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## CONTRACTUAL HETEROGENEITY IN STRATEGIC ALLIANCES

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## Abstract

We investigate firms' alliance design choices by examining alliances as multifaceted contractual forms. The analysis explores the contractual heterogeneity underlying alternative governance structures for alliances, the bundling of different contractual provisions, and the dimensionality of the contractual completeness construct. The empirical evidence indicates that the complexity of collaborative agreements – in terms of the number and stringency of provisions – is greater for alliances that are strategically important and that involve high levels of asset specificity. Factor analysis of tetrachoric correlations among eight contractual provisions reveals two distinct dimensions of contractual completeness. Partners with prior collaborative relationships tend to institute fewer contractual provisions for monitoring and control of an alliance. Relative to open-ended contractual agreements, time-bound alliances tend to rely less heavily on such provisions, but more so on safeguards concerning confidential and proprietary information, alliance termination, and the adjudication of disputes by third parties.



**Keywords:** alliance design, governance structures, collaborative agreements, alliance termination.


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## Introduction

During the last three decades, many taxonomies of strategic alliances have been developed (e.g., Hamel, 1991; Hennart, 1988; Killing, 1983). While there currently is no consensus on an alliance taxonomy for either theory development or testing, a common, convenient, and theoretically-meaningful way of capturing the underlying differences in collaborative agreements is to separate equity alliances and nonequity alliances. This partition reflects the categorization of alliances in general as hybrid organizational forms (Williamson, 1991) and a desire to array different forms of alliances along the governance continuum in a parsimonious fashion (e.g., Chi, 1994; Hennart, 1993).

The view that these two classes of alliances represent distinct governance structures has contributed to advancements in the alliance literature, but also carries some limitations for theory and practice. Most importantly, focusing on alliances as governance structures obscures the substantial contractual heterogeneity that exists within each governance structure and the potentially unique determinants of governance structures and contractual arrangements (James, 2000). To be sure, the discrete governance mode utilized by firms in an alliance is a helpful way of encapsulating the mechanisms that incentivize and control interfirm exchanges. However, within a given governance structure, parties have considerable latitude in allocating duties, risks, procedures, and so forth through individual contractual provisions that determine exchanges in more precise terms. These contractual terms may help firms devise remedies for foreseeable contingencies or design processes for unforeseeable outcomes (Poppo and Zenger, 2002). Thus, firms' alliance design alternatives are far more numerous and complex than depicted by the equity/nonequity dichotomy.

In this paper, our main objective is to offer a more fine-grained investigation into firms' alliance design decisions by focusing on alliances as multifaceted contractual forms. We do so by collecting and examining primary data on firms' usage of eight different types of contractual provisions in collaborative agreements. These provisions appearing in alliance contracts range from notification and auditing rights to obligations concerning proprietary information to clauses for termination and for the resolution of disputes. Open questions that we seek to address relate to firms' adoption of these various provisions in alliance contracts; the dimensionality of the contractual completeness, or contractual complexity, construct used in prior research on alliances and outsourcing (Parkhe, 1993; Poppo and Zenger, 2002); and the theoretical determinants of the contractual structures of strategic alliances.

The remainder of the paper is organized as follows: In the next section, we develop a series of hypotheses regarding the determinants of contractual completeness in strategic alliances. We then provide details on the research design, and the empirical results follow. Exploratory factor analysis of tetrachoric correlations among the eight contractual provisions uncovers two distinct dimensions of contractual completeness: One relates to the specification of commitments concerning proprietary and confidential information, alliance termination, and dealings with third parties to resolve disputes (for example, *extra-alliance commitments*), and the other concerns rights to reports of relevant transactions, notification rights for departures from the agreement, and auditing rights (for example, *monitoring and control*).

After exploring the incidence of various contractual provisions and the nature of their bundling, we present multivariate results on their antecedents. We find that firms tend to negotiate more complex contracts in terms of the number and stringency of provisions when the alliance is of strategic importance and when firms make transaction-specific investments in the collaborative agreement. Firms lacking prior collaborative relationships with one another tend to rely more heavily on provisions concerning the monitoring and control of the alliance, yet prior alliances between the parties do not appear to influence the other dimension of contractual completeness. When alliance contracts are time-bound rather than open-ended, firms tend to use provisions for monitoring and control less frequently, but are more apt to specify rights and obligations concerning proprietary information, the termination of the agreement, and the adjudication of disputes by third parties. We conclude with a discussion of the implications of these findings and potential avenues for future research on firms' alliance design alternatives.

## Theory and hypotheses

The content of alliance contracts and the processes by which firms codify their intents for an alliance into a binding agreement serve several important functions. As one example, parties to an alliance use the contract to set forth their mutual rights and obligations through the specification of inputs to the alliance, processes by which exchanges will occur and any disputes will be resolved, and expected outputs from the joint undertaking. The alliance contract establishes the scope of the collaboration as well as a division of labor by detailing partners' individual roles and responsibilities. It also lays out constraints and obligations external to the alliance proper. For instance, before the alliance is operational, firms can limit information disclosures. During the operation of the alliance, the contract may specify how the parties will interact with third parties, whether other divisions of the firms, alternative suppliers, or the court system. The contract can also specify the way in which the alliance will end, firms' subsequent claims on intellectual property, and possible limitations on firms' competitive and hiring practices through noncompete and nonsolicitation agreements, respectively.

Regardless of the number or stringency of provisions firms embed in their alliance contracts, such agreements will inevitably be incomplete. Invariably partners will not foresee all potential contingencies or the most appropriate responses to them. Even if it were theoretically possible for a firm to design a complete alliance agreement, the negotiation and crafting of such a contract would involve substantial direct and opportunity costs. The task for managers, therefore, is to weigh these costs against the potential benefits of more complex, or complete, alliance contracts. In the subsections that follow, we develop four hypotheses that consider the relative benefits of developing more complex alliance contracts.

**Strategic Importance of the Alliance**

The changing characteristics of collaborative agreements over time suggest that alliances are becoming more central to firms' strategies. These changes also indicate why firms might find it worthwhile to design more complex alliance contracts. Several decades ago, the prototypical alliance was an equity joint venture by a multinational corporation (MNC) into a developing country, involving a one-way transfer of technology from the MNC to the local affiliate. The MNC may have formed the joint venture outside the firm's core business, and the firm likely invested in the alliance primarily, if not solely, for the purposes of accessing the local market and responding to the local government's restrictions on foreign direct investment (e.g., Stopford and Wells, 1972). Many alliances today continue to have these or similar features. For some large firms investing in alliances, particularly when in an opportunistic manner, the impact of collaborative agreements on the firm's profits, learning, or overall competitive position may be barely discernible to senior managers. Some of the fabled alliances that have partners agreeing to collaborate on the basis of a handshake following a spontaneous meeting in an airport lounge likely fall into this category.

