

**CONTRACTUAL DESIGN:
FORMALISATION VS. IMPLICIT SAFEGUARDS**

GONZÁLEZ-DÍAZ, MANUEL
LÓPEZ BAYÓN, SUSANA
VENTURA VICTORIA, JUAN

*Universidad de Oviedo
Dpto. Administración de Empresas y Contabilidad
Área Organización de Empresas*

Facultad de CC.EE. y Empresariales
Avda. del Cristo s/n, 33071 Oviedo –SPAIN–.

E-mail:

mgdiaz@econo.uniovi.es

sbayon@econo.uniovi.es

Abstract. This paper studies the adoption of formal contracts in subcontracting agreements in the Spanish electronic industry, examining its relation with specificity, uncertainty, size, and the existence of implicit safeguards. The analysis of 74 contracts has confirmed that the probability of writing a formal subcontracting agreement is positively related to the contractor's size, and negatively related to the subcontracted activity specificity, to the degree of previous knowledge and confidence between firms, and to the contractor's capacity for substituting the subcontractor. Furthermore, statistically significant differences in the use of formal contracts are also detected, depending on the electronic subsector considered and the nature of the subcontracted activity (goods or services).

Key words: transaction costs, incomplete contracts, formal contracts, electronic industry, subcontracting.

Clasificación (JEL): L14, L22, L63.

1. Introduction

This paper aims to analyse the factors determining inter-firm *contract formalisation*. For this purpose, we have focused on a particular type of exchange: *subcontracting vertical relations* established by firms in the Spanish electronic industry¹. The analysis is undertaken by testing the hypotheses proposed in the contractual literature –particularly, the theoretical contributions made from Transaction Costs Economics literature– on a sample of 74 subcontracting agreements that were in force in 1997.

The rationale underlying this study is the fact that the success of subcontracting does not only depend on the relative advantages offered by outsourcing compared to vertical integration, revealed in the classic “make-or-buy” trade-off. Once the firms decide to subcontract a certain activity, the success of this decision is also influenced by the type of contractual structure the firms establish to organise their exchange relationship and, more specifically, by the ability of such structures to achieve an appropriate balance between: a) The firm’s greater *efficiency*, favoured by the delegation of activities to outside specialists, and b) The increase in *transaction costs* arising from the need to *control* the possible opportunistic efforts of the subcontractor –together with the costs resulting from the possible loss of basic skills or abilities for the future competitiveness of the firm–. Thus, the ability to develop such structures will constitute the key to the new competitive strategy of the firms regarding their vertical dimension². In this sense, our study makes a more in-depth analysis of the contractual

¹ We understand by “subcontracting” the agreement by which a firm (contractor, buyer or principal) entrusts another (subcontractor, vendor or auxiliary) the procedure of performing for it, and *according to certain pre-established indications*, a part of the production or services, the final economic responsibility falling on the contractor (European Community Commission, Memorandum, 1989).

² Noteworthy, in this sense, is the growing importance given to the so-called “advanced subcontracting”, characterised, among other features, by the establishment of a long-term agreement with a low number of

alternatives available for the governance of subcontracting, focusing on a particular aspect of these: the degree of *formalisation* of contracts.

The remainder of the paper is organised as follows: Section 2 formulates general hypotheses on factors determining the efficiency and, consequently, the probability of contracts being formalised. Section 3 describes the data and methodology and goes on to discuss the results. The paper ends with the main conclusions of the study.

2. Determinants of contractual formalisation

A basic characteristic of inter-firm agreements is the extent to which these are more or less formalised, understanding as *formalisation* the explicit written statement of the future duties and obligations between the contracting parties.

Such formalisation arises from the search for an utopian complete contract in which unforeseen contingencies do not exist and all the parties involved are interested in acting in line with the established terms for each contingency. Since it is unlikely that such a contract exists, the contracting parties will attempt to develop other similar safeguard mechanisms that also manage to lower the conflict in the contract. Formalisation is one such mechanism, as it acts as an objective proof of the assumed obligations and is therefore able to facilitate the contract's legal enforceability. Nevertheless, the degree of formalisation finally adopted will depend on the trade-off between the costs and benefits accompanying the *ex ante* written enumeration of such rights and obligations. In the following sections, we analyse in detail the determinants of such costs and benefits and, consequently, the probability of writing formal contracts.

subcontractors, with which the buyer establishes a close collaboration based on their co-specialisation or strategic

2.1. Specificity and contractual formalisation: Hold-up problems versus self-enforcing guarantees

The contractual gaps characterising an incomplete contract can be used by the agents for expropriation purposes; that is to say, these agents can take advantage of unforeseen contingencies not covered by the written terms of the contract in order to impose unfavourable conditions on the other party and appropriate a greater proportion of the rents derived from the transaction. Nevertheless, such behaviours are only beneficial if there do not exist economic alternatives in the market that enable the injured party to change vendor (buyer) without incurring high costs. Thus, the existence of a competitive market of vendors (buyers) would decrease the potential success associated to opportunism, and thus, the risk linked to incomplete contracting.

In this sense, and taking into account the contributions of the Transaction Costs theory, the firms will demand more complete contracts. The reason is that the greater the specific investments they have committed to the exchange relationship, the sunk costs associated to such investments limit the number of profitable contracting alternatives, should the other party infringe the agreement (Williamson, 1985; Goldberg et al, 1987; Masten, 1988).

This same theory also maintains that the writing of formal contracts also favours ex ante making idiosyncratic investments (apart from discouraging ex post opportunistic behaviours regarding such investments). Particularly, in an incomplete contract, the possibility that an unrestricted re-negotiation of the exchange terms will take place deteriorates the ex ante incentive to invest in assets that are simultaneously capable of generating greater value and having a transaction-specific nature (Tirole, 1986; Hart and Moore, 1988; Rogerson,

interdependence (Dyer and Ouchi, 1993; Fernández Sánchez, 1991).

1990). Agents anticipate that the quasi-rents generated by their investments can be retained by the other party, which leads them to invest in alternative technologies which are more flexible or generic but less efficient³. From this perspective, contractual formalisation will act, in the last analysis, as a mechanism able to increase the potential transaction-based gains.

In short, when the agents need to invest in specific assets to carry out an exchange there will exist a greater probability of writing a formal contract, because this will avoid, first the risk of future opportunistic negotiations of the contractual gaps and, second, ex ante distortions in the incentive to invest in such assets. Hence:

Hypothesis 1A: The probability of writing a formal contract increases when the parties must make significant investments in specific assets in order to carry out the exchange.

Nevertheless, the condition of specificity is not always interpreted as a factor that increases the risks of bilateral contracting and, thus, the need to establish explicit contractual safeguards. To this respect, various authors emphasise the role that idiosyncratic investments can play as an implicit guarantee mechanism, able to ensure the adequate fulfilment of the contractual obligations (Klein and Leffler, 1981; Dyer, 1997).

