for disputes. The authors do not test any specific hypothesis, yet besides providing descriptive results, they conduct formal statistical analyses of the sample focusing on the relationship between proxies of relational mechanisms and the use of penalties in contracts.³⁰ Two of the proxies are found to affect positively and significantly the level of penalties while the control for uncertainty (breadth of technology) is found to have a negative impact.

A case-study by Dekker (2004), analyzes how greater contractual formalization (when feasible) may be a sufficient safeguard to the parties, and how it is called for by an increase in dependency. In the buyer-supplier alliance analyzed, the parties had a long standing business

²⁷ These clauses include supplier's threats, like the right of exploitation of further developments of the contractual project, and buyer's commitments, like the right of the supplier to be informed about further developments.

²⁸ 'Free riding hazard' is a variable capturing the interaction of the brand-name value and the spillover of the effects of franchisee's improper behavior on the rest of the franchise.

²⁹ The items considered are 'financial penalties for underperformance' and 'right to terminate for underperformance'.

³⁰ The authors analyze also the influence of relational mechanisms on other contract terms. We shall present other results from this study in Sections 4.2.4 and 5.4

relationship in which many issues, including intellectual property, had never become sensitive. The decision to strengthen the relationship into a strategic alliance brought to surface the fact that deeper interaction could expose them to different risks, both related to proprietary knowledge: the supplier could be exposed to the spillover of sensitive information while the buyer was risking excessive dependence on technical knowledge that was only partly codified. These concerns were cured through reciprocal concession of commitments, supported by greater formalization of intellectual property rights (IPR). Unlike the context analyzed by Lerner and Malmendier (2005), here IPR's main function was not to generate incentives to exert effort; rather, it had a simpler, more defensive purpose of preventing expropriation. Thus, an additional contribution of this paper is to bring to our attention the fact that the appropriation concerns that must be dealt with may extend beyond the sharing of the financial proceeds from the exchange, and also include intermediate and ancillary resources that the parties bring to the collaboration.

In sum, contracts do set up mechanisms that reduce the need to rely on court adjudication for enforcement. One way to reduce the probability of non-performance, whether opportunistic or accidental, is greater contractual formalization. When formalization of some aspect of the relation is unfeasible, contracts may deter non-performance either through the assignment of certain decision rights or through contractual hostages. The intensity of either form of enforcement tends to increase with the dependence of one party upon the other.

4.2.3. *Rules and restraints*

'Restraints' is a legal term that is frequently used in competition law and policy, which was introduced in the economic theory of contracting most probably by Klein and Murphy (1988). Klein and Murphy do not explicitly define it. Instead, they refer to a series of practices that are commonly understood as such. A definition is found in Lafontaine and Slade (2005), but it refers generically to "any restriction that is imposed by one member (...) on the other member of the relationship".

While research on restraints usually addresses their consequences for competition and social welfare, a study by Brickley (1999) analyzes them as efficient responses to certain contracting problems. Brickley focuses on the three contractual clauses (restrictions on *passive ownership*, *area development plans* and *mandatory advertising*) that are specific to franchising contracts, that he interprets as a means of providing incentives to exert effort in a principal-agent relationship. In his model 'restrictions on passive ownership' have the effect of restricting the agent from allocating effort to other outside activities, thereby reducing the opportunity cost of working at the unit; 'area development plans', by granting the agent a claim on multiple positions, internalize some effects of

the agent's effort and reduce the horizontal free-riding problem;³¹ finally, 'mandatory advertising' cures the free-riding problem by setting a minimum level for an observable input to be supplied by the agent. His findings are supportive of the hypothesis that use of these clauses increases with the intensity of various measures of horizontal externalities.

While an incentive interpretation is credible for the first two restraints, it is much less so for the third one. With 'mandatory advertising' the franchisee is forced to provide the required performance not by implicit incentives, but by the explicit prescription of an easily observable and verifiable input.³² In our opinion this restraint is better seen as governance by rules. While in principle the franchisor's main concern should be with the output of the relation (the royalties), amid uncertainty about the process that delivers the best outcome, all the franchise stands to gain by the setting of rules that infuse predictability in the relationship, by prescribing specific behavior, while saving cognitive effort in terms of search, calculation, negotiation and conflict resolution. If this interpretation is correct Brickley's finding would indicate that in relational contracts, the prescription of specific behavior through rules increases with the level of externalities. Overall, the role of rules in contractual governance has been the focus of very little investigation. Yet the evidence available indicates their use in contracts is influenced by contextual factors that deserve further analysis.

4.2.4. *Monitoring*

Monitoring may be considered as an integral part of the enforcement apparatus (Brousseau 1995). Indeed agency theory (Jensen, Meckling 1976; Fama, Jensen 1983) sees it principally as a cure to conflicts of interests. However, monitoring may be useful also to prevent non-performance that is simply accidental or caused by insufficient skills. Thus, there are reasons to analyze it as a process not entirely explained by the same factors as enforcement.

Arruñada et al. (2001) investigate the use of monitoring in franchising relationships as a device to control for franchisee's moral hazard. They estimate the regression coefficients of the number of monitoring rights assigned by the contract to the franchisor on three independent variables capturing the cost of horizontal externalities arising from possible agent's misbehaviour, as in their analyses of control and termination rights, and find that greater risk and consequentiality of shirking is significantly associated with more obtrusive monitoring. Additionally, they find that the intensity of monitoring rights is complementary with the use of incentives, as is to be expected.

³¹ As argued by Klein and Murphy (1988), as long as the marginal return to a franchisee is only a fraction of the total return of an extra sale, the franchisee chooses to provide a lower amount of services than would be optimal from the point of view of the whole franchising network.

³² The prescription of a specific amount of advertising does not remove the externality, so that the marginal return to the agent of additional expenditure is lower than his marginal cost. Thus if actions could not be observed, the franchisee would still have an incentive to free ride.

Another study of franchising contracts (Bercovitz 1999) also measures the presence and the levels of contract terms relating to monitoring. However, since these variables are found to have very little variation (with a presence in over 90% of contracts), the sample is deemed unsuitable to test hypotheses about monitoring.