Increasingly, however, alliances are between actual or potential competitors, involve two-way knowledge transfers, have global market aspirations, and rely on considerably more complex deal structures in terms of the number of partners or auxiliary collaborative agreements (e.g., Gomes-Casseres, 1996). In short, the 'strategic' adjective has become more appropriate over time. As a reflection of these changes, firms are adopting a more disciplined means of capturing and sharing best practices as well as formalizing alliance procedures for selecting partners and negotiating collaborative agreements (e.g., Harbison and Pekar, 1998). With the increasing strategic importance of alliances as well as the increasing share of profits and revenues attributable to alliances, some firms have also implemented positions or functions dedicated to the formation and management of strategic alliances (e.g., Kale, Dyer, and Singh, 2002).

We predict that firms will tend to utilize more complete contracts in alliances of greater strategic importance, for several reasons. Such alliances will tend to involve considerably more downside risk than more peripheral or exploratory initiatives (Koza and Lewin, 1998). Singh and Mitchell (1996) report that firms have an elevated risk of failure after alliances dissolve or a partner forges new relationships with others. In light of these and other risks, the firm has an incentive to specify the scope of the alliance and to clarify rights and obligations concerning what is outside of the immediate scope of the alliance (e.g., confidential information) as well as what is produced during the time span of the collaboration (e.g., proprietary technology) (e.g., Borys and Jemison, 1989). Parties negotiating alliances that are strategically important are also more likely to invest in thinking through and specifying the way the alliance will end (e.g., through dissolution, buyout of the venture, etc.) in order to mitigate the risk of creating or shoring up a competitor's resources or having strategic assets fall into the hands of a third party (Branstetter and Sakakibara, 2002; Khanna, Gulati, and Nohria, 1998).

On the process side, strategically salient alliances will tend to be more actively monitored by senior managers, both during the formation stage and during the implementation of the relationship. Parties are therefore more apt to set forth the mechanisms facilitating the control of the alliance (e.g., notification and auditing rights, reporting, etc.), the means by which disputes will be resolved (e.g., arbitration provisions, lawsuits, etc.), and ways in which the alliance's development will be managed (Doz, 1996;

Ring and Van de Ven, 1994). The fact that more individuals are likely to be involved in the establishment and negotiation of a strategically important alliance also suggests that contracts for such collaborative agreements will have a natural tendency to be more complex. For all of these reasons, firms will tend to find it worthwhile to bear the costs of negotiating provisions into strategically important alliances in order to ensure the desired direct and indirect outcomes from the collaboration. We therefore hypothesize:

*Hypothesis 1: The contractual completeness of an alliance will be positively related to the strategic importance of the alliance.*

**Transaction-Specific Investments**

Even for an alliance that is not central to a firm's strategy, many different types of problems can arise for a firm due to challenges such as monitoring difficulties, disruptions to the alliance, unforeseen contingencies, and threats to terminate the agreement. The costs and performance losses that ensue may be less problematic when the resources a firm contributes to an alliance can be efficiently redeployed to other relationships or businesses. When this is not the case, however, partner identity begins to matter a great deal (Williamson, 1991), and the firm must devote more effort to design an alliance to be able to mitigate the effects of these contractual hazards with a particular exchange partner (e.g., Klein, Crawford, and Alchian, 1978).

Transaction cost theory asserts that firms will choose a level of completeness, or complexity, in their alliance contracts that corresponds with the level of exchange hazards. This expresses transaction cost theory's fundamental tenet of 'discriminating alignment,' which argues that firms should align governance mechanisms with the hazards of exchange in order to achieve efficiency. This principle holds both within the bounds of a given governance structure as well as across governance structures when firms make discrete structural choices in the form of vertical integration and outsourcing (e.g., Joskow, 1988; Williamson, 1985).

Transaction cost theory therefore considers the tradeoffs between the costs of implementing safeguards in alliance contracts with the costs of failing to do so. More specifically, the theory suggests that to the degree that exchange hazards are low, managers can avoid the costs of negotiating complicated contracts that detail potential contingencies, parties' responses to them, and a framework for resolving disputes. Conversely, the theory suggests that firms will only seek to bear such costs when the consequences of exchange hazards become significant (Williamson, 1991). The costs of instituting safeguards into alliance contracts become worthwhile to bear when such safeguards act to reduce the costs and performance losses from exchange hazards (e.g., Macneil, 1978; Heide, 1994). In the alliance context, for instance, Parkhe (1993) reports that perceptions of opportunistic behavior lead firms to negotiate more contractual safeguards into their alliance contracts.

Prior research on contractual completeness argues and finds that asset specificity is an important contractual attribute affecting contract design (e.g., Joskow, 1988; Poppo and Zenger, 2002). When firms make transaction-specific investments in an alliance, the partner can threaten to terminate the alliance, which would result in the firm giving up the value of specialized assets. Faced with such threats, managers must therefore weigh the value losses they would experience from hold-up behavior with the costs of negotiating safeguards into their alliance contracts *ex ante*. As the potential value loss increases with transaction-specific

investment, managers will find it beneficial to negotiate more complex contracts to cover the consequences of breach and termination as well as the processes by which such threats will be handled. For example, partners can specify rights to first refusal on a joint venture's shares, ownership on intellectual property, the means by which an alliance will be terminated, whether a buyout price is set ex ante or determined ex post by third party appraisal, and so forth. By specifying the consequences of breaches to the agreement or termination, parties can exchange hostages that promote the continuance of the collaborative agreement. Firms can also spell out in the alliance contract the processes by which disputes will be resolved internally or adjudicated by third parties (e.g., Williamson, 1983). We therefore predict:

*Hypothesis 2: The contractual completeness of an alliance will be positively related to asset specificity.*

**Prior Ties**

Although the previous hypotheses take up relevant characteristics of an alliance and how they influence the contractual provisions that firms adopt for a collaborative arrangement, firms' decisions regarding alliances' contractual forms will also likely reflect partners' collaborative histories. For example, research that examines the functioning of relational contracts and the court system suggests that repeated exchanges between firms induce cooperation since the possibility of breaking off relations serves as a self-enforcing sanction against deviations from an agreement (e.g., Telser, 1980). Well-functioning courts, by contrast, are helpful in encouraging firms to invest in relationships with new exchange partners and support them with formal contractual provisions (Johnson, McMillan, and Woodruff, 2002).

Prior research has emphasized that trust emerges from successive collaborative relationships between firms, which leads them to institute less extensive governance mechanisms in future alliances. Gulati (1995), for instance, shows that firms with prior collaborative agreements tend to choose nonequity alliances over equity alliances (c.f., Oxley, 1997). By contrast, the more elaborate control and incentive alignment features of equity alliances become more attractive when prior ties are absent. Such ties also serve to promote stability in collaborative agreements between firms (Kogut, 1989). In an analysis of Japanese automakers' networks, Dyer (1997) suggests that these firms have lower transaction costs than their U.S. counterparts because they engage in repeated exchanges. The noncontractual safeguards they use (e.g., goodwill trust) are efficient because the firms have already invested in relationship building and have borne governance set-up costs, which would not be the case for alternative safeguards such as contractual provisions and various hostages (e.g., Klein, 1980). Related evidence from data on buyer-supplier relations indicates that interorganizational trust reduces alliance negotiation costs (Zaheer, McEvily, and Perrone, 1998).