In general, implicit or “self-enforcing” safeguards, unlike the contractual clauses that give rise to a formal contract, are not enforceable by third parties (courts or arbitrators). In this case, the interest of the parties to fulfil the contract is based on the benefits they expect to obtain from future trade and, therefore, on the losses that they will suffer in the medium and long term should they behave opportunistically. The presence of such guarantees acts, in

³ The positive relation between transaction-specific investments and the value created is recognised, among others, by Asanuma (1989), Dyer (1997; 1998), Parkhe (1993), Perry (1989) or Williamson (1985).

addition, as a substitute for the explicit improvement of the contracts (Al-Najjar, 1995; Klein, 1996; Dyer, 1997). The question, therefore, is how specific investments establish this type of safeguard, thus decreasing the probability of formalising contracts.

In this sense, it is argued that making symmetrical investments in idiosyncratic assets (co-specificity) generates a link or bilateral hostage between contracting parties, capable of aligning their economic incentives (Klein, 1980; Williamson, 1985; Dyer and Ouchi, 1993; Koss and Eaton, 1997). That is to say, given that the value of such assets is lost if the agreement is unilaterally infringed, the making of co-specialised investments serves to increase the strategic interdependence between the buyer and vendor, acting as a credible sign of commitment towards fulfilment and justifying the co-operation between both parties (Dyer, 1997, 1988)⁴. Thus:

Hypothesis 1B: Making investments in transaction-specific assets acts as a credible sign towards fulfilment, establishing a self-enforcing safeguard that decreases the need to write a formal contract.

2.2. The role of trust and market safeguards as substitutes of formalisation

In the context of trade relations, trust is defined as an expectation that attenuates the suspicion that the other party in the transaction will behave opportunistically (Bradach and

⁴ Although the idea set down implicitly assumes that “asymmetric” investments in specific assets do not lower the probability of opportunism, this condition does not always necessarily have to be fulfilled. In this respect, Klein (1996) establishes that losses undergone by an agent when an agreement is breached are explained by the sum of: **a**) the present value of the *quasi-rents* generated by their specific investments, and **b**) the losses undergone in their *reputational capital*. Both determine the “private enforcement capital” of the agents; that is to say, the costs they must bear in terms of private sanctions if they infringe the agreement. Since the agents do not necessarily have to approach the exchange with the same amount of “reputational capital”, the investments in specific assets should be made by the party with lower private capital (the one who has less to lose if he contravenes the agreement). What is more, this reasoning does not only explain who assumes the specific investments; but also why many contracts have an “unfair” or “unbalanced” appearance when unequal explicit specifications are set for the rights of each party.

Eccles, 1989; Gulati, 1995). Thus, if trust exists, the contracting parties will be convinced that they will not be victims of behaviour such as adverse selection, moral risk, hold-up or another type of contractual hazard.

Trust defined in this way can arise from the presence of any instrument capable of discouraging opportunism by economic or social sanctions –i.e. due to the presence of any type of safeguard, whether implicit or explicit⁵. However, in a more restricted sense, the type of trust we refer to here is that characterised by being exogenous to the specific structure of each transaction. In particular, this arises due to exclusively personal motivations, reflecting the history and culture of the organisation or the personal beliefs and ideologies of its members (Barney, 1986; Dietrix and Cool, 1989). This field includes the so-called knowledge-based trust (Shapiro et al., 1992), arising as a consequence of the prior relations or contacts the parties in the exchange have been maintaining. That is, as the agents interact repetitively, they acquire a greater mutual learning-eliminating possible information asymmetries- and develop closer personal or social links, increasing the credibility of their behaviours and the degree to which these are predictable (Ring and Van de Ven, 1989; Parkhe, 1993)⁶.

⁵ This trust relies on the utilitarian or selfish nature of individuals; in other words, they only behave honestly because this benefits their own interests. In this sense, this modality is usually termed *calculative, economic or rational trust* (Williamson, 1993).

⁶ Nevertheless, it must be pointed out that the interaction over time also contributes to generating specific assets, able to increase efficiency in the exchange relation. For example, the creation of a specialised knowledge concerning the procedures and preferences of the other party, difficult to attain or duplicate in the short run through other means (Levinthal and Fichman, 1988). In the extent that such idiosyncratic assets are reciprocal, they will create a perception of strategic interdependence between the partners, capable of acting as a bilateral guarantee (*hostage*) of fulfilment. This, in the last analysis, and following the terminology of Williamson (1993), gives rise to *calculative* trust. Thus, separating the “rational or economic” component and the “moral or affective” component generated by the *past interactions* can be quite complex.

In this sense, trust and the writing of detailed, or formal, contracts, are considered alternative mechanisms when making behaviour more predictable and ensuring that the future contractual adaptations will be overcome honestly and efficiently (Barney and Hansen; 1994; Gulati, 1995; Chiles and McMackin, 1996). Therefore, it is to be expected that:

Hypothesis 2: The existence of trust between the contracting parties acts as an informal self-enforcing safeguard and therefore, the need to use explicit contractual safeguards to ensure fulfilment decreases.

Alike trust, implicit market safeguards also decrease the vulnerability of the parties faced with opportunistic behaviour and, with this, the need to draft formal contracts. These safeguards are based on the ease with which the parties in the transaction can sanction breaches by changing the vendor/buyer⁷. In a certain sense, even when the investments in specific assets have created a post-contractual situation of *small numbers*, the parties can attempt to maintain the market discipline, or their bargaining power, through different practices. For example, in the case of subcontracting, these practices can consist in internally maintaining part of the production subcontracted -“partial subcontracting”- or in contracting the subcontracted activity with various vendors- “multiple subcontracting”.Therefore:

Hypothesis 3: The establishment of implicit safeguards tending to maintain the market discipline of the contractors lowers the need to write a formal contract.

⁷ When specific investments are made, given their nature, the capacity of market discipline decreases. Nevertheless, we must also distinguish between those situations in which *small numbers* occurs prior to contracting. In this sense, the existence *ex ante* of a small number of qualified buyers and vendors will increase the risk of opportunism increasing with it the probability of writing a formal contract.

2.3. Factors determining costs associated to formalisation: Uncertainty and Firm Size.

Another factor to be taken into account is that formalisation is not free. The most obvious cost is that associated to identifying future contingencies and negotiating *a priori* responses that will be acceptable by all the participants in the contract. Given the individuals' *limited rationality*, this cost will increase with the *uncertainty* and/or complexity of the transactions⁸. Therefore, in conditions of great *uncertainty*, it may be more economic to accept the risks and shortcomings of an incomplete contract, than the high costs entailed in the drafting of a detailed or exhaustive agreement (Goetz and Scott, 1981; Croker and Reynolds, 1993)⁹.

In addition, when writing a complete contract is not possible, the explicit and detailed formalisation of the future rights and obligations of the parties can result in the appearance of problems of contractual inflexibility (Klein, 1988; Crocker and Masten, 1991; Al Najjar; 1995). In other words, in incomplete contracts, the efficient actions to adopt when faced with an unforeseen contingency may be different to those prescribed *a priori* expressly by the terms of the agreement. In the last analysis, this can cause one party in the exchange to make costly concessions if he is obliged to strictly obey the "terms" of the contract. Hence:

⁸ *Uncertainty* refers to the difficulty of the economic agents in anticipating the evolution of variables that affect the result of the exchange –for example, costs, demand or quality levels–. The *complexity* of a transaction can constitute an important source of insecurity, and so will be closely related to uncertainty and will produce similar effects to this. Thus, it seems logical that an increase in either of the two factors will cause an increase in the contracting costs, as the exchange participants will have to invest more in order to identify and lower the opportunities for opportunistic behaviour.