Kaplan and Strömberg (2003) provide evidence on monitoring in the form of data and analysis on board rights in venture capital financing contracts. Besides supervising and evaluating top management, the board serves other functions related to corporate decision-making. However, Kaplan and Strömberg find out that in venture capital financing board rights (the number of seats allocated to the entrepreneur, to the financing company and to third parties) can be, and actually are, separated from voting rights through explicit agreements, particularly in case of adverse circumstances. This separation allows us to assume that 'board rights' in that sense are somewhat decoupled from authority and decision making, and are an acceptable proxy of the supervisory and monitoring dimensions of contracting. Two major findings of Kaplan and Stromberg on this point are that board rights allocated to the venture capitalist can be state-contingent (typically they increase with default on dividends), and, overall, they tend to be higher if the company has no revenues at the time of financing. These findings may be taken to suggest that enhanced supervision and monitoring by the principal are required when financial adversities render mistakes more costly and when a short track record makes it more difficult to assess the founder's type.

Dekker (2004), in the above mentioned study of a buyer-supplier alliance, also observes a significant role for monitoring, in an alliance where explicit incentivization is also provided for. In the focal alliance two organizational structures in particular – the alliance board and ex-post mechanisms like open book accounting – contributed to the monitoring function and were instrumental in the reduction of information asymmetry between the partners.

The role of monitoring in inter-firm contracts has been explored also in the above-mentioned study by Ryall and Sampson (2006). These authors find that each of the seven items of monitoring they have developed is present in at least 15% and at most in 46% of contracts and that one of their proxies for relational capabilities (prior deal experience, with any partner) affects positively and significantly the level of monitoring.

In sum, several of the authors reviewed see a role for monitoring in contracting. Empirical evidence confirms that monitoring is a relevant process dealt with in relational contracts. Available evidence is not abundant and it supports hypotheses based on agency theory and ICT. On account of its significance and on the dearth of research about it, this is an issue that warrants further investigation.

5. Contract dimensions

Economists' contractual benchmark is the complete contingent claim contract. 'Complete' means that it leaves no possibility to improve efficiency by an ex-post adjustment of actions. Ex-ante this is achieved by figuring out contingencies and prescribing a joint-surplus maximizing action in correspondence to each them.

As explained in Masten (2000), originally the complete contingent claim contract was conceived as an analytical device to model general equilibrium, rather than as a model of contracting per se. Thus, it is no wonder that it is a highly unrealistic depiction of real-world contracts. Sooner or later the assumption of 'completeness' had to be relaxed. Recalling this genealogy helps in understanding that 'incompleteness' is to be understood simply as "possibility to improve efficiency ex-post" and that its main corollary is the need for governance devices in addition to the prescription of behavior. However, this change of assumptions also inspired a stream of research that focused on measuring the 'degree of completeness' or related concepts.

Once the assumption of completeness is endogeneized it becomes apparent that it is impossible to achieve the virtues of the contractual ideal type by increasing just one particular contract dimension. Yet, this fact was not immediately realized, and studies in this stream have used a variety of denominations and operationalizations for constructs that implemented the program of endogeneizing "completeness". We shall regroup them under three labels – complexity, contingency planning and specificity – that correspond to three contractual strategies that are supposedly effective in fulfilling two competing requirements: reducing the risk of non-performance and ensuring the possibility of harmonious ex-post adaptation.

However, before "completeness" became an issue, economists and business scholars had already observed that contracts differed in the duration dimension, and had started to investigate it empirically. Thus, following the order by which contract dimensions have become problematic, we shall begin our review from duration.

5.1. Contract duration

According to Klein, Crawford and Alchian (1978) and Williamson (1979) contract duration is a fundamental design variable in the case of exchange backed by transaction-specific investment. In fact, long term contracting is supposed to save the bargaining costs of repeat negotiations, which would be unavoidable if sequential spot contracting were selected instead. However, a longer term also increases the potential for maladaptation. Therefore, opposite transaction costs must be traded-off against each other in deciding the actual contract term.

In an early study of duration Joskow (1987) analyzed the effect of asset specificity on the duration of contracts for coal market transactions between coal producers and electric utility operators.³³ The analyses were carried out on a database of 277 observations of contract variables coded from secondary sources. The results strongly supported the hypothesis that higher specificity is conducive to longer duration. Other studies that provide evidence consistent with TCT's view of duration are Goldberg and Erickson (1987) and Pirrong (1993).

In recent years, an empirical investigation of contract term was performed by Ciccotello, et al. (2004). The authors argue that while previous research has found long-term contracting to be an efficient response to hold up risks associated with investment in transaction-specific *tangible* capital, the same thing should also be true when the investment involved is in *intangible* capital (human capital). For a given level of investment, the hold-up risk – they maintain – increases with the novelty of the technology. In fact, the more novel the technology the higher the probability that the behaviors stipulated in the agreement will become inefficient at later dates. A test was performed on a database of secondary data on 582 cooperative R&D agreements between Air Force agencies and other partners and lead to the rejection of the null hypothesis that technological novelty has no influence on contract duration.³⁴

The possibility that transaction costs *increase* as a consequence of longer contract duration was empirically analyzed by Masten and Crocker (1985). Their investigation strategy sets forth from the idea that in certain markets like natural gas supply, price regulation induces the parties to engage in non-price competition by offering each other non-optimal contract terms (like 'take-or-pay' provisions). In turn, since a consequence of these suboptimal provisions is to raise the potential liabilities of contractual exchange, the presumption is that they would lead to shorter contracts. This proposition was tested on a database of 280 observations of contract terms from a public survey. Contract duration was regressed on incentive distortions and other control variables. The results were largely supportive of the hypothesis: the prospect of inefficient adaptation reduces the willingness of the parties to engage in long-term contracting.

Developing the idea that duration also increases contractual rigidities, Crocker and Masten (1991) investigate the process by which the parties restore flexibility in long term contracts. While the study is properly an investigation into the antecedents of different types of renegotiation

³³ We take this article to represent a series of four that Joskow published between 1985 and 1990 on contracts between coal suppliers and electric plants.