We submit that if prior collaborative relationships do not exist between firms, it might also be worthwhile for the partners to negotiate more complex alliance contracts. Absent a collaborative history, partners will be more willing to bear contracting costs to enhance their monitoring and control of the alliance through reporting provisions, notification procedures, and auditing rights. Moreover, given significant behavioral uncertainty, partners will devote more attention to clauses concerning proprietary technology, confidential information, the possible termination of the alliance, and the use of

third parties to adjudicate any disputes that arise (e.g., Johnson, McMillan, and Woodruff, 2002). This prediction also is in accord with prior empirical findings on contract design and the role of firms' reputations. In an analysis of pricing provisions in procurement contracts for Air Force aircraft engines, Crocker and Reynolds (1993) find that firms with records of acting opportunistically have more complete contracts than firms known to fulfill their obligations to partners.

Beyond facilitating interorganizational trust, prior strategic alliances between firms can lead to the development of routines that also lessen the need to detail monitoring and control mechanisms and to institute other safeguards. As firms enter into successive collaborative agreements with each other, partners develop a better understanding of each other's procedures, management systems, cultures, and so forth. By engaging in sequential alliances, partners might tacitly develop a set of routines, and additional alliances allow firms to reinforce and refine them. The mutual understanding that develops can help firms mitigate coordination, conflict resolution, or information gathering problems and can thereby facilitate partners' iterative learning and adjustment cycles rather than being wedded to contractual terms (Doz, 1996). Dyer and Singh (1998) suggest that the relationship-specific knowledge that develops from frequent and intense partner interactions builds a firm's relational capabilities, which can enhance the efficiency of alliances. Whether prior collaborative relationships between firms enhance the development of interorganizational trust and/or routines, we predict that prior collaborative agreements between firms will reduce the number and stringency of provisions that firms rely upon in a future alliance:

*Hypothesis 3: The contractual completeness of an alliance will be negatively related to the number of prior alliances between the partners.*

**Time Boundedness**

Partners' choices on the provisions to incorporate into an alliance agreement will not only reflect their history of collaborative relationships with each other, but also their expectations for the evolution of the alliance (Parkhe, 1993). For example, some collaborative agreements will be open-ended in duration, much like hierarchical organizational forms, and other alliances will be narrower in scope, designed to operate for a pre-specified length of time (Williamson, 1991).

We suspect that these choices will affect the contractual provisions that firms embed in their alliance contracts for several reasons. First, partners that negotiate explicit time bounds on their alliances are simply more likely to be cognizant of concerns such as ownership of proprietary technology, disclosures of confidential information, and the means by which the alliance will end. Second, for time-bound alliances, it is easier to predict the relevant contingencies that might affect the alliance. By contrast, the costs of predicting future economic conditions for open-ended alliances and crafting appropriate contractual provisions will be significant, so firms will tend to rely more heavily on incomplete agreements under these circumstances (Crocker & Reynolds, 1993). Finally, alliances that have a pre-specified duration may experience an increased risk of partner opportunism. For time-bound alliances, partners are less able to rely on tit-for-tat responses to keep opportunism in check (Axelrod, 1984). Conversely, in open-ended alliances, potential gains from future collaboration safeguard the alliance from a partner defecting to obtain more proximate payoffs (Telser, 1980). We therefore hypothesize:

*Hypothesis 4: The contractual completeness of an alliance will be greater for time-bound alliances than open-ended collaborative relationships.*

## Methods

### *Data*

*Sample.* In order to identify a population of collaborative agreements to target for this study, we used Funk and Scott's Countries Index – Europe to find Spanish firms forming strategic alliances. Financial constraints and the fact that one of the authors lives in Spain led us to focus on Spanish firms engaged in interfirm collaboration. This focus also facilitated the follow-up process, thereby increasing the odds of obtaining a satisfactory response rate. We identified firms engaging in 674 dyadic alliances, but due to time and financial considerations, we focused the data collection efforts on industries more active in alliances, which yielded a target population of 436 alliances formed by 346 firms. Questionnaires were sent out to the firms in which a key informant directly related to the alliance could be identified. Of the 189 surveys mailed, 91 responses were obtained, representing a 48 percent response rate. The high response rate may be attributed to the steps taken to locate appropriate respondents, the follow-up procedure of making supplemental phone calls (Dillman, 1978), and guarantees of confidentiality and access to the study's findings. As an illustration of the competence and appropriateness of key informants, 91 percent had been involved since the formation of the collaborative agreement, and on average respondents had been involved with the alliance for 4.9 years. Usable data were available for 88 strategic alliances.

*Survey instrument.* Preliminary versions of the questionnaire were reviewed by business scholars to ensure face validity. The survey was then translated into Spanish and reviewed by two Spanish-speaking researchers. The translated survey was pre-tested with six Spanish executives experienced in managing alliances, and several changes were made after the pre-testing stage. The final Spanish version was then reverse translated into English by a person unfamiliar with the study, and there was a high degree of correspondence between the Spanish and English versions.

We performed a number of tests to assess the validity of the data. First, to examine the data's external validity, we examined secondary data sources for information corresponding to the survey items. In particular, we assessed whether or not the responding firm is state-owned and whether the partner firm is a Spanish company, a subsidiary, or a foreign company, and we found matches for 98 and 96 percent of the cases, respectively.

Second, in order to assess potential nonresponse bias, we tested for possible differences between early and late respondents, on the assumption that late respondents are more similar to non-respondents than early respondents are to non-respondents (Armstrong and Overton, 1977). In particular, we tested for differences in firm size based on number of employees, and we examined the sectoral distribution of alliances. A one-way analysis of variance (ANOVA) for firm size across early and late respondents yielded an insignificant F-value of 0.67. Chi-square values comparing the sectoral distribution of alliances for early and late respondents and for respondents and non-respondents were similarly insignificant (i.e., 8.54 and 13.52, respectively), again providing no evidence of nonresponse bias.

Finally, although our dependent variables are objective indicators of the contractual provisions that firms put into their alliance agreements, we addressed the possibility that consistency artifacts and common methods bias may influence our models. Beyond arranging questionnaire items so that subjective items appear prior to questions on the contractual design and governance of alliances (e.g., Salancik and Pfeffer, 1977), we used Harman's (1967) single-factor test to assess whether a significant amount of common variance exists in the data (e.g., Podsakoff and Organ, 1986). Unrotated factor analysis using the eigenvalue-greater-than-one criterion revealed four factors, and the first factor explained only 21.0 percent of the variance in the data, indicating that the results presented in the next section cannot be attributed to common methods bias.