⁹ Along the same lines, Goetz and Scott (1981) indicate that contractual agreements may be incomplete, due not only to the impossibility of identifying uncertain future events, but also due to the impossibility of characterising complex adaptations even when the contingencies may be anticipated.

Hypothesis 4: The greater the uncertainty surrounding the exchange, the lower the probability of writing a formal contract.

Taking into account that uncertainty can affect either the technological characteristics of the object of the *transaction*, or the level to which this object is going to be demanded or exchanged, the above hypothesis can be expressed in the following way:

Hypothesis 4A: The greater the technological uncertainty surrounding the object of the exchange, the lower the probability of writing a formal contract.

Hypothesis 4B: The greater the uncertainty regarding the future demand or needs for the exchanged object, the lower the probability of writing a formal contract.

On the other hand, it is also expected that the cost of writing contingent and detailed agreements is inversely related to the size of the firms (Lyons, 1994). The reason is that the activity carried out by the legal *staff* of an entity, consisting in the negotiating and formalisation of complex contracts, can enjoy greater scale economies in large firms compared to smaller firms. According to this premise, we expect:

Hypothesis 5: The probability of writing a formal contract will increase with the size of the contractor firm.

In short, the uncertainty or complexity surrounding a transaction, as well as the small size of the firm, will restrict the entity's ability to economically draft complete and legally enforceable contracts. In these circumstances, and if there exists a high degree of vulnerability

in the face of opportunistic negotiations, other alternative control mechanisms must be used to ensure the fulfilment and the flexibility of the transaction¹⁰.

3. Empirical testing

The field considered to analyse the determinants of contractual formalisation embraced the contracts governing subcontracting relations in the Spanish electronic industry. The hypotheses were tested on a representative sample of 74 firms belonging to this industry, that acted as contractors in one or more subcontracting agreements¹¹. The methodology used for data collection was the mail survey. In particular, the information necessary to describe the contracts in terms of the proposed hypotheses, was obtained based on a subcontracting agreement that was in force in 1997 for a product (goods or service) that was usually subcontracted, relevant in the firm's production system. In all cases, the people requested to fill in the questionnaire were managers directly responsible for the management of the subcontracting agreements chosen by the firms.

The main sources used to obtain the list of firms in the objective population were the directories drawn up by the Asociación Nacional de Industrias Electrónicas y de Telecomunicaciones (ANIEL)¹². Firms with under ten employees (5.7% of those registered)

¹⁰ In particular, the restoration of contractual flexibility may be achieved through two complementary mechanisms (Al-Najjar, 1995, p. 435): *i*) introducing ambiguity in the exchange terms and, in a complementary fashion, *ii*) adding more flexible governance instruments, to supplement the incomplete written contracts, such as reputation and trust or the ownership systems of assets. That is to say, resorting to the "implicit safeguards" analysed in the previous section.

¹¹ This analysis only considers the information provided by the demand side; consequently, it does not consider the data that the subcontractors in the electronic industry could provide concerning the characteristics of this type of contract. Although this could constitute a bias in the information obtained, previous studies confirm that buyers and vendors share consistent perceptions of the attributes of the exchanges (Heide and John, 1990; Anderson and Narus, 1990; Poppo and Zenger, 1997).

¹² Particularly, the *Repertorio de Empresas del Sector Electrónico y de Tecnologías de la Información* and the *Directorio de Empresas y Productos del Sector Electrónico Español 96/97*, both published in 1998. These are drawn up from multiple sources, including the data base of this institution, consisting of its associate firms. In

were excluded. The justification lies in the fact that these small entities are usually specialised in highly specific products with lower added value, being more likely to act as subcontractors rather than contractors, a requirement stipulated in order to fill in the questionnaire (European Commission, 1997)¹³. In total, the population considered came to 248 firms, from which 74 valid questionnaires were obtained, which represents a sample error of 9.5% at a level of confidence of 95%.

3.1. Data and methodology

Dependent variable and analysis method

In order to analyse the factors accounting for the presence of formal contracts, we went on to measure this attribute by directly asking the respondents if the contract existing between their firm and the chosen subcontractor was a *formal contract*. In turn, this item was accompanied by a clarification in which formal contracts were characterised as those “written (not verbal) and defensible or enforceable by third parties (courts, arbitrators...)”¹⁴.

Based on the information obtained by this item, we constructed a dummy variable labelled FORMALCO, that takes a value of “1” if the contract governing the subcontracting

this respect, sources of ANIEL confirm that its associate firms constitute over 85% of the firms in the sector; providing a level of representativeness of over 90% of the total production and exports of the Spanish electronic industry sector. In a complementary fashion, the information in these lists was tested with the directories of firms DUNS-50.000 and FOMENTO 30.000 for 1997..

¹³ Other research works on business subcontracting, although aimed at other sectors, use similar criteria to delimit the population of contractor firms or principals. Thus, for example, in the study by the Ministerio de Fomento on subcontracting in the Construction industry, all the contractor firms making up the population are characterised by having over twenty employees (See the report by the *Ministerio de Fomento: Estructura de la Construcción* (1997).

¹⁴ A similar way of evaluating the contractual formalisation in subcontracting agreements, has been previously used by Lyons (1994, p. 262). Nevertheless, this author gives an open-ended definition of *formal contract*, thus enabling the surveyed entities (in his study, subcontractors) to freely interpret its meaning. In this respect, we understand that the inclusion in the questionnaire of a definition of a *formal contract* is useful for limiting the subjectivity of the answers, and thus for achieving a greater internal consistency in the measure of this characteristic.

relation is formal and a value of “0” if not. Using FORMALCO as the dependent variable, we proceeded to estimate a model where the probability of establishing a formal contract, $P_i = \text{Prob}(\text{FORMALCO}=1)$, is explained by the independent variables defined according to the following epigraph.

Given the typical problems of the ordinary least squares (OLS) estimate in a dummy dependent variable model¹⁵, the original model was transformed using a logistic function in the following form:

$$P_i = F(\alpha + \beta X_i) = \frac{1}{1 + e^{-(\alpha + \beta X_i)}}$$

which assumes that the model estimated by maximum likelihood is:

$$\log\left(\frac{P_i}{1 - P_i}\right) = \alpha + \beta X_i$$

Where P_i is the dependent variable representing the probability that contractor i adopts a formal contract, X_i is the vector of independent variables of the model and β the vector of parameters to be estimated.

Independent variables

In accordance with the proposed hypotheses, as independent variables, we have analysed the specificity, the use of implicit or self-enforcing safeguards, the uncertainty and the size of the firms participating in the subcontracting agreement. *Table 1*, at the end of this section, shows a summary of the constructs used to measure such characteristics, compiling the description of each of these and their expected influence on the dependent variable

FORMALCO. In turn, *Table 2* compiles the summary of the main descriptive statistics obtained for each of these predictors.