³⁴ The authors discuss at some length an issue of identification (whether contract duration reflects hold-up risk or the fact that it takes longer to complete a novel project) and conclude that upon controlling for task characteristics that may influence project length independently of contracting hazards, contracts for novel technologies are still significantly longer than contracts for more mature ones. However, the authors had to make do with the limited information about task characteristics that is available in their dataset. Hence there is room for future studies employing richer databases to try isolating project effects and contracting effects.

provision, it can be seen as providing indirect evidence on the complementarity between price adjustment clauses, duration and explicit breach penalties (take-or-pay)

In sum, these studies confirm that duration is an effective safeguarding device to protect reliance in a variety of contexts, that its benefits must be traded off against the costs it entails, and that its effectiveness is enhanced by the simultaneous use of mechanisms that define admissible dimensions for adjustment. Other studies alert us to the fact that there are contexts like manufacturing where the variability of specifications and perhaps other characteristics of investment make duration less well suited to protect specific investment (Lyons 1994). Future studies may ponder the function served by duration in contexts like technology development and licensing, where long-term contracts are observed, yet duration seems to have little or no variance (Brousseau, Coeurderoy, Chaserant 2006).

5.2. Complexity

Contracts are incomplete, we are told, because of the limits of our cognitive capabilities. As a result we must figure out other devices to prevent information problems, motivation problems and incomplete commitment problems. However – one could reason – the higher the stringency of the language and the harder the exertion in foreclosing the possibilities of misbehavior, the more closely real-world contracts would approach the complete contract archetype. This is approximately the reasoning that inspires the research on contract complexity. As a result of greater drafting effort – it was thought – the contract should be longer, include a higher number of clauses and provide for a larger array of enforcement mechanisms.

One early empirical study that investigated these ideas is Parkhe (1993). Actually, this study concerned itself with the wider problem of explaining differential performance of strategic alliances as a function of their structuring. However, Parkhe considers part of this structuring to be both the contractual aspects of the cooperation, and non-contractual governance mechanisms. Despite dedicating only tangential attention to the formal contract, Parkhe devises an operationalization of the degree of “contractual safeguards” that would influence many later studies on contracts in the strategic management perspective (Deeds, Hill 1999; Reuer, Ariño 2002, 2003, 2004; Reuer, Ariño, Mellewigt 2003). What he does is to look at the presence in contracts, or absence thereof, of some clauses (out of a total set of nine) that embody the enforcement apparatus. He assumes that he can rank them in order of “increasing stringency” so that he can assign them a stringency score and summarize them in an index of “ex-post deterrents”. Given such operationalization, we think it suitable to consider this a study of ‘complexity’. Parkhe’s substantive finding is that the intensity of

these contractual safeguards is negatively related to the “shadow of the future”, that is, to the intended duration of the alliance and to the ease with which the partner’s actions are observed.

Another study that is relevant in this context is Luo (2002). Luo realizes that what had attracted attention until the time of writing – the intended ‘completeness’ of contracts – is actually a cure to two distinct problems: that of motivation and that of incomplete commitment. Hence, he argues, ‘completeness’ must itself be a multidimensional concept, comprising what he calls ‘term specificity’ and ‘contingency adaptability’. The former “concerns how specific and detailed the terms are”. The latter is “the extent to which unanticipated contingencies are accounted for and relevant guidelines for handling these contingencies are delineated in a (...) contract” Luo (2002: 905). This claim is empirically validated because his study finds that the questionnaire items chosen to operationalize the two constructs load on two separate factors in the expected way, and have a high Cronbach alpha in both cases. To our understanding the content domain sampled by ‘term specificity’ has little to do with the articulation and extensiveness of the contract. The reason why we enlist this study here is that some scholars have considered ‘term specificity’ as an alias of ‘complexity’ and has drawn inspiration from Luo (2002) for investigations on complexity.

Poppo and Zenger (2002) test the idea that the complexity of the contractual governance apparatus employed in outsourcing relations in information services increases with the intensity of exchange hazards. The interesting aspect of this paper is the fact that exchange hazards are not only spelled out as the risk of opportunism, but also include the environmental uncertainty associated with technological change. The authors find the regression coefficient of the latter factor to be negative. Their interpretation is that as uncertainty becomes very severe managers may lose confidence in contracts.

Ariño and Reuer (2002, 2003, 2004) build on Luo (2002) and explain that ‘contract complexity’ (the number and stringency of the provisions provided) is conceptually distinct from ‘contract completeness’ (the extent to which the contract accounts for unanticipated contingencies). However, departing from Luo, they propose that lack of detailed knowledge about the transaction a contract refers to (which is most often obtained in cross sectional comparisons of contracts), makes it impossible to compare contracts along the second dimension. Hence they focus on contract complexity and rely on Parkhe (1993) for its operationalization. As to its antecedents, the authors argue that contract complexity increases with the strategic importance of the alliance and with variables that can be interpreted in terms of behavioural and environmental uncertainty. The empirical analyses of Ariño and Reuer (2003), based on 88 responses to a questionnaire administered to dyadic alliances, generally support these relations, particularly the one between

complexity and strategic importance. However, variables relating to environmental uncertainty are not significant in several specifications of the model.

An interesting part of this study is that besides estimating models of complexity the authors also explored whether ‘complexity’ is itself multidimensional. They applied factor analysis to the contract clauses and found that they loaded on two factors, labeled by the authors ‘partner control’ and ‘operations control’. Unfortunately, the limited size of the sample and the small number of contractual clauses that were coded somewhat limit the significance of this exercise.

Another study that provides evidence on contract complexity is Anderson and Dekker (2005). This dimension is referred to by the authors as ‘extensiveness’ and is operationalized as the number of contract terms included in the contract, out of a pre-defined set of 24. The authors investigate the impact on contractual complexity of all the canonical TCE dimensions of transactions and find them to be significant and of the expected sign, except for uncertainty. Given the context investigated, the authors think that ‘size’ of the project captures the risk of hold up better than ‘frequency’. Quite unsurprisingly ‘size’ turns out to be by far the most significant antecedent of complexity.

Overall, we think that the available evidence on complexity and its antecedents is not very compelling, except perhaps the finding relating complexity with indexes of transaction ‘size’ and ‘importance’. Thus, the strongest indication we have that the greater the contractual hazards the more an efficient contract *ought* to be complex, is perhaps one finding in the above-mentioned study of Helm and Kloyer (2004: 1120): “The *perceived* control of both components of exchange risk increases with a *growing number* of contractual hostages” (our emphasis).