## Model Specification and Measures

*Model specification.* The basic structure of the different models, which test the factors associated with the degree of contractual completeness in strategic alliances, is as follows:

$$\text{[1] Contractual completeness} = \beta_0 + \beta_1\text{Strategic importance} + \beta_2\text{Asset specificity} + \beta_3\text{Prior ties} + \beta_4\text{Time bound} + \beta_5\text{Firm size} + \beta_6\text{Foreign} + \beta_7\text{Equity} + \varepsilon.$$

*Contractual completeness.* Contractual provisions in alliances and other types of contracts have been studied and measured in various ways. Some research has relied upon global measures of the complexity of contracts. For instance, recently Poppo and Zenger (2002) have followed Macneil (1978) in asking key informants to rate the degree to which the parties created a complex contract to deal with future contingencies. Similarly, Joskow (1988) used contract length as a proxy for the complexity of an agreement. Other studies, by contrast, have examined very specific details of agreements or the provisions which parties institute into their contracts. For example, prior research has investigated the causes and consequences of territorial restraints in licensing agreements (e.g., Mueller and Geithman, 1991), of up-front fees and royalty rates in franchising agreements (Lafontaine, 1992), of contract duration in supply agreements (e.g., Joskow, 1987), and of specific pricing provisions in procurement contracts (Crocker and Reynolds, 1993).

In this study, we utilize a series of indicators of contractual provisions that can also be aggregated to form a global measure of the complexity of alliance contracts. The provisions which we focus on were highlighted in a study by Parkhe (1993). Specifically, he developed a checklist of contractual safeguards obtained from a computer-assisted search of the legal literature (e.g., Macneil, 1978, 1981; Narasimhan, 1989; Practicing Law Institute, 1986) and documented the following eight provisions: 1) periodic written reports of all relevant transactions, 2) prompt written notice of any departures from the agreement, 3) the right to examine and audit all relevant records through a firm of CPAs, 4) designation of certain information as proprietary and subject to confidentiality provisions of the contract, 5) non-use of proprietary information even after termination of agreement, 6) termination of agreement, 7) arbitration clauses, and 8) lawsuit provisions. These items are arrayed in increasing order of stringency, so a weighting scheme can be adopted to arrive at a global measure of contractual completeness, as follows:

$$\text{[2] Contractual completeness (weighted)} = \frac{1}{36}\sum_{i=1}^{8} D_i,$$

where $D_i$ equals i if the ith provision was employed, and zero otherwise (Parkhe, 1993). In other words, $D_i$ equals one if the first provision was employed, zero otherwise; two if the second provision was employed, zero otherwise; and so on. The summation term therefore ranges from 0 to 36, and the division by 36 yields a measure ranging from zero to one. When the variable takes on a value of zero, none of the eight provisions listed above are in place. When the variable assumes its maximum value of one, all of the eight provisions appear in the alliance agreement.

Use of this proxy for contractual completeness can effectively be seen as a joint test for the weighting scheme employed and for the unidimensionality of the contractual completeness construct. As a consequence, in order to explore the robustness of our results and in an attempt to disentangle these auxiliary assumptions, two additional types of analysis were performed. First, we constructed the multivariate models using an unweighted measure of contractual completeness as the dependent variable. This alternative measure allows us to examine if the effects of the individual covariates remained significant or insignificant when the contractual provisions were instead assumed to be equivalent in stringency. This measure for contractual completeness was calculated as follows:

$$[3] \quad \text{Contractual completeness (unweighted)} = \sum_{i=1}^{8} X_i,$$

where $X_i$ equals 1 if the ith provision was employed, and zero otherwise. The summation ranges from zero to eight, and specifications reliant on this dependent variable were therefore estimated using ordered logit models.

Second, we examined the dimensionality of the construct using exploratory factor analysis. A problem arises, however, because the contractual provision dummies violate the assumption of multivariate normality in standard factor analysis. While prior studies have factor analyzed discrete data, one can calculate an appropriate matrix of tetrachoric correlations, which can be used as an input into factor analysis. Tetrachoric correlation analysis essentially uses data in 2x2 contingency matrices to arrive at estimates of the Pearson correlations that one would obtain had the variables been continuous, bivariate normal, and linearly related (e.g., Drasgow, 1988). Specifically, if a, b, c, and d represent the number of observations in the cells of a 2x2 contingency matrix, and $x_1$ and $x_2$ represent latent variables defining a two-dimensional space, then the tetrachoric correlation is the correlation r that satisfies:

$$[4] \quad \frac{a}{N} = \int_{-\infty}^{z_2} \int_{-\infty}^{z_1} \phi(x_1, x_2, r) dx_1 dx_2,$$

where N is the total number of observations, $\phi(x_1,x_2,r)$ is the bivariate normal p.d.f., and $z_1$ and $z_2$ are the cutoff values that divide the two-dimensional space into four quadrants whose probabilities equal the probabilities in the four cells of the 2x2 matrix (similar equalities are specified for the relative frequencies $\frac{b}{N}$, $\frac{c}{N}$, and $\frac{d}{N}$). The tetrachoric correlation can be found through various approximation techniques, such as the cosine-pi formula, graphic estimates, or iterations using the tetrachoric series expansion to approximate the bivariate normal integral (see Brown, 1977 for numerical solution techniques). For our application, we used the POLYCHOR macro (v1.2) in SAS to estimate the matrix of tetrachoric correlations for the eight indicators of contractual provisions in strategic alliance agreements.

*Explanatory variables.* The first variable that we included in the multivariate models to test H1 reflects the strategic importance of the alliance (i.e., *Strategic importance*). Respondents were asked to indicate on a five-point scale the importance of gaining competitive advantage through the collaborative agreement when the alliance contract was signed. The measure ranged from a value of one for 'minimal' to 5 for 'vital.'

*Asset specificity*, our second theoretical covariate, was constructed as an unweighted index based on four indicators, each of which were measured on a five-point scale ranging from negligible to substantial: "Our investment in dedicated personnel specific to this venture is…," "Our investment in dedicated facilities specific to this venture is…," "If we decided to stop this venture, the difficulty we would have in redeploying our people and facilities presently serving the venture to other uses would be…," and "If this venture were to dissolve, our non-recoverable investments in equipment, people, etc. would be…" (e.g., Anderson and Weitz, 1992; Parkhe, 1993). The Cronbach alpha for this index is 0.74, suggesting that it demonstrates satisfactory reliability (Nunnally, 1978). In an unrestricted factor analysis, these items loaded on a single factor with an eigenvalue of 2.21 based on the eigenvalue-greater-than-one criterion, and the factor loadings for the items were 0.75, 0.82, 0.67, and 0.72, respectively.

*Prior ties* captures previous collaborative relationships between the two parties. We measured prior ties as the number of prior alliances between the firms (Gulati, 1995). In order to examine whether the existence of prior relationships differs in impact from the depth of prior dealings, we also re-estimated the models with a dummy variable indicating the presence or absence of prior ties, and the same results were obtained as for the continuous measure.