Specificity measure. In order to measure this characteristic, the respondents were requested to indicate the degree to which the *subcontracted activity* was specific to their firm on a five-point Likert scale, which enabled the construction of SPECIF_P. This item, although it does not directly measure the amount of specific investments made by both parties participating in the exchange, can be interpreted as an integrating measure of the level of idiosyncratic assets undertaken in the subcontracting relationship and, with this, of the degree of bilateral dependence existing between the contractor and subcontractor¹⁶. Nevertheless, this form of measuring the presence and/or importance of specific investments is not free of disadvantages. In particular, the responses given to this type of qualitative question can depend on the subjectivity of the person responding to the questionnaire; that is to say, on the respondent's personal appraisal of the alternative uses of the firm's investments (Masten *et al.* 1991, p. 12). Despite this, the measures of specificity based on the responses of technicians or managers have been used in numerous empirical studies, which is mainly due to the difficulty in gaining access to direct quantitative information on this variable¹⁷.

Measure of self-enforcing safeguards. In relation to this group of factors, we have defined a series of independent variables, to measure firstly the *trust* existing between the

¹⁵ See, for example, Pindyck and Rubinfeld (1991, p. 249-268).

¹⁶ In order to eliminate the possible biases in the interpretation of this term, the question incorporated in the questionnaire directly explains the concept of specificity to the respondents.

¹⁷ See, for example, Anderson and Schmittlein (1984, p. 390), Masten, *et al.* (1989, p. 269 and 1991, p. 12), Lyons (1994, p. 264), Zaheer and Venkatraman (1995, p. 382), Noteboom, *et al.* (1997, p. 337) and Poppo and Zenger (1998, p. 866).

firms participating in the agreement and, secondly, the contractor's *bargaining power* over the vendor.

a) *Degree of trust* between the contractor and subcontractor

In order to evaluate the importance of knowledge-based trust between the contractor and subcontractor, diverse authors consider that this is constructed through the interaction of agents over time and that, therefore, this can be measured in terms of the number of years the firms have been dealing with one another (Lyons, 1994; Gulatti, 1995). It is also considered that this trust increases, the greater the geographical proximity between the firms and, similarly, when the vendor's employees have previously worked in the contractor's firm (Lyons,1994) –basically due to the fact that both circumstances facilitate inter-personal contacts and the development of increased inter-firm linkage–.

Based on these considerations, the items defined to measure trust, as well as the variables constructed from these, were as follows:

Characteristic	Items used for measure	Variable
Trust	✓ Number of years the firm has been dealing with the subcontractor: "1" (two years of under)_____ "4" (over 10 years)	⇒ DURACEL
	✓ Some of the subcontractor's employees have been previously employed in the contractor firm: (YES / NO)	⇒ EMPLEADO
	✓ Geographical location of the subcontractor firm: "1" (Same town)_____ "6" (Other non-European countries)	⇒ DISTAGEO

b) Contractor's bargaining power over the vendor

The contractor's bargaining power over the vendor acts as a market safeguard, an alternative to contractual formalisation capable of discouraging the vendor's future opportunistic behaviour. This market power was measured by taking into account the following factors:

First, it is considered that this power is greater as the level of competition in the subcontractors' market increases. In order to measure this level, the respondents were requested to indicate the level of competition between the existing subcontractors- able to satisfactorily carry out the subcontracted activity- on a five-point Likert scale. With the information obtained, we constructed the variable COMPETEN, that ranges between "1" (very low) and "5" (very high).

On the other hand, multiple subcontracting (with more than one vendor) can also have positive effects on the contractor's bargaining power, as it avoids the contractor depending on a single vendor for the provision of a subcontracted product (Lyons, 1994). To measure this factor, the respondents were directly asked for the number of firms with which they subcontracted the product in question. Based on these data, we constructed the dummy variable MULTIPLE, that takes a value of "1" when the firm has more than one vendor.

Similarly, if the firm performs partial subcontracting –that is to say, if it maintains part of the production internally– it will probably be in a greater position of power over the vendor, than it would if this activity was subcontracted in its entirety. This is due, not only to the fact that partial subcontracting favours the decrease of possible information asymmetries between the two firms –the contractor has "first-hand" information about the technical aspects of the outsourced activity–; but also to the fact that it can decrease the costs resulting from the suspension of the agreement. This characteristic was also measured by a direct question to the contractors. This enabled us to construct the dummy variable PARCIAL, which was given a value of "0" when the subcontracting was total and "1" otherwise.

Measure of factors influencing the costs of formalisation. In accordance with Hypothesis 4 we consider, first, the degree of technological uncertainty. Regarding its

measurement, it is fitting to point out that technological uncertainty has been analysed in previous empirical studies from different perspectives, taking into account that this can be explained by the “dynamism” or “complexity” of the technology involved in the exchange. Thus, diverse works understand that this type of uncertainty is greater as the *degree of novelty* or *technological change rate* surrounding a transaction increases¹⁸. On the other hand, the studies measuring this characteristic in terms of the degree of technology complexity have determined the latter by direct questions¹⁹ or, indirectly, by the *engineering effort*²⁰ required by the development of the exchanged product. Taking this into account, the following questions were posed to the respondent firms –all measured on five-point Likert scales–²¹:

Characteristic		Items used for measure	Variable
Technological dynamism	✓	Probability of technological improvements in the design or functions of the subcontracted product.	⇒ DINACTION
Technological Complexity	✓	Technical complexity of the subcontracted activity, compared to the other products manufactured or obtained internally.	⇒ COMPLEJO
	✓	Engineering or R+D effort required by the elaboration of the subcontracted product, compared to the rest of the products manufactured or obtained internally.	⇒ INGENIER

Second, uncertainty regarding the future needs of the contractor is also expected to have a discouraging effect on contractual formalisation. Following Walker and Weber (1984 y

¹⁸ See, among others: Balakrishnan and Wernerfelt (1986), Harrigan (1986), Walker and Weber (1984 and 1987), Lyons (1994), Zaheer and Venkatraman (1995), Ulset (1996) and Poppo and Zenger (1998).

¹⁹ See, for example, Masten, *et al.* (1991).

²⁰ In particular, this measure is used by Masten (1984). Nevertheless, it must be pointed out that this measure based on the “engineering effort” has not only been used to measure the degree of technological complexity. It has also been used to estimate the *specificity of human capital* involved in a transaction (Monteverde and Teece, 1982) and, by Masten *et al.* (1991), to evaluate the degree of *similarity* between the internal operations of the firm and those contracted out.

²¹ The estimation of the α Cronbach coefficient for the variables measuring the degree of complexity confirms the internal consistency of the scales used (0.7792). This enables both variables to be combined in a single explanatory factor, the result of averaging the values of COMPLEJO and INGENIER.

1987), this variable was measured using a five-point scale, by which the respondents were asked to value the following items:

Characteristic	Items used for measure	Variable
Demand uncertainty	✓ Degree to which significant fluctuations are expected in the volume of needs (monthly, annual consumption) of the subcontracted product.	⇒ FLUCTUA
	✓ The previsions made regarding the future needs of the subcontracted product (foreseen consumption) How certain or accurate are they?	⇒ CERTPREV (*)

(*) Given that CERTPREV measures the degree of "precision" in the demand previsions in order to use this variable to gauge the "lack of certainty", it was previously transformed by the construct: $IMPREVI = (5 - CERTPREV) / 5$, that ranges between "0" (total accuracy) and "1" (great inaccuracy).