5.3. Contingency planning

As discussed by Bernheim and Whinston (1998), empirically, contracts are incomplete in two different senses. First they may make actions less sensitive to verifiable events than would appear optimal. Second, they may fail to specify verifiable obligations of the parties. The investigation undertaken by Mayer and Bercovitz (2003) corresponds to the first of these two notions, and to the contingency adaptability aspect of the question of ‘completeness’. Mayer and Bercovitz ask to what extent the parties resort to ‘contingency planning’. Their operationalization of the construct grades contracts on a three-point scale based on the degree to which they develop explicit response rules for specific classes of events. The variable is coded from the actual content of 386 contracts. The authors find that the use of contingency planning in a contract is positively

related to the level of *task interdependence* and to the *appropriability of proprietary technology*, and negatively related to the *cost of specifying contingencies*.³⁵

Based on the same database, Argyres, Bercovitz and Mayer (2007) also find that contingency planning is positively affected by *prior relationships* between the parties. While the result is open to the interpretation that a history of frictions advises the adoption of greater safeguards under the form of stricter contingency planning, the authors subscribe to an alternative reading that repeat interactions allow the partners to develop relation-specific routines, and lower the cost and effort of explicitly planning for contingencies. The findings of a previous multiple case study carried out by Argyres and Mayer (2004) in the same setting also favor the latter interpretation.³⁶

Another paper that addressed the issues of the foresight of contingencies in contracting is Elfenbein and Lerner (2005) that studied this problem in the context of alliances between internet portals and other partners. A peculiar characteristic of the setting is that the realization of contingencies – in the sense of levels of performance of the parties – would be cheaply observed and verified. However, as a matter of fact, contracts are often left less complete than would actually be feasible. Elfenbein and Lerner interpreted this with the help of recent literature on information and control, that proposes that offering (state contingent) control rights to a potential partner in an alliance, is a means by which an agent can signal its quality and its goal congruence. The point of this literature is that the value of the signal to the principal is higher the greater the noise contained in the performance measure and the greater the uncertainty about the congruence of the contracting parties' objective.³⁷ Consistent with the theoretical model the study finds that a proxy for the anticipated conflict of interests and uncertainty impact positively and significantly on the use of contractual contingencies of performance. Although this study is remarkable in many respects, one should not draw normative implications too hastily. The theory tested is recent and reverses some of the implications of the earlier works, the sample used is relatively small, and the contracts analyzed

³⁵ The last of these relationships is fairly easily understandable. The first and the second one warrant a little clarification. As the authors explain, “contingency planning can place limits on how much of the supplier’s proprietary technology must be revealed in the event of changes to the schedule or the addition of new features” and “the parties can outline exactly what access is allowed and what steps will be taken if certain problems occur that may impact the use of the supplier’s proprietary technology” (Mayer and Bercovitz 2003: 14-15). This explanation makes clear that contingency planning, *qua* planning, not only enhances flexibility but also specifies, and thus constrains, how the parties will respond to certain changes. To the extent to which contingency planning constrains responses, it is a little surprising that it has been found efficient in situations characterized by one type of interdependence that *prima facie* could be described as ‘reciprocal’. In fact under those conditions organization theory would typically recommend coordination by mutual adjustment, rather than by plan (Thompson 1967). Although the coefficient of *task interdependence* is significant at a very high confidence levels, we think this is an issue that requires further investigation.

³⁶ Other findings of Argyres, Bercovitz and Mayer (2007) are mentioned in the Section 5.4.

³⁷ As noise increases, “the difference in the cost of providing the control right for high and low quality firms becomes greater” (Elfenbein and Lerner 2005: 7).

were frequently signed between start-ups with little prior alliance experience. Overall, we should regard this evidence as tentative.

In this context it is worth remembering the above-mentioned classical study of Masten and Crocker (1985) that allows a dual reading of its findings in terms of contract adaptability. As said above, their study shows how long-term contracts can achieve considerable flexibility through the simple inclusions of a unilateral option ('take-or-pay'), without resorting to many clauses that are liable to misinterpretation or deception. Moreover, in section 4.2.1 we mentioned how decision-making also serves the purpose of adaptation. These examples indicate that in different contexts adaptability may be achieved through a variety of structural and procedural elements.³⁸ Thus adaptability is better thought of as an emergent property of contracts, rather than as a dimension, and "contingency planning" is a dimension that measures the intensity of use of one particular strategy to achieve efficient adaptation. As seen above, this strategy is increasingly resorted to the greater the *ex-ante* conflicts of interests and the lower the cost of specifying contingencies are.³⁹

5.4. Ambiguity and specificity

While enlisting contingencies is sometimes an unwieldy way of increasing the adaptability of a contract, an alternative strategy is more feasible, although it has its own downside.⁴⁰ As noticed by economist Al-Najjar (1995) one way to restore flexibility in a contract is to introduce ambiguity, that is, to state broad requirements without restricting the parties to specific actions. This corresponds to the second notion of incompleteness according to Bernheim and Whinston (1998). Scholars familiar with actual business contracting practices agree that this strategy is quite common. For instance, Turner (2004) informs us that fixed price contracts for construction projects can be based on "fixed design", on "scope design" or on design based on "cardinal points", clearly in an increasing order of specification ambiguity. Although empirical studies generally do not address the issue of 'ambiguity' we can gather some empirical evidence from studies designed to investigate its opposite: contract 'specificity', or contract 'detail'.

The study by Ryall and Sampson (2006), already mentioned for its implications about monitoring, has tried to capture contractual detail through six items that measure the degree to

³⁸ One caveat is in order. We do not claim that unilateral options are suitable to enhance the adaptability of all the types of contracts. At minimum one should be aware that the use of certain unilateral options, like stipulated damages, "requires that most of the uncertainty associated with performance be only on one side of the transaction. If there were uncertainty also on the other side, the penalty stipulated *ex-ante* could lead to inappropriate incentives *ex-post*" (Crocker, Masten 1988: 329).

³⁹ Subject to the disclaimer as per note 35, contingency planning also increases the higher the task interdependency between the parties.