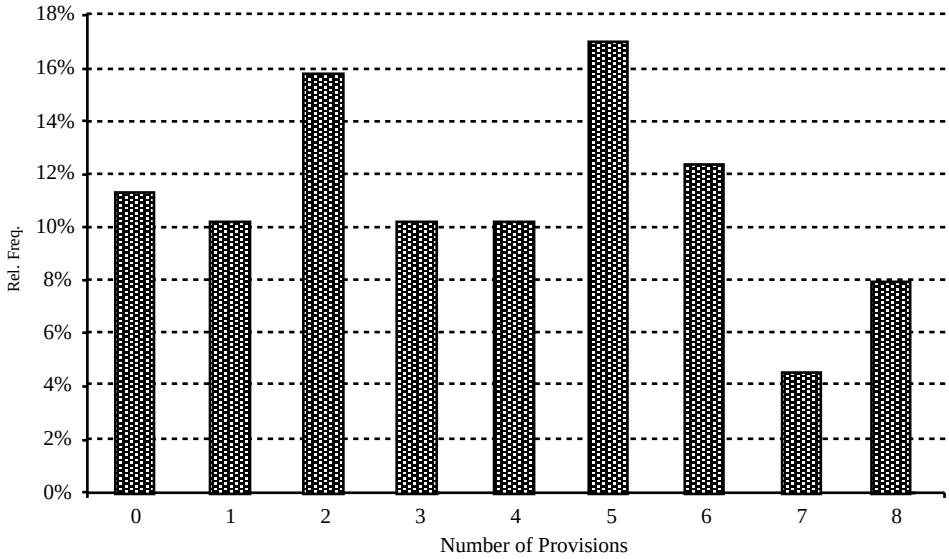
The measure used to test our fourth hypothesis is an indicator of whether or not parties put explicit time bounds on the collaborative agreement. Respondents were asked whether or not the agreement was meant to last a definite time at the time the contract was signed. The variable *Time bound* was coded 1 for contracts that specified a duration to the alliance, and 0 for contracts for which the duration of the collaboration was open-ended.

***Control variables.*** In order to account for potential confounds to the theoretical relationships of interest, we included three important control variables into the model specifications. First, we incorporated a control for firm size because for larger firms a given alliance may be less relevant to the firm's strategy and the investments made more redeployable to other operations (i.e., *Firm size*). Moreover, smaller firms may lack the experience, slack resources, or staff to craft more sophisticated alliance agreements. Respondents were asked to indicate the number of employees in their firm on a 7-point scale. Second, we included a control for cross-border alliances for several reasons. There may be enforceability concerns or legal barriers to negotiating specific provisions into international alliances. However, less information tends to be known about foreign firms than domestic firms, character-based trust tends to emerge between firms that are socially similar (Zucker, 1986), and behavioral uncertainty is apt to be greater for cross-border alliances. The variable *Foreign* assumes a value of 1 if the partners are from different countries, and 0 otherwise. Finally, we introduced a control to indicate whether the alliance was a nonequity or equity agreement since firms may alter the fundamental governance structure of an alliance in response to exchange hazards rather than only tailor a contract (e.g., Chi, 1994; Hennart, 1988). Introduction of this control also helps to account for unobserved transactional attributes and deal with the possibility that some provisions may be better suited to the establishment of a separate business entity or to a purely contractual interface between firms. *Equity* takes on a value of 1 for equity alliances, and 0 for nonequity, or purely contractual, agreements.

## Results

Figure 1 presents the distribution of the unweighted measure of contractual completeness. The mean number of provisions put into alliance contracts is 3.7, or slightly less than half of the eight types of provisions in the survey. The figure also indicates that the modal number of contractual provisions is five, and approximately eleven and eight percent of firms have either zero or all of the provisions in their contracts, respectively. The relatively uniform distribution of the provisions highlights the heterogeneity of alliances' contractual forms.

**Figure 1. Distribution of Contractual Provisions**[a]




[a]N=88.

Table 1 provides the relative frequencies for each of the individual contractual provisions. It also presents Chi-square tests and two-sample t-tests to examine whether the proportions of contractual provisions employed by firms or the global measures of contractual completeness vary systematically across nonequity and equity alliances. The most used provision is arbitration clauses (55%), followed by termination clauses (53%), and the least used provision concerns lawsuits between the parties (30%). With only one exception, the usage of these individual contractual provisions does not vary across equity and nonequity alliances. However, firms tend to negotiate auditing rights into contracts in 82 percent of the equity alliances, whereas their usage drops to only 26 percent for nonequity alliances ($p<0.001$). This is consistent with the establishment of a separate business entity in the case of equity alliances and the lesser need for monitoring and control in alliances reliant purely on a contractual interface.

**Table 1. Relative Frequencies of Specific Contractual Provisions**

| *Provision* | *Total* | *Nonequity* | *Equity* | $\chi^2$ | *t value* |
|---|---|---|---|---|---|
| 1. Rights to reports of relevant transactions | 0.49 | 0.46 | 0.53 | 0.38 | |
| 2. Notification rights for departures from the agreement | 0.45 | 0.44 | 0.47 | 0.10 | |
| 3. Auditing rights | 0.50 | 0.26 | 0.82 | 26.28*** | |
| 4. Confidentiality provisions | 0.45 | 0.50 | 0.39 | 0.96 | |
| 5. Restrictions on proprietary information | 0.42 | 0.40 | 0.45 | 0.20 | |
| 6. Termination provisions | 0.53 | 0.58 | 0.47 | 0.98 | |
| 7. Arbitration clauses | 0.55 | 0.52 | 0.57 | 0.30 | |
| 8. Lawsuit provisions | 0.30 | 0.30 | 0.29 | 0.01 | |
| Contractual completeness (weighted) | 0.45 | 0.43 | 0.47 | | –0.50 |
| Contractual completeness (unweighted) | 3.69 | 3.46 | 4.00 | | –1.04 |
| N | 88 | 50 | 38 | | |

[b]N=88. † p<0.10, * p<0.05, ** p<0.01, *** p<0.001.

The relatively uniform and frequent utilization of the eight contractual provisions by firms engaged in interfirm cooperation also suggests the possibility that the individual provisions might often be bundled. Table 2 provides relative frequencies of the contractual provisions, conditional upon the focal provision listed in the first column appearing in the alliance contract. Given differences in the usage of the various contractual provisions, the table also indicates asymmetries in the matrix. In other words, the relative frequency of provision i given that provision j is in the contract often differs from the relative frequency of provision j given that provision i is in the contract. In the last column, the table indicates the mean unweighted count of the provisions (not including the focal provision) when a particular provision appears in an alliance contract. This value provides an indicator of overall contractual completeness when the focal provision is in place.