The uncertainty as to the future needs for the subcontracted product does not necessarily have to be high when these needs undergo great fluctuations. That is to say, if the contractor is able to accurately anticipate such changes –due to, for example, the fact that these follow a repetitive oscillation pattern– the certainty as to the contractor’s future requirements may be high. Taking this into account, the value of the variable FLUCTUA was weighted, for each of the observations in the sample, based on the score given by the respondents to the variable CERTPREV. As a result, the independent variable *INCERTIQ*, was obtained in order to measure the effective uncertainty regarding demand in the model.

In order to test hypothesis 5 regarding the firms’ size the respondents were requested to indicate the number of workers employed by the firm (TAMAÑO_E). This variable takes values in the interval [1,6], being: 1: (under twenty employees), 2: (20-49 employees), 3: (50-99 employees), 4: (100-249 employees), 5: (250-499 employees), and 6: (500 employees or over).

Control Variables. Finally, we considered a set of control variables referring to the subsector of the electronic industry where the contractor firms operate (SECTOR_i) and to the type of subcontracted activity (IDENTIF). The aim was to estimate the influence of the

characteristics typical of the field of activity and the nature of the subcontracted operation – apart from the previously defined independent variables– on the drafting of a formal contract. IDENTIF is a dummy variable that takes a value of “1” for subcontracting a production activity –whether the manufacture of components, finished products or equipment– and “0” for subcontracting a service other than manufacturing. The qualitative variable SECTOR_i can take the following values: 1. Consumer electronics, 2. Electronic Components, 3. Professional electronics, and 4. Telematics.

Table 1: Independent variables and expected sign of their influence on the dependent variable (FORMALCO)

Hypothesis	Variable	Definition	Expected Influence
H1A / H1B	SPECIF_P	Degree to which the subcontracted activity is specific to the contractor.	+ / -
	DURACEL	Number of years the contractor firm has been dealing with the vendor.	-
H2	EMPLEADO	= "1" Some of the subcontractor's employees have been previously employed in the contractor firm.	-
	DISTAGEO	Geographical distance between contractor and subcontractor firms.	+
	COMPETEN	= Level of competition in the subcontractors' market.	-
H3	PARCIAL	= "1" if the contractor firm maintains part of the production internally.	-
	MULTIPLE	= "1" if the contractor has more than one vendor.	-
	DINACTIV	Probability of technological improvements in the design or functions of the subcontracted product	-
H4A	INGENIER	Degree of engineering or R+D effort required by the elaboration of the subcontracted product, compared to the rest of the products manufactured or obtained internally.	-
	COMPLEJO	Degree of technical complexity of the subcontracted activity, compared to the other products manufactured or obtained internally.	-
H4B	IMPREVI	Degree of inaccuracy in the previsions made regarding the future needs of the subcontracted product (foreseen consumption).	-
	FLUCTUA	Degree to which significant fluctuations are expected in the volume of needs (monthly, annual consumption) of the subcontracted product.	-
H5	TAMAÑO_E	Contractor's size, in terms of number of employees.	+
	SECTOR _i ^(a)	= "1" if contractor firm belongs to the electronic subsector i. (i= 1,2,3,4).	+ / -
Control variables	IDENTIF	= "1" if subcontracted activity consists in the manufacturing of equipment, a finished product, components ..., "0" if a service is subcontracted.	+ / -

Table 2: Descriptive statistics of variables

	SPECIF_P	DURACEL	EMPLEADO	DISTAGEO	COMPETEN	MULTIPLE	PARCIAL	COMPLEJO	INGENIER
N	74	69	74	74	74	74	74	74	74
R	(1-5)	(1-4)	0/1	(1-6)	(1-5)	0/1	0/1	(1-5)	(1-5)
\bar{X}	3.30	2.60	0.25	2.70	3.43	0.69	0.27	2.77	2.85
S	1.38	0.83	0.43	1.24	0.78	0.47	0.45	0.97	1.27

	DINACTIV	IMPREVI	FLUCTUA	TAMANO_E	SECTOR1	SECTOR2	SECTOR3	SECTOR4	IDENTIF
N	74	74	74	74	74	74	74	74	73
R	(1-5)	(0-1)	(1-5)	(1-6)	0/1	0/1	0/1	0/1	0/1
\bar{X}	3.11	2.76	3	3.10	0.06	0.16	0.58	0.19	0.67
S	1.09	0.70	0.89	1.48	0.19	0.37	0.49	0.39	0.47

N = valid observations; **R** = range or variation; \bar{X} = mean; **S** = standard deviation.

Table 3: Correlation matrix

	SPECIF_P	DURACEL	EMPLEAD	DISTAGEO	COMPETEN	PARCIAL	MULTIPLE	COMPLEJO	INGENIER	DINACTIV	FLUCTUA	IMPREVI	TAMAÑO
SPECIF_P	1	0.01832	0.05269	-0.0073	-0.2305	-0.0683	-0.2713	0.10085	0.17791	0.17064	0.25735	-0.0179	-0.1681
DURACEL		1	0.07623	-0.1166	0.06117	-0.0047	-0.0921	0.08976	0.04451	-0.0928	-0.2661	-0.3856	-0.0594
EMPLEADO			1	-0.0304	-0.0595	0.01777	-0.1550	-0.0605	0.04306	0.05040	-0.0183	-0.0014	0.18740
DISTAGEO				1	0.00084	0.04717	-0.0028	0.03315	0.06056	0.40452	0.08461	0.08605	0.07014
COMPETEN					1	-0.1860	0.16144	-0.0844	-0.1588	0.03990	-0.2643	-0.1042	-0.1049
PARCIAL						1	0.12993	-0.0262	0.06920	-0.0119	0.29286	0.19387	0.18740
MULTIPLE							1	-0.0703	0.11747	-0.0613	0.08630	0.19095	-0.0437
COMPLEJO								1	0.62481	0.39772	0.06231	0.01043	-0.1274
INGENIER									1	0.44559	0.30561	-0.0034	-0.2335
DINACTIV										1	0.21279	-0.0204	0.01509
FLUCTUA											1	0.19000	-0.0342
IMPREVI												1	0.06880
TAMAÑO													1

3.2. Results and discussion

Table 4 compiles the main results of the different specifications of the estimated binomial logit model. Thus, in column 1, we have considered all the independent variables required to test the hypotheses established in the above section. Column 2, on the other hand, shows the results obtained when only the effect of specificity on contractual formalisation is considered. Finally, column 3 presents the model including only those variables in which significant parameters have been obtained in the different tests performed. *Table 5* shows the prediction ability of the different specifications of the model.