⁴⁰ "Actual contracts incorporate few if any explicit contingencies" (Masten 2000: 29)

which required inputs, expected outputs and division of intellectual property rights are fully specified. While rich in terms of measuring contract content, Ryall and Sampson's database is somewhat limited in terms of information on transaction characteristics and other contextual variables. Thus it only allows the authors to analyze contractual complexity in terms of characteristics of the *relationship*. Their key findings are that contracts are *more detailed* when firms have prior deal experience, and have engaged in prior deals with the same partner. These findings point to the existence of a learning effect in contracting, whereby the capacity to draft detailed contracts increases with the experience.⁴¹

Argyres, Bercovitz and Mayer (2007) also undertake to investigate whether the learning entailed by prior relationships between the parties lowers the cost and effort of writing more specific task obligations. The authors fail to find support for this relationship, but find evidence of complementarity between task description detail and contingency planning. Moreover, since the efforts at planning for contingencies that are made for one contract are associated with increases in the extensiveness of task descriptions in later contracts, the authors can demonstrate quite unambiguously, that the causal mechanism driving complementarity is the existence of learning spillovers.

Another study that informs us about the use and limits of ambiguity in contracting is Corts and Singh (2002). The interested reader may refer to the comments on this paper we made in the section on remuneration and risk allocation. Here we just remark on the implication that the optimal level of contract detail has to be decided by trading off the benefits of controlling moral hazard against the costs of increasing the risk of maladaptation that specification entails. In fact, Corts and Singh find that contracts based on more ambiguous term specification are increasingly opted for when previous experience with the same partner assuages the fear of moral hazard.⁴² Similarly, the above-mentioned study by Brickley (1999) may be considered as evidence that the precision of behavior prescriptions in franchising increases with moral hazard (horizontal externalities).

Also the study by Crocker and Reynolds (1993) contains a message about this dimension and its antecedents: ambiguity is endogenous to the relationship and "transactors' choice of contract terms reflects a trade off between the specification costs and rigidities associated with specifying detailed performance obligations (...) and the greater flexibility but higher expected cost of

⁴¹ While the authors interpret their findings as indicative also of complementarity between contractual and social governance, we prefer to say they indicate an impact of the 'shadow of the past' on contractual governance. In fact, past alliancing experience is not an element of 'governance', susceptible to design. Rather, from a design perspective it can be regarded as a dimension of the transaction.

⁴² This result is in contrast with what has been found by Ryall and Sampson (2006). However, it must be noticed that while in Ryall and Sampson (2006) contract detail is a six-values polychotomous variable, in Corts and Singh the parties are faced only with a stark choice between 'turnkey' and 'dayrate'. Thus, parties that opt for more detailed contracts (turnkey) have to accept an accompanying sharp increase in maladaptiveness.

establishing the terms of trade *ex post* (Masten 2000: 37)”.⁴³ Among the factors that call for more ambiguous specifications is task uncertainty, while a known propensity of the contracting party for litigiousness advises a better definition of contractual obligations.

Mayer (2006) also investigates the relationship between contractual specification and contracting hazards. In the context of IT service provision, the potential reusability of knowledge-intensive work (“knowledge spillovers”) may create a conflict between the client, interested in seeking a product optimized to its environment, and the supplier, who may sacrifice optimality to enhance the chance of later reuse. Mayer finds that a greater detail in the specification of task associates positively and significantly with a proxy for reusability.

One final work concerning contract ambiguity is provided by Saussier (2000) who analyzes 29 contracts between Electricité de France and its private suppliers that deliver coal to riverside power plants. Saussier purposes to develop the investigation of Crocker and Reynolds (1993) and to extend the measurement of contract ‘completeness’ to multiple clauses. However, unlike his models, Saussier does not measure a *level* of specification for each clause and operationalizes ‘completeness’ as the number of the clauses, out of a set of six, that are specified in the contract. To appreciate the importance of different operationalizations consider that in Crocker and Reynolds more ‘complete’ contracts are the simplest (fixed price) while in Saussier they have the largest number of clauses. We aver that this is due to Crocker and Reynolds defining completeness *intensionally* (by an external criterion) and Saussier *extensionally* (by the items it contains). Thus although Saussier’s contribution is quite innovative in some respect (it is the first paper that endogeneizes the level of asset specificity) its findings do not relate directly to the topic of this section.⁴⁴

In sum, contract specificity is a relevant dimension that is negatively impacted on by uncertainty and positively by behavioral hazards. At least in certain settings, it appears that the existence of relational enforcement mechanisms also favors greater contractual detail.

6. Discussion

The evidence collected in our review of literature, is almost entirely related to dyadic relationships, interactions taking place over a significant time span. Thus, although in the remainder of this article we may use the expression ‘contracts’ without further qualifications, it should be borne in mind that our statements apply essentially to contractual relations. A second disclaimer is

⁴³ For precision’s sake, Crocker and Reynolds use ‘completeness’ instead of ‘ambiguity’ but the contract characteristic they measure better captures the dimension of ambiguity.

⁴⁴ Saussier finds that the dependent variable is positively affected by asset specificity and negatively by uncertainty.

that extant literature on remuneration provisions is particularly rich and well reviewed. Therefore our discussion will focus particularly on the procedural elements and on contractual dimensions

We think that the literature reviewed provides ample evidence of the usefulness of the organizational perspective advocated by Stinchcombe (1985), although we have focused on processes and dimensions, rather than on mechanisms, as originally proposed by Stinchcombe. Contracts are not just collections of promises, as emphasized by classical legal scholarship. They are also “constitutions” that establish procedures to govern the relation over time, as already proposed by Goldberg (1976a: 428). However this review allows us to underscore emphatically a couple of points. First, that the requisite procedural coordination of inter-firm organizations is established, to a considerable extent, *in* the contract. Second, that those procedures support not just ‘adjustments’ of almost complete plans, but also the discovery of suitable actions, and the adaptation, if not the discovery, of the goals of the relationship, as in venture capital financing agreements or in contracts for joint exploratory R&D.