**Table 2. Bundling of Contractual Provisions**

| | | *Conditional Relative Frequencies of Other Provisions* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| *Provision* | *# in Effect (%)* | *(1)* | *(2)* | *(3)* | *(4)* | *(5)* | *(6)* | *(7)* | *(8)* | *Mean Unweighted Count* |
| 1. Rights to reports of relevant transactions | 43 (48.9) | — | 0.51 | 0.60 | 0.51 | 0.44 | 0.53 | 0.60 | 0.37 | 3.58 |
| 2. Notification rights for departures from the agreement | 40 (45.5) | 0.55 | — | 0.68 | 0.63 | 0.55 | 0.60 | 0.65 | 0.48 | 4.13 |
| 3. Auditing rights | 44 (50.0) | 0.59 | 0.61 | — | 0.50 | 0.52 | 0.59 | 0.73 | 0.45 | 4 |
| 4. Confidentiality provisions | 40 (45.5) | 0.55 | 0.63 | 0.55 | — | 0.78 | 0.75 | 0.75 | 0.50 | 4.5 |
| 5. Restrictions on proprietary information | 37 (42.0) | 0.51 | 0.59 | 0.62 | 0.84 | — | 0.76 | 0.84 | 0.51 | 4.68 |
| 6. Termination provisions | 47 (53.4) | 0.49 | 0.51 | 0.55 | 0.64 | 0.60 | — | 0.79 | 0.45 | 4.02 |
| 7. Arbitration clauses | 48 (54.5) | 0.54 | 0.54 | 0.67 | 0.63 | 0.65 | 0.77 | — | 0.48 | 4.27 |
| 8. Lawsuit provisions | 26 (29.5) | 0.62 | 0.73 | 0.77 | 0.77 | 0.73 | 0.81 | 0.88 | — | 5.31 |
| Averages | 40.6 (0.46) | | | | | | | | | 4.31 |

Examining each of the columns for maximum and minimum values provides an indication of when a contractual provision tends to be used together with, or separate from, other provisions. For example, the relative frequency of provision four – confidentiality provisions – is as high as 84 percent when restrictions are placed on proprietary information (for example, provision five) and as low as 50 percent when parties make commitments concerning auditing rights (for example, provision three). The fact that the conditional relative frequencies in all of the columns are greater than the relative frequencies appearing in Table 1 is suggestive of complementarities among the various contractual provisions.

The data patterns largely confirm the increasing order of stringency of the eight contractual provisions (Parkhe, 1993) if one assumes that firms tend to add contractual items in increasing order of stringency. For example, the usage of the first provision – rights of reports of relevant transactions – is above the mean of 0.46. Conditional upon this provision being used, the mean unweighted count of 3.58 is below the average of 4.31, indicating that contracts tend to be less complete when this provision appears in alliance agreements. Moving toward the opposite extreme, the eighth provision – lawsuit provisions – occurs much less frequently (29.5%), but when it is used, alliance contracts tend to be significantly more complex, as demonstrated by the mean unweighted count of 5.31 (versus an average of 4.31). If the mean unweighted counts are rank-ordered and compared with the ordering of the contractual provisions as presented in the table, the Spearman rank correlation coefficient is 0.69 ($p<0.001$). The most notable exception to this rank ordering is the provision for alliance termination. This provision appears in alliance contracts relatively frequently (53.4%), but when it appears alliance contracts are comparatively less complex, as indicated by the mean unweighted count of 4.02.

In order to explore further the bundling of contractual provisions in collaborative agreements as well as the dimensionality of the contractual completeness construct, we factor analyzed the matrix of tetrachoric correlations for the eight indicators of contractual provisions (see Table 3). The matrix at the top of the table indicates that the contractual provisions that are most related are restrictions on proprietary information and confidentiality provisions ($\rho=0.86$, $p<0.001$) and provisions for termination and arbitration ($\rho=0.73$, $p<0.001$). The contractual provisions that are least related include rights to reports of relevant transactions and termination provisions ($\rho=0.002$, n.s.) and rights to reports of relevant transactions and restrictions on proprietary information $\rho=0.07$, n.s.).

**Table 3. Exploratory Factor Analysis of Tetrachoric Correlations**[c]

## Correlation Matrix

| *Provision* | *(1)* | *(2)* | *(3)* | *(4)* | *(5)* | *(6)* | *(7)* |
|---|---|---|---|---|---|---|---|
| 1. Rights to reports of relevant transactions | 1 | | | | | | |
| 2. Notification rights for departures from the agreement | 0.18 * | 1 | | | | | |
| 3. Auditing rights | 0.32 ** | 0.48 *** | 1 | | | | |
| 4. Confidentiality provisions | 0.18 * | 0.47 *** | 0.14 † | 1 | | | |
| 5. Restrictions on propietary information | 0.07 | 0.40 *** | 0.32 ** | 0.86 *** | 1 | | |
| 6. Termination provisions | 0.00 | 0.20 * | 0.18 * | 0.59 ** | 0.57 ** | 1 | |
| 7. Arbitration clauses | 0.18 * | 0.30 ** | 0.54 ** | 0.56 *** | 0.72 *** | 0.73 *** | 1 |
| 8. Lawsuit provisions | 0.27 ** | 0.56 *** | 0.56 *** | 0.63 *** | 0.62 *** | 0.57 *** | 0.71 *** |

## Varimax Rotated Factor Pattern

| *Provision* | *Factor One* | *Factor Two* | *Communalities* |
|---|---|---|---|
| 1. Rights to reports of relevant transactions | –0.07 | **0.69** | 0.49 |
| 2. Notification rights for departures from the agreement | 0.33 | **0.63** | 0.51 |
| 3. Auditing rights | 0.21 | **0.82** | 0.71 |
| 4. Confidentiality provisions | **0.85** | 0.15 | 0.75 |
| 5. Restrictions on proprietary information | **0.89** | 0.15 | 0.81 |
| 6. Termination provisions | **0.85** | -0.03 | 0.72 |
| 7. Arbitration clauses | **0.80** | 0.34 | 0.76 |
| 8. Lawsuit provisions | **0.70** | 0.55 | 0.79 |
| Eigenvalue | 3.52 | 2.01 | |
| Percent of Variance | 43.98 | 25.07 | |
| Cumulative Percent of Variance | 43.98 | 69.05 | |

[c]N=88. † p<0.10, * p<0.05, ** p<0.01, *** p<0.001. Bold print indicates the largest factor loading for each contractual provision.

The bottom portion of the table provides the results of a principal components factor analysis after varimax rotation. Factors were retained if their corresponding eigenvalues exceeded one. Together, the two factors that were retained explained 69.1 percent of the variance in the data. Communalities generally exceeded 0.50, with the exception of the first provision – rights to reports of relevant transactions – which had a communality of 0.49, indicating that the two factors capture a significant portion of the variance in each of the eight indicators.

Although the interpretation and labeling of factors is subjective and a matter of judgment, there are two noteworthy findings from this analysis. First, the provisions load on the two factors in accordance with their order of stringency. The first three contractual provisions load on a distinct factor, and the last five contractual provisions load on a separate factor. None of the provisions load in a manner inconsistent with their ranked stringency. This observation is consistent with prior findings on the bundling of contractual provisions and the relationship between contractual completeness and the presumed stringency of the various provisions.