Table 4: Binomial logit model. Factors determining contractual formalization
 β^{SIG} . (t-ratio between brackets)

	Specification (1)	Specification (2)	Specification (3)
Independent variables			
CONSTANTE	6.8324 (1.580)	2.9805 *** (2.997)	4.5550 ** (2.283)
SPECIF_P	-0.6342 * (-1.886)	-0.4060 * (-1.820)	-0.5522 * (-1.861)
DURACEL	-0.5884 (-1.036)	—	—
EMPLEADO	-1.7939 * (-1.888)	—	-1.5197 * (-1.816)
DISTAGEO	-0.0312 (-0.093)	—	—
COMPETEN	0.1666 (0.321)	—	—
PARCIAL	0.5002 (0.519)	—	—
MULTIPLE	-1.8671 ** (-2.020)	—	-1.7333 ** (-2.233)
COMPLEJO	-0.6896 * (-1.667)	—	-0.5364 (-1.517)
FLUCTUA	0.0756 (0.153)	—	—
IMPREVI	-2.2249 (-0.991)	—	—
TAMAÑO_E	1.1670 *** (3.092)	—	0.917 *** (3.021)
Control variables			
SECTOR1	-1.8330 (-1.004)	-0.7981 (-0.701)	-2.3181 (0.131)
SECTOR2	-3.5194 * (-1.992)	-2.3994 ** (-2.184)	-4.288 ** (-2.610)
SECTOR3	-0.2223 (-0.227)	-0.5473 (-0.811)	-0.5349 (-0.622)
IDENTIF	-2.2719 ** (-2.108)	-1.0193 (-1.527)	-1.5396 * (-1.779)
N	68	72	72
χ^2	40.10 (P<0.0005)	15.72 (P<0.01)	37.13 (P<0.00005)
Pseudo R ²	0.446	0.196	0.403

Key: * p < 0.1 ** p < 0.05 *** p < 0.005

Table 5: Classification Table

	Specification (1)			Specification (2)			Specification (3)		
	Predicted			Predicted			Predicted		
Actual	Y=0	Y=1	Total	Y=0	Y=1	Total	Y=0	Y=1	Total
Y = 0	23	6	29	21	11	32	25	7	32
Y = 1	4	35	39	13	27	40	5	35	40
Total	27	41	68	34	38	72	30	42	72
% Cases predicted correctly	85.29%			66.66%			83.33%		

Specificity

As observed in *Table 4*, a negative and significant relation is obtained between specificity (SPECIF_P) and the dependent variable FORMALCO, which indicates that the more specific the subcontracted activity, the lower the probability of drafting a formal contract. Given the relevance of this result, we have checked its robustness by estimating the model with different specifications. Thus, column 2 compiles the results of the model when only the specificity and control variables are considered,²² it being observed that the estimated coefficient maintains its sign and statistical significance. This leads us to reject *Hypothesis 1A* and to accept the alternative explanation provided by *Hypothesis 1B* about the effect of specificity on formalisation. That is to say, the quasi-rents generated as a consequence of this specificity are not expropriable, but rather act as a guarantee of fulfilment, reducing the need to introduce explicit contractual safeguards. In particular, the bilateral investments in specific assets generated by the idiosyncratic nature of the subcontracted activity serve to reinforce the “informal promises of fulfilment” made by the parties, when the strategic interdependence increases between the contracting parties and, with this, their losses if the agreement is unilaterally broken. These losses are determined by the decrease in their

reputational capital and, consequently, by the impossibility to take advantage in the future of the greater value that the transaction-specific investments are capable of generating (Dyer, 1997, p. 550).

Implicit safeguards based on trust

The results show that if the subcontractor's workers are ex-employees of the contractor (EMPLEADO) the probability of drafting a formal contract decreases. This result reinforces the hypothesis that the trust arising from the greater mutual knowledge between the firms acts as an implicit safeguard capable of substituting the drafting of formal contracts (Hypothesis 2). It could be argued that this measure does not compile the calculative or rational effect of trust (Williamson, 1993), according to which this would be an attribute more typical of people than institutions. Consequently, this effect could be expected to decrease with the size of the firm; that is to say, as the importance of personal and/or affinity links decrease as the organisation becomes larger (and probably more bureaucratic). Quantitatively, this effect could be compiled by an interactive variable resulting from the product of TAMAÑO_E and EMPLEADO. Nevertheless, when this variable was introduced in the model no significant coefficients were obtained, which seems to indicate that the effect of trust does not decrease with size.

The parameters estimated for the rest of the variables designed to measure the trust based on mutual knowledge are not statistically different from zero. In particular, the previous experience measured through the number of years the firms had been trading with one another (DURACEL) does not affect formalisation, although its coefficient presents the appropriate

²² These results are also maintained when control variables are eliminated.

sign. In this respect, it is fitting to point out that most of the firms in the sample have been trading with their subcontractors for over two years. In fact, this period is 7.11 years on average,²³ a period that we consider adequate to have developed an “acceptable” level of trust between both firms. To a certain extent, this can conceal the possible significant effect of this variable on formalisation.

The geographical distance between the contractor and subcontractor measured by DISTAGEO, does not present a significant effect on FORMALCO either. In this sense, it would be fitting to argue that only those firms geographically very close to each other can take advantage of the type of inter-personal contacts and information exchange necessary to develop high levels of trust. From this perspective, the probability of drafting a formal contract will only be lower in those firms located in the same town. In order to test this hypothesis, we opted to re-estimate the model with the dummy variable DISTADIC, that takes a value of “0” if the subcontractor is located in the same town and a value of “1” otherwise; however, the parameter estimated for this new variable is not significant –although, in this case, it presents the expected sign²⁴. Therefore, the results obtained do not support the hypothesis proposed concerning the negative effect of the geographical distance between the contractor and subcontractor on formalisation.

Implicit safeguards based on the contractor’s bargaining power

In relation to *Hypothesis 3*, the estimations obtained seem to support the substitution effect between contractual formalisation and the implicit safeguards linked to the buyer’s

²³ 26% of the respondent firms replied that some of the subcontractor’s employees had been previously contracted in their firm.

bargaining power when this is measured through the variable MULTIPLE. Hence, the fact that the principal subcontracts with more than one vendor has a significant and negative effect on the probability of drafting a formal contract. However, the fact that the principal performs internally part of the subcontracted activity (PARCIAL) does not seem to improve its capacity to sanction future breaches by the vendor —hence the probability of formalisation will not be affected—. Similarly, the level of competition existing between the potential subcontractors (COMPETEN) does not have significant effects on the degree of formalisation. These results indicate to us that, in the last analysis, the ability of the market to discipline or ensure the correct behaviour of the subcontractors seems to be more efficient when this is articulated through the establishment of subcontracting agreements with multiple sellers than when a certain internal production capacity is retained. That is to say, it will be under these conditions when the contractor's threat to change vendor in the case of breach will be more credible from the vendors' perspective.

Factors increasing the formalisation costs

With respect to the factors determining the costs associated to formalisation, our results confirm the presence of a negative and significant relation between the degree of technological uncertainty surrounding the subcontracted activity, measured through its complexity (COMPLEJO), and the contractual formalisation (*Hypothesis 4A*). Nevertheless, this result must be interpreted with caution, for as was observed in column 3 of *Table 4* the results show slight variations in their level of significance, probably due to the correlations between the independent variables and the few available observations. In order to test this

²⁴ These results are not presented as their coefficient is not significant and their inclusion in the model does not affect the results presented in *Table 4*.

result, we have attempted to estimate the technological uncertainty through the engineering effort (INGENIER) or the rate of technological change (DINACTIV), without the results improving, as these two variables are not statistically significant²⁵. On the other hand, regarding the variables measuring the uncertainty as to the future needs for the subcontracted product, none of the estimated coefficients is statistically significant, although in the case of IMPREVI the sign is as expected. Furthermore, after combining the variables IMPREVI and FLUCTUA in a single variable, INCERTQ, significant results are not obtained, which leads us to reject *Hypothesis 4B*²⁶.