Among the various classes of operating mechanisms, the procedures for decision-making and for the enforcement of promises have received the greatest attention. Contracts provide amply for decision-making procedures. At times, the allocation of decision rights is highly concentrated, the more so the greater the information asymmetry and the risks it entails. Yet their actual allocation is not entirely explained by efficiency reasons, but may be influenced also by the parties’ bargaining powers (Lerner and Merges 1998). Thus one party may be subject to another’s ‘fiat’ as a result of contract instead of integration. While ICT-inspired studies focus on the lopsidedness of decision rights allocation, contractual relations often use negotiation to adapt performance. If properly designed, post-contractual negotiation procedures may be acceptable to the parties, and need not end up in haggling or hold up. Contracts increasingly feature this process the lower the behavioral hazards faced by the parties and the higher the task uncertainty. Based on the known properties of negotiation, we can assume that negotiation is unsuitable in the case of extreme information asymmetries (Grandori 1997a), but this has not been investigated in the studies we have reviewed.

Contractual relations often also set up the means for their own enforcement. These include certain action rights that affect the relation as whole, explicit penalties, rights that give rise to threats and commitments. One indirect indication about the effectiveness of those means is the fact that parties often waive rights to court access for disputes or create obligations that would be difficult for a court to enforce (Ryall & Sampson 2006: 4). The intensity of use of procedures for self-enforcement tends to increase with the intensity of behavioral hazards and with the uncontractibility of output. There is also a little empirical evidence that higher allocation of decision rights to one party is complementary with greater assignment of enforcement rights to that party.

Contractual governance serves its purposes not only through the enforcement of the original promises, or through an affirmative process of decision making, but also through *rules* and vetoes, to make the behavior of the parties more predictable and more congruent with the stated goals of the relation. One common use of rules in contracts is to generate incentives for the parties to invest greater effort in the relation, through the foreclosure of opportunities. This justifies the label of restraints, which is used sometimes to indicate also obligations of positive behavior, not strictly related to the accomplishment of tasks. The working of this operating mechanism in contracts has received limited attention. Available evidence indicates that greater behavioral hazards are conducive to more restraints and that greater task complexity associates with more severe restrictions to exit on the party holding critical capabilities.

Another little investigated process is monitoring. Yet contracts do assign monitoring rights, to the point that in some settings, like franchising, monitoring terms may look more as boilerplate provisions rather than real design variables. The few available studies indicate that the assignment of monitoring rights increases with behavioral hazards and with their consequentiality for the goals of the relation and that monitoring rights are complementary with monetary incentives. The evidence concerning monitoring and the other processes investigated, is summarized in Table 1 in the Appendix.

Before we move to contractual dimensions, let us comment on a few findings that would represent anomalies in an ICT perspective. ICT generally predicts an all or nothing solution to the problem of contracting: either a contract is totally complete or it is not entered at all.⁴⁵ However, the contracts actually observed are clearly not ‘complete’. Yet they assign several decision rights that altogether shift the balance of control in favor of one party or the other. These rights are not particularly difficult to parse (Lerner and Merges 1998). Thus, in order to gain control, one party need not ‘buy’ residual, and partly irrelevant, decision rights through asset ownership. The second anomaly can be appreciated in contrast with ICT’s view that the salience of the ownership of physical assets is owed to the impossibility to assign residual control rights over human assets (Hart, 1995: 29). While, absent slavery, that impossibility surely holds in a strict sense, in practice contracts can establish powerful devices, like incentives and restraints, to lock human assets in a relationship and to exert effort and capabilities in its interest (Kaplan, Strömberg 2002), again, without the ‘power’ entailed by asset ownership.

As to contractual dimensions, common representations seem to appreciate little more beyond the contracts’ higher or lower incompleteness and their longer or shorter duration. Our

⁴⁵ Saussier (2000:191) made this point, while acknowledging one attempt by Hart and Moore (1999) to develop a theory of ‘partial’ incompleteness.

review has documented that more dimensions have been investigated and that still others await investigation. We have assessed that ‘completeness’ is a misleading label for an empirical construct: the ideal type of complete contract performs functions that impose competing requirements to boundedly rational actors. In the real world these functions need to be served by multiple mechanisms whose impact on contractual dimension is impossible to capture with a one-dimensional construct. Table 2 in the Appendix provides a concise summary of the evidence concerning the antecedents of four contractual dimensions.

Through the observation of the same processes in different contracting contexts this review of literature adds content to the notion *relational contracts*. It lays the foundation for analyzing relational contracts on the basis of their elementary building blocks, and not simply as one archetype opposed to the discrete contract. The notion of relational contract that emerges from our analysis lends itself quite straightforwardly to measurability and to structural-contingency contract design. Although in practice contract relations may benefit from the support of non-economic exchange factors “such as social exchange, the motivation of kinship, of friendship, of altruism (...) and of the other psychological and social phenomena” (Macneil 1974: 732), in principle, relational contracts do not need them to be distinguished from discrete contracts: there are structural differentiating elements that are internal to the formal document.

As to designing relational contracts, what has been observed only supports a very general and tentative framework, yet one that is based on observable characteristics of the transaction and of the relation, and not simply on the goals of the parties and on juridical typologies. Such framework would recommend that in the case of transactions characterized by substantial *asset specificity*, the parties should draft contracts of longer duration and greater complexity than in the opposite case of generic assets. More generally, in the face of *behavioral hazards*, contracts should be more complex, prescribe performance more in detail and strive for greater planning of contingencies. The increase in these dimensions would be partly the result of greater formalization of processes for enforcement, behavior control and monitoring. When the hazards relate to hidden action, greater effectiveness of monitoring can be expected if the contracts simultaneously resort to explicit incentives. As to providing flexibility to such contracts, decision-making through negotiation should be used sparingly. Rather, the parties should choose from a roster of alternative means encompassing authority, neutral third parties’ decision making, formulaic adjustments, and penalties for efficient breach. Additional circumstances, like the feasibility and the costs of these devices, or the extent of the principal’s moral hazard, should guide the selection within this repertoire.

Under conditions of external *uncertainty*, contracts should be longer, if conditions of asset specificity also prevail. Yet contracts could be simpler, and their specification of obligations less

detailed. Greater provision for decision-making should be used to specify the parties' obligations as the relationship unfolds. One kind of uncertainty is that which leads to the *uncontractibility* of the output expected from the relation. When this condition couples with substantial informational asymmetry, a lopsided distribution of both decision rights and rights of enforcement may also serve efficiency, and not just reflect a possible imbalance of the bargaining powers of the parties.