Second, the two factors are discernible as they deal with rather different aspects of alliance governance. In the case of the first factor, provisions loading highly on this factor are concerned with confidentiality, proprietary information, alliance termination, arbitration, and lawsuits. We labeled this factor *extra-alliance commitments* since these variables deal with the use of information outside of the scope of the alliance and concern the ending of the collaborative agreement and the use of outside parties to resolve disputes. The second factor, by contrast, relates more closely to the management of the collaborative agreement *per se*. Variables loading highly on this factor include rights of reports for relevant transactions, notification rights for departures from the agreement, and auditing rights. Hence, in order to reflect the more direct linkage between this factor and on-going alliance management, we labeled this factor *monitoring and control.*

Table 4 presents descriptive statistics and a correlation matrix for the variables comprising the multivariate models. The average number of prior alliances between partners was 0.52, and the number of prior collaborative agreements ranged from zero to twelve. 19.8 percent of the firms had a prior alliance with each other. The majority of the sampled alliances were cross-border collaborations (for example, 85%), and firms rated collaborations with foreign partners as being strategically more important than domestic collaborations ($p<0.01$). Roughly half of the collaborative agreements were equity alliances (for example, 43%), and roughly half of the sample alliances had a pre-specified duration (for example, 47%). Of those alliances that were time-bound, the average specified duration was 4.9 years. Consistent with prior treatments of equity and nonequity alliances as alternative governance arrangements for hybrid organizational forms (e.g., Oxley, 1997; Pisano, 1989), equity-based alliances were used over nonequity collaborations when firms made transaction-specific investments to the alliance ($p<0.01$). There is also evidence that smaller firms tend to make less redeployable commitments to their alliances than larger firms ($p<0.01$).

**Table 4. Descriptive Statistics and Correlation Matrix**[d]

| *Variable* | *Mean* | *S.D.* | *(1)* | *(2)* | *(3)* | *(4)* | *(5)* | *(6)* | *(7)* | *(8)* |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Contractual completeness (unweighted) | 3.69 | 2.41 | | | | | | | | |
| 2. Contractual completeness (weighted) | 0.45 | 0.33 | 0.97 *** | | | | | | | |
| 3. Strategic importance | 3.54 | 0.76 | 0.39 *** | 0.38 *** | | | | | | |
| 4. Asset specificity | 9.07 | 3.37 | 0.30 * | 0.27 * | 0.15 | | | | | |
| 5. Prior ties | 0.52 | 1.83 | 0.04 | 0.04 | 0.01 | 0.08 | | | | |
| 6. Time bound | 0.47 | 0.50 | 0.14 | 0.18 | 0.01 | 0.01 | –0.01 | | | |
| 7. Firm size | 4.47 | 2.08 | 0.05 | 0.06 | –0.19 | –0.33 ** | 0.17 | 0.03 | | |
| 8. Foreign | 0.85 | 0.36 | 0.23 † | 0.21 † | 0.36 ** | 0.02 | –0.09 | –0.03 | 0.11 | |
| 9. Equity | 0.43 | 0.50 | 0.11 | 0.06 | –0.08 | 0.30 ** | 0.12 | –0.11 | –0.05 | –0.12 |

[d]N=88. † p<0.10, * p<0.05, ** p<0.01, *** p<0.001.

Table 5 presents the results of the multivariate analyses. Models 1 and 2 are estimated using order logit since the dependent variable, Contractual completeness (unweighted), is discrete (for example, as given by Equation 3 above). Models 3 and 4 rely on the weighted measure of contractual completeness (for example, as given by Equation 2 above), and are therefore estimated using OLS. In contrast to Models 1-4, which examine contractual completeness using aggregate analyses, the remaining models examine specific dimensions of contractual completeness, as determined by the exploratory factor analysis. Models 5 and 6 consider antecedents of extra-alliance commitments, using the scores from factor one discussed above. Similarly, Models 7 and 8 assess the determinants of monitoring and control by using the factor scores from factor two as dependent variables. Models 1, 3, 5, and 7 serve as baseline models by incorporating control variables alone. Models 2, 4, 6, and 8 augment the baseline models with the theoretical covariates. A likelihood ratio test indicates the joint significance of these theoretical variables in Model 2 ($p<0.01$), and hierarchical F-tests reveal that the four theoretical variables are jointly significant in Models 4 ($p<0.01$), 6 ($p<0.001$), and 8 ($p<0.05$).

**Table 5. Estimation Results from Multivariate Analyses**[e]

| *Independent Variable* | *Aggregate Analyses* | | | | *Disaggregate Analyses* | | | |
|---|---|---|---|---|---|---|---|---|
| | *Contractual completeness (unweighted)* | | *Contractual completeness (weighted)* | | *Extra-alliance commitments (Factor 1)* | | *Monitoring and control (Factor 2)* | |
| | *(1)* | *(2)* | *(3)* | *(4)* | *(5)* | *(6)* | *(7)* | *(8)* |
| Intercept(s) | Incl. | Incl. | 0.25 * | –0.56 * | –0.28 | –2.35 * | –0.70 * | –1.73 ** |
| | | | (0.12) | (0.22) | (0.32) | (0.56) | (0.30) | (0.63) |
| Firm size | 0.02 | 0.15 | 0.01 | 0.03 † | 0.01 | 0.07 | 0.01 | 0.08 † |
| | (0.10) | (0.11) | (0.02) | (0.01) | (0.05) | (0.05) | (0.04) | (0.05) |
| Foreign | 1.26 * | 0.59 | 0.18 † | 0.04 | 0.39 | 0.06 | 0.28 | 0.08 |
| | (0.58) | (0.63) | (0.10) | (0.10) | (0.26) | (0.25) | (0.25) | (0.26) |
| Equity | 0.56 | 0.40 | 0.05 | 0.02 | –0.18 | –0.23 | 0.69 *** | 0.58 ** |
| | (0.43) | (0.43) | (0-08) | (0.07) | (0.20) | (0.19) | (0.19) | (0.18) |
| Strategic importance | | 0.85 ** | | 0.15 ** | | 0.41 ** | | 0.22 |
| | | (0.33) | | (0.05) | | (0.13) | | (0.14) |
| Asset specificity | | 0.14 * | | 0.03 * | | 0.05 † | | 0.04 |
| | | (0.07) | | (0.01) | | (0.03) | | (0.03) |
| Prior ties | | –0.00 | | –0.00 | | 0.02 | | –0.13 * |
| | | (0.11) | | (0.02) | | (0.05) | | (0.06) |
| Time bound | | 0.51 | | 0.11 | | 0.46 * | | –0.40 * |
| | | (0.43) | | (0.06) | | (0.18) | | (0.18) |
| $\chi^2$ | 5.39 | 20.31 ** | | | | | | |
| $-2[L(\beta_1) - L(\beta_2) \sim \chi^2$ | | 14.92 ** | | | | | | |
| F value | | | 1.18 | 3.31 ** | 1.19 | 3.98 ** | 4.86 ** | 4.36 ** |
| ΔF | | | | 4.71 ** | | 5.81 *** | | 3.42 |

[e]N=88. † p<0.10, * p<0.05, ** p<0.01, *** p<0.001.