Finally, the results support *Hypothesis 5*; that is to say, the probability of drafting this type of contract is higher, the larger the contracting firm (TAMAÑO_E), which seems to indicate the existence of scale economies in the contract formalisation process.

Control variables

The results obtained for the variables introduced in order to control other effects (SECTOR_i and IDENTIF) reflect that, compared to the contractors belonging to the subsector of telematics (variable SECTOR4), the firms whose main activity is consumer electronics and professional electronics do not present significant differences regarding their tendency to draft formal contracts. Nevertheless, a significant and negative coefficient is obtained for variable

²⁵ The variables COMPLEJO, INGENIER and DINACTIV cannot be simultaneously introduced in the model due to their high correlation (*Table 3*).

²⁶ In any case, the justification that the variable FLUCTUA presents the opposite sign to the expected one lies in the fact that, as already mentioned, the variability in the needs for the subcontracted product only increases the uncertainty when these variations cannot be accurately predicted or anticipated.

SECTOR2, which indicates that in the electronic components industry the tendency to write formal contracts is lower than in the telematics industry²⁷.

On the other hand, the results also reveal that, in relation to the contracts used in the subcontracting of a service other than manufacturing (such as, for example, a logistic, programming or design service), the contracts established for industrial subcontracting (whether the manufacture of a component, a finished product or equipment) have a lower probability of being formal.

Both results are explained, probably, due to the fact that in the subsector of electronic components (compared to the telematics subsector), as well as in the subcontracting of products (compared to services), the object of subcontracting can be more standardised. This lowers the problems of measuring *output* and, possibly, the need to formalise the agreement.

4. Conclusions

This work analyses the subcontracting agreements in the electronic industry, considering a series of hypotheses on the main determinants of their degree of formalisation. First, we consider the possible influence of specificity on the use of explicit contractual safeguards, typical of formal contracts. Second, we analyse the substitution effect between the use of implicit or self-enforcing safeguards, such as trust or the contractor's market power and the formal explicit ones. Finally, we have considered uncertainty as a factor increasing the costs associated to the drafting of formal contracts and the firm size as a variable acting in the opposite direction, increasing the probability of establishing such contracts.

²⁷ Following a similar comparative analysis, and taking as a reference the subsectors apart from telematics, no significant differences were noted between subsectors –with the logical exception of variable SECTOR4 that presented a significant positive coefficient when compared to the electronic components subsector–.

These hypotheses have been tested on a sample of 74 subcontracting agreements established by firms in the electronic industry with their subcontractors and in force in 1997. The results reflect that the specificity of the subcontracted activity lowers the probability of formalisation, as it increases the interdependence between the contractor and subcontractor, and consequently, their interest in co-operation. The negative effect of trust on formalisation is significant when this is measured through the mutual knowledge generated by the fact that the subcontractors have been previously employed by the vendor. On the contrary, the geographical proximity and the duration of the trade relations between both firms does not seem to increase their level of trust, nor influence the degree of drafting a formal contract. On the other hand, multiple subcontracting acts as an implicit safeguard mechanism, capable of substituting formalisation, as it increases the ease with which the contractor can sanction future breaches. In turn, the effect of uncertainty on the formalisation costs is only relevant when measured in terms of the technological uncertainty caused by the complexity of the subcontracted product. In contrast, when measured in terms of the dynamism (or technological change rate) or in terms of demand (future needs for the subcontracted product) this has no significant effects on the degree of formalisation. Finally, the results show that the large firms seem to have greatest ease to formalise their arrangements, resorting to a greater extent to this type of explicit safeguards than smaller firms, probably due to the existence of certain scale economies in the formalisation process.

5. Bibliography

- Al-Najjar, N. I. (1995), "Incomplete Contracts and the Governance of Complex Contractual Relationships", *American Economic Review*, vol. 85, no.2, pp. 433-436.
- Anderson, E. and Schmittlein, D. (1984), "Integration of the Sales Force: An Empirical Examination", *Rand Journal of Economics*, vol. 15, pp. 385-95.

- Anderson, J. and Narus, J. A. (1990), "A Model of the Distributor's Firm and Manufacturer Firm Working Partnerships", *Journal of Marketing*, vol. 54, pp. 42-58.
- Asanuma, B. (1989), "Manufacturer-supplier Relationships in Japan and the Concept of Relation-specific skill", *Journal of the Japanese and International Economies*, vol. 3, pp. 1-30.
- Balakrishnan, S. and Wernerfelt, B. (1986), "Technical Change, Competition, and Vertical Integration", *Strategic Management Journal*, vol. 7, no. 4, pp. 347-359.
- Barney and Hansen (1994), "Trustworthiness as a Source of Competitive Advantage", *Strategic Management Journal*, vol. 15, pp. 175-190.
- Barney, J. B. (1986), "Organizational Culture: Can it be a Source of Sustained Competitive Advantage?", *Academy of Management Review*, vol. 11, pp. 656-665.
- Bradach, J. L. and Eccles, R. G. (1989), "Price Authority and Trust", *Annual Review of Sociology*, vol. 15, pp. 97-118
- Chiles, T.H. and McMackin, J.F. (1996), "Integrating Variable Risk Preferences, Trust, and Transaction Cost Economics", *Academy of Management Review*, vol. 21, no.1, pp. 73-99.
- European Communities Commission (1990), *Subcontracting Terminology: Electrotechnical/Electronic Sector*. Catalogue n.º: CB-58-90-433-9A-C, Ed.: Office for Official Publications of the European Communities: Luxembourg.
- European Commission (1997), *La Nouvelle Sous-Traitance Industrielle en Europe*. Ed.: Office for Official Publications of the European Communities: Luxembourg.
- Crocker, K. J. and Masten, S. E. (1991), "Pretia ex Machina? Prices and Process in Long-Term Contracts", *Journal of Law and Economics*, vol. 34, pp. 69-99.
- Crocker, K. J. and Reynolds, K. J. (1993), "The Efficiency of Incomplete Contracts: An Empirical Analysis of Air Force Engine Procurement", *RAND Journal of Economics*, vol. 4, n.º 1, (Spring 93) pp. 126-46.
- Dierickx, I. and Cool, K. (1989), "Asset Stock Accumulation and Sustainability of Competitive Advantage", *Management Science*, vol. 35, pp. 1504-1511.