The precise level at which all these design variables should be set, may depend also on other factors, like the shadow that the future and the past project on the relation, through the experience the parties have acquired from past transactions, social norms (if any were developed), the expected length and size of the stream of future payoffs, as well as the ease with which they can be observed. The evidence available is rather scarce, and tentatively suggests that the shadow of the past may help greater process formalization, while the shadow of the future supports expectations of self enforcement and reduces the marginal benefit of formalization.

7. Conclusion

This paper has applied an organizational perspective to the assessment of a sample of empirical studies on contract design where stated foci of investigation were sometimes different from ours. Moreover, the studies related to a number of rather heterogeneous settings. Yet the framework we developed has proved reasonably successful in identifying a few common processes and dimensions under the evidence yielded by the literature reviewed. We think that an organizational perspective on contracting can be developed further and is promising of progress both from a methodological and a theoretical point of view.

From a methodological perspective, it should enable us to make sense of the variety of contractual solutions in a reasonably general way, and to overcome our reliance on discrete juridical typologies (e.g. a franchising contract, a joint venture contract, a consortium contract, etc.) or on endless lists of content (R&D, commercial, production, etc.). One example of such reliance is found in research on strategic alliances where a certain governance characteristic, say, hierarchical control, is assumed to be a monotonic function of alliance *form* (e.g., Oxley 1997). While propositions based on that hypothesis may withstand empirical tests, from a normative point of view they imply a much more restricted set of possibilities for governance design than actually feasible.

Second, this perspective should encourage us to draw from the repertoire of coordination processes that organization theory has investigated, both at the organizational and inter-organizational level, and to start a systematic inquiry into whether, and to what extent, these processes are also formalized in contracts.

Third, the consolidation of a framework for analyzing contracts according to common dimensions and processes may help overcome the consequences of the practical difficulties of doing empirical research on contracts. Empirical research on contracts is severely constrained by problems of data availability. As a reflection of such difficulties, studies based on actual contract content are still very few. In the sample we surveyed they were only 11 out of 35 (see Table 3 in the Appendix) despite our bias in favor of that type of data source.⁴⁶ These difficulties are not going to disappear any time soon. Therefore, it is important that our understanding of relational contracts is based on the whole range of available evidence, and not just on the small subset of studies that deal precisely with the sector of our concern (e.g., land tenure, franchising, venture capital, etc.). However, this requires the development of a general framework.

From a theoretical perspective, the findings of our review of empirical literature indicate that contracts differ from one another by a considerable number of processes and mechanisms, which they incorporate to serve different functions. The extent of such heterogeneity is such that it cannot be captured satisfactorily by variations along a single dimension. This fact is loosely reflected in the various dimensions that different studies have focused upon. However, on the whole the various dimensions investigated have been derived conceptually, have not been clearly distinguished from one another and have not been satisfactorily reconciled with the various mechanisms adopted at the intra-contractual level. This state of things opens up the possibility of a research program that investigates contractual dimensions empirically, in a more grounded and systematic way and that generates empirical taxonomies based on those dimensions.

Another implication from our review is that contracts can employ multiple mechanisms of different kinds to solve the problem of adaptation. The richness of this panoply of mechanisms seems to indicate two consequences. First, adaptability needs not to subtract substantially from enforceability. Second, the classical recipes of ICT and TCE – ownership and hierarchy – are not the only ways to achieve flexible enforcement. The highly documented use of contracting in settings where trust and the shadow of the future cannot be presumed also indicates that the burden of solving this conundrum cannot be put entirely on social governance.

If contracts can do without the standard means of adaptation and have a rich set of devices to choose from, perhaps incompleteness is not as serious a problem as could be inferred by the frequency with which it is postulated in the literature. Therefore, the question of how exactly, and by which combinations of assignments of rights and of coordination mechanisms can flexible

⁴⁶ The actual figure is smaller than it appears. In fact, some of the studies that investigated actual contract content based most of their analyses on readily-available variables coded by industry analysts, who did not necessarily have specific theoretical concerns in mind.

enforceable contracts be designed, turns out to be a relevant program for conceptual and empirical research alike. Recent studies are exploring the idea that a hierarchization of the contractual matters is a key to solving the puzzle (Grandori and Furlotti 2006, 2007) but considerably more investigation will be required to develop, operationalize and test this or alternative hypotheses.

Achieving the progress we have envisaged also requires overcoming certain specific limitations. First, we have to enhance our understanding of how various contractual mechanisms combine together. Contractual provisions are chosen simultaneously. Yet the bulk of the available evidence has been produced by analyses of single provisions, in isolation. There are also a few examples of works addressing the issue of complementarities. Yet this issue definitely requires more investigation.

Second, we need to improve our measurement techniques. While the studies reviewed practically indicate that it is possible to analyze contractual relations at a more microanalytic level than is common in the majority of the extant empirical literature on contracting *lato sensu*, in passing our investigation has also revealed problems of validity and reliability of certain measures of contract variables. The blame is not to be put entirely on empirical researchers. As is evident in the section on contractual dimensions, problems often originate in hazy definitions of the constructs' content domains. Yet, undeniably, there is also a need for better operationalizations.

In sum, focusing on these and other limitations of current analytical apparatus, under the hypothesis that contracts are an organizational phenomenon offers a clear and challenging research agenda, one that promises to reveal that there is more to contracts than just incompleteness.