Our first hypothesis predicted that a firm will negotiate more contractual provisions and more stringent provisions into alliances that are strategically important to the firm. Consistent with this prediction, the results in Models 2 and 4 demonstrate that the greater the strategic importance of an alliance, the more complex the alliance contract in terms of the number and stringency of contractual provisions (both p<0.01). The diminished significance of the indicator for whether the alliance was cross-border or purely domestic, as well as the significant correlation between this variable and the alliance's strategic importance, also indicates that strategic importance, rather than partner identity *per se*, is more relevant as a factor influencing the design of alliance contracts.

The second hypothesis suggested that alliances will be contractually more complete when firms make alliance commitments that are less redeployable without significant loss in value. The results in Models 2 and 4 provide support for this prediction. The greater the transaction-specific investment in an alliance, the greater the number and stringency of contractual provisions built into the alliance contract (both $p<0.05$). Alliances with more general purpose assets, however, tend to rely on fewer contractual provisions.

The remaining hypotheses considered the roles of partners' prior ties and their specification of a duration for the alliance. Neither of these hypotheses received support in the aggregate analyses. However, the significance of these variables in the disaggregate analyses presented in Models 6 and 8 suggests that the more aggregate treatments of contractual completeness mask the actual influence of these variables. Specifically, prior alliances between firms leads them to specify fewer provisions relating to monitoring and control ($p<0.05$ in Model 8), but has no bearing on the commitments firms make to each other in terms of the usage of proprietary information, the provisions made for alliance termination, and the reliance on third parties to adjudicate disputes. Moreover, the results show how the effects of time bounds on collaborative agreements hinge upon the dimension of contractual completeness considered. Consistent with the predictions of H4, alliance agreements with specified durations will tend to rely more heavily on provisions dealing with proprietary information, termination, and dispute resolution ($p<0.05$). However, it is also apparent that the specification of durations for strategic alliances lessens the usage of contractual provisions for monitoring and control ($p<0.05$ in Model 8). The findings for the control variables confirm the bivariate result that such provisions also tend to be more relevant for equity alliances involving a business entity rather than a purely contractual interface between collaborators.

## Discussion

Our findings underscore the importance of contractual heterogeneity in strategic alliances. The complexity of alliance contracts varies greatly across collaborative agreements, and contractual completeness is not captured by the equity/nonequity dichotomy that distinguishes the discrete governance arrangements that firms use for alliances. For seven out of the eight contractual provisions studied, significant differences in usage are not observed across equity alliances and nonequity alliances. Only auditing rights are systematically used more frequently in equity alliances.

More importantly, our results suggest that alliance governance structures and contractual forms have unique determinants. Transaction-specific investment influences both the governance structures that firms choose as well as the contractual provisions that they put in place in their alliance agreements. This finding is in accord with prior research examining alternative types of contracts (e.g., Joskow, 1988). Prior research has also found that previous collaborative relationships between firms affect alliance governance (Gulati, 1995), and we report that such prior ties also influence the contractual provisions that firms institute into their alliances. However, we also note that the strategic importance of alliances and the potential time-bounds that firms place on their collaborative agreements influence alliances' contractual designs, but these variables are not related to the governance structures firms select for their alliances. These results challenge prior thinking on alliances that tends to equate governance structures with contractual forms.

Our analysis is responsive to Poppo and Zenger's (2002) call for research on the specific types of clauses managers institute into contracts rather than relying upon global measures of contractual completeness. By examining eight types of contractual provisions that can also be combined into an overall measure of contractual completeness, the study first examined the implications of alternative weighting schemes for the stringency of provisions. In our assessment of the bundling of contractual provisions and the completeness of alliance contracts when firms use particular provisions, we validated prior orderings for the stringency of the eight provisions (Parkhe, 1993). However, the stringency-weighted index and the unweighted index of contractual completeness are highly correlated ($\rho$=0.97, $p<0.0001$) and therefore yield equivalent results in multivariate models of alliances' contractual forms. This suggests that weights for stringency do not provide new information in models for alliance contracts.

By examining the eight different types of contractual provisions, we were also able to explore the dimensionality of the contractual completeness construct. Prior research has tended to assess contractual completeness by relying on either very aggregate measures of contractual complexity or by examining individual contractual clauses. The results of our factor analysis of tetrachoric correlations among the eight provisions highlight the relevance of an intermediate approach. This analysis suggests that neither is the contractual completeness construct unidimensional nor are many indicators of specific clauses required. Rather, the analysis uncovered two distinct dimensions to the contractual completeness construct. One factor consists of provisions dealing with firms' rights and commitments to one another before and after the alliance is in operation as well as with their usage of third parties to resolve disputes. The second factor comprises provisions concerning the monitoring and control of the alliance during its operation.

Although the multivariate results do not hinge upon the weighting scheme adopted, they do depend upon the dimensionality of the contractual completeness construct. When using global measures of contractual completeness (i.e., either stringency-weighted or unweighted), we found that prior collaborative relationships and time bounds on the alliance have no apparent bearing on the contractual designs firms select for their alliances. However, more disaggregated analyses indicate that the effects of these variables are masked by treating contractual completeness as a unidimensional construct.

More specifically, we find that prior collaborative relationships between partners reduce the usage of provisions designed to facilitate the monitoring and control of a future alliance. This result is consistent with the view that prior relationships between firms can enhance trust as well as develop interorganizational routines. However, prior alliances have no effect on the institution of provisions relating to confidential information, proprietary technology, termination of the alliance, and reliance on third parties to adjudicate disputes. If trust tends to be lacking for alliances between new exchange partners and more developed for alliances between familiar partners, it is surprising that new exchange parties are no more likely to put such safeguards into their alliance agreements. This might reflect lower contracting costs for parties with prior alliances or the possibility that firms refine their contractual arrangements as trust develops (e.g., Poppo & Zenger, 2002). Because the measure for prior collaborative relationships captures the effects of trust as well as interorganizational routines, it would be desirable in future research to obtain more direct measures for these constructs coming from different theoretical traditions.

As an additional indication of the relevance of contractual completeness as a multidimensional construct, we found that time-bound alliances are more likely to be supported by some contractual provisions, but not others. Specifically, consistent with H4,

firms forming time-bound alliances are more likely to craft alliance agreements that include provisions for confidential information, proprietary technology, the termination of the alliance, and dispute resolution by third parties than are firms forging open-ended alliances. Because these provisions deal with what happens before and after the collaborative agreement is in operation, this result is consistent with managers' desire to design alliances as transitional mechanisms, the lack of a shadow of