- Dyer, J. H. and Ouchi, W. G. (1993), “Japanese Style Business Partnerships: Giving Companies a Competitive Edge”, *Sloan Management Review*, Vol. 35, no. 1, pp. 51-63.
- Dyer, J. H. (1997), “Effective Interfirm Collaboration: How Firms Minimize Transaction Costs and Maximize Transaction Value”, *Strategic Management Journal*, vol. 18, no. 7, pp. 535-556.
- Dyer, J. H. (1998), “The Relational View: Cooperative Strategy and Sources of Interorganizational Competitive Advantage”, *Academy of Management Review*, vol. 23, no. 4, pp. 660-679.
- Edwards, J. E.; Thomas, M. D.; Rosenfeld, P. and Booth-Kewley, S. (1997), *How to Conduct Organizational Surveys*. Ed.: SAGE Publications, Inc.: California.
- Fernández Sánchez, E. (1991), “La subcontratación incrementa la competitividad empresarial”, *Economía Industrial*, vol.: November-December, pp. 145-153.
- Goetz, C. and Scott, R. (1981), “Principles of Relational Contracts”. *Virginia Law Review*, vol. 67, p 1089-1150.
- Goldberg, V.P. and Erikson, J.R. (1987), “Quantity and Price Adjustment in Long-Term Contracts: A Case Study of Petroleum Coke”, *Journal of Law and Economics*, vol. 30, pp. 369-398.
- Goodman, P. S., Fichman, M., Lerch, F. J. and Snyder, P. R. (1995), “Customer-Firm Relationships, Involvement and Customer Satisfaction”, *Academy of Management Journal*, vol. 38, no. 5, pp. 1310-1324.
- Gulati, R. (1995), “Does Familiarity Breed Trust? The Implications of Repeated Ties for Contractual Choice in Alliances”, *Academy of Management Journal*, vol. 38, no. 1, pp. 85-112.
- Harrigan, K. R. (1986), “Matching Vertical Integration Strategy to Competitive Conditions”, *Strategic Management Journal*, vol. 7, no. 6, pp. 535-555.
- Hart, O. D. and Moore, J. (1988), “Incomplete Contracts and Renegotiation”, *Econometrica*, vol. 56, pp. 755-785.

- Heide, J. and John, G. (1990), "Alliances in Industrial Purchasing: The Determinants of Joint Action in Buyer-Supplier Relationships", *Journal of Marketing Research*, vol. 27, pp. 24-36.
- Klein, B. and Leffler, K. (1981), "The Role of Market Forces in Assuring Contractual Performance", *Journal of Political Economy*, vol. 89, August, pp. 615-641.
- Klein, B. (1980), "Transaction Cost Determinants of "Unfair" Contractual Arrangements", *American Economic Review*, vol. 70, no. 2, pp. 56-62.
- Klein, B. (1988), "Vertical Integration as Organisational Ownership: The Fisher Body – General Motors Relationship Revisited". *Journal of Law, Economics and Organization*, vol. 4, no.1, pp. 199-213.
- Klein, B. (1996), "Why Hold-ups Occur: The Self-enforcing Range of Contractual Relationships", *Economic Inquiry*, vol. 34, no. 3, pp. 444-463.
- Koss, P. A. and Eaton, B. C. (1997), "Co-specific Investments, Hold-up and Self-enforcing Contracts", *Journal of Economic Behavior and Organization*, vol. 32, no. 3, pp. 457-470.
- Levinthal, D. A. and Fichman, M. (1988), "Dynamics of Interorganizational Attachments: Auditor-Client Relationships", *Administrative Science Quarterly*, vol. 33, pp.345-369.
- Lyons, B. R (1994), "Contracts and Specific Investment: An Empirical Test of Transaction Cost Theory". *Journal of Economics and Management Strategy*, vol. 3, no. 2, pp. 257-278.
- Lyons, B. R., Krachenberg, A. R. and Henke, J. W. (1990), "Mixed Motive Marriages: What's Next for Buyer Supplier Relations?", *Sloan Management Review*, Spring 1990, pp. 29-36.
- Masten, S. E. (1984), "The Organization of Production: Evidence from the Aerospace Industry", *Journal of Law and Economics*, vol. 23, pp. 403-417.
- Masten, S. E. (1988), "Equity, Opportunism, and the Design of Contractual Relations", *Journal of Institutional and Theoretical Economics*, vol. 144, pp. 180-195.
- Masten, S.E., Meehan, J.W. and Snyder, E.A. (1991), "The Costs of Organisation". *Journal of Law, Economics and Organization*, vol. 7, no. 1, pp. 1-25.

- Milgrom, P. and Roberts, J. (1992), *Economics, Organization and Management*, Prentice Hall.
- Monteverde, K. and Teece, D. J. (1982), “Appropriable Rents and Quasi-Vertical Integration”, *Journal of Law and Economics*, vol. 25, no. 2, October, pp. 321-328.
- Nooteboom, B.; Berger, H. and Noorderhaven, N. G. (1997), “Effects of Trust and Governance on Relational Risk”, *Academy of Management Journal*, vol., 40, no. 2, pp. 308-338.
- Parkhe, A. (1993), “Strategic Alliance Structuring: A Game Theoretic and Transaction Cost Examination of Interfirm Cooperation”, *Academy of Management Journal*, vol. 36, pp. 794–829.
- Perry, M. (1989), “Vertical Integration”. In: R. Schmalensee & R. Willin (Eds.), *Handbook of Industrial Organization*, pp. 185–255, Amsterdam: North Holland.
- Poppo, L. and Zenger, T. (1998), “ Testing Alternative Theories of the Firm: Transaction Cost, Knowledge-Based, and Measurement Explanations for Make-or-Buy Decisions in Information Services”, *Strategic Management Journal*, vol. 19, no. 9, pp. 853-877.
- Quinn, B. J. and Hilmer, F. G. (1994), “Strategic Outsourcing”. *Sloan Management Review*, vol. 34, no. 4, pp. 43-55.
- Ring, P. M. and Van de Ven, A. (1989), “Formal and Informal Dimensions of Transactions”. In: A. Van de Ven, H. Angle, & M. S. Poole (Eds.), *Research on the Management of Innovation: The Minnesota Studies*: pp. 171-192. New York: Ballinger/Harper-Row.
- Rogerson, W. P. (1990), *Contractual Solutions to the Hold-up Problem*. Mimeo, Northwestern University, February 1990.
- Shapiro, D. L.; Sheppard, B. H. and Cheraskin, I. (1992), “In Theory: Business on a handshake”, *Negotiation Journal*, vol. 8, pp. 365-377.
- Stuckey, J. and White, D. (1993), “When and When not to Vertically Integrate”, *Sloan Management Review*, vol. 34, no. 3, pp. 71-83.
- Tirole, J. (1988), *The Theory of Industrial Organization*, MIT Press: Cambridge.
- Tirole, J. (1986), “Procurement and Renegotiation”, *Journal of Political Economy*, vol. 94, pp. 235-259.

- Ulset, S. (1996), "R&D Outsourcing and Contractual Governance: An Empirical Study of Commercial R&D Projects", *Journal of Economic Behaviour and Organisation*, vol. 30, pp. 63-82.
- Walker, G. and Weber, D. (1984), "A Transaction Cost Approach to Make-or-Buy Decisions", *Administrative Science Quarterly*, vol. 29, no. 3, pp. 373-391.
- Walker, G. and Weber, D. (1987), "Supplier Competition, Uncertainty, and Make-or-Buy Decisions", *Academy of Management Journal*, vol. 30, no. 3, pp. 589-596.
- Williamson, O. E. (1985), *The Economic Institutions of Capitalism*. Free Press, New York.
- Williamson, O. E. (1993), "Calculativeness, Trust, and Economic Organization". *Journal of Law and Economics*, vol. 36, pp. 453-486.
- Williamson, O. E. (1996), *The Mechanisms of Governance*. Oxford University Press: Oxford, New York.
- Zaheer, A. and Venkatraman, N. (1995), "Relational Governance as an Interorganizational Strategy: An Empirical Test of the Role of Trust in Economic Exchange", *Strategic Management Journal*, vol. 16, pp. 373-392.