Appendix

Table 1: Antecedents of contract procedural elements

Dependent construct	Studies reviewed	Independent construct	Observed direction	Evidence
Decision making	Crocker & Masten 1985, 1991 Crocker & Reynolds 1993 Lerner & Merges 1998 Arruñada et al. 2001 Kaplan & Strömberg 2003, 2004	Behavioral hazards	-	*
		Task uncertainty	+	**
<u>Notes</u> <ul style="list-style-type: none"> Evidence enlisted above refers to antecedents of <i>joint</i> decision rights 'Behavioral hazards' encompasses both a motivation dimension and the consequentiality of potential non-performance <u>Further empirical evidence</u> <ul style="list-style-type: none"> Unilateral decision rights are assigned more generously the less consequential they are for the party subject to them Fewer decision rights are assigned to a party having a conflict of interests Allocation of decision rights between the parties is influenced by their respective bargaining power Decision rights assigned to a principal are complementary with the assignment of rights of enforcement Decision rights need not align perfectly with ownership 				
Enforcement	Bercovitz 1999 Arruñada et al. 2001 Dekker 2004 Helm & Kloyer 2004 Lerner & Malmendier 2005 Ryall & Sampson 2006	Behavioral hazards	+	***
		Uncontractibility of output	+	**
		Task uncertainty	-	*
		Shadow of the past	+	*
<u>Further empirical evidence</u> <ul style="list-style-type: none"> Complementarity between enforcement mechanisms and wider decision rights <u>Notes</u> <ul style="list-style-type: none"> Studies focused on highly heterogeneous means of enforcement termination rights, penalties, various threats and commitments 				
Rules and restraints	Brickley 1999	Behavioral hazards	+	*
		<u>Further empirical evidence</u> <ul style="list-style-type: none"> Greater task complexity associates with more restrictions to exit on the party holding critical capabilities <u>Notes</u> <ul style="list-style-type: none"> Little investigated mechanism 		
Monitoring	Bercovitz 1999 Arruñada et al. 2001 Kaplan & Strömberg 2002 Dekker 2004 Ryall & Sampson 2006	Behavioral hazards	+	**
		Shadow of the past	+	*
<u>Further empirical evidence</u> <ul style="list-style-type: none"> Complementarity between monitoring and monetary incentives Greater monitoring rights to financier contingent on alliance financial adversities 				

Note: 1) The studies enlisted contain evidence that is related to the contract procedural element of the corresponding row, but not necessarily to each independent construct affecting it; 2) ***: relation backed by multiple convergent empirical evidence and theory; **: relation backed by convergence of limited empirical evidence and theory; *: relation regarded as tentative on account of limited evidence, idiosyncratic context or pioneering theory.

Table 2: Antecedents of contractual dimensions

Dependent construct	Studies reviewed	Independent construct	Observed dir.	Evidence
Duration	Joskow 1987 Goldberg & Erickson 1987 Pirrong 2003	Asset specificity	+	***
	Ciccotello et al 2004	Uncertainty	+	*
	<u>Further empirical evidence</u> <ul style="list-style-type: none"> Longer duration may increase certain transaction costs Duration is complementary with contractual adjustment mechanisms 			
Complexity	Parkhe 1993	Transaction size and importance	+	**
	Poppo & Zenger 2002	Asset specificity	+	*
	Ariño & Reuer 2003	Behavioral uncertainty	+	
	Helm & Kloyer 2004	Environ. uncertainty	-	
	Anderson & Dekker 2005	<u>Further empirical evidence</u> <ul style="list-style-type: none"> Contrasting evidence of relationship between relational governance and contract complexity <u>Methodological problems</u> <ul style="list-style-type: none"> Lack of unifying theoretical structure hampers specification of hypotheses Difficulty to gather good information on both the contract and its context forces scholars to make do with available proxies 		
Contingency planning	Mayer & Bercovitz 2003	Conflict of interests	+	**
	Elfenbein & Lerner 2004	Cost of specifying contingencies	+	*
	<ul style="list-style-type: none"> Little investigated dimension 			
Contract specificity	Crocker & Reynolds 1993	Uncertainty	-	**
	Brickley 1999 Saussier 2000 Corts & Singh 2002 Mayer 2006 Ryall & Sampson 2006	Behavioral hazards	+	**
	<u>Further empirical evidence</u> <ul style="list-style-type: none"> Contrasting evidence hints at possible U-shaped relationship between relational enforcement mechanisms and contractual governance or at mediating role of other contextual variables on relational enforcement mechanisms 			

Note: 1) The studies enlisted contain evidence related to the contract dimension of the corresponding row, but not necessarily to each independent construct affecting it; 2) ***: relation backed by multiple convergent empirical evidence and theory; **: relation backed by convergence of limited empirical evidence and theory; *: relation regarded as tentative on account of limited evidence, idiosyncratic context or pioneering theory.

Table 3: Empirical studies by data source

Study	Core DV	Data
Goldberg and Erickson 1987	Duration, adjustment processes	Case study
Mayer and Argyres 2004	Planning for contingencies & others	Case study
Pirrong 1993	Duration	Case study
Dekker 2004	Outcome control; Behaviour control	Case study
Argyres, Bercovitz, Mayer 2007	Contingency planning; Task description detail	Contract data
Arruñada et al. 2001	Principal's discretion	Contract data
Elfenbein and Lerner 2004	Contingent rights	Contract data
Kalnins and Mayer (2004)	Incentive intensity	Contract data
Kaplan and Strömberg 2002	Selected incentive and control mechanisms	Contract data
Kaplan and Strömberg 2004	Selected incentive and control mechanisms	Contract data
Lerner and Malmendier 2005	Termination rights	Contract data
Lerner and Merces 1998	Control rights	Contract data
Mayer 2006	Task description detail	Contract data
Mayer and Bercovitz 2003	Contingency planning	Contract data
Ryall and Sampson 2006	Contract completeness/ complexity	Contract data
Anderson and Dekker 2005	Contract extensiveness	Questionnaire
Deeds and Hill 1998	Contractual safeguards	Questionnaire
Helm and Kloyer 2004	Perceived control of transaction risks	Questionnaire
Luo 2002	Contingency adaptability; term specificity	Questionnaire
Parkhe 1993	Contractual safeguards	Questionnaire
Poppo and Zenger 2002	Contract complexity	Questionnaire
Reuer, Ariño 2002	Contract complexity	Questionnaire
Reuer, Ariño 2003	Contract complexity	Questionnaire
Reuer, Ariño 2004	Contract complexity	Questionnaire
Reuer, Ariño and Mellewigt 2003	Contractual safeguards	Questionnaire
Bercovitz 1999	Various monetary and non-payment related clauses	Secondary
Brickley 1999	No passive ownership; specification of inputs; area development plan	Secondary
Ciccotello et al. 2004	Duration	Secondary
Corts and Singh 2002	Compensation provision	Secondary
Crocker and Masten 1988	Duration	Secondary
Crocker and Masten 1991	Price adjustment processes	Secondary
Crocker and Reynolds 1993	Completeness	Secondary
Hubbard and Weiner (1986)	Minimum purchase requirement %	Secondary
Joskow 1987	Duration	Secondary
Masten and Crocker 1985	Compensation provisions	Secondary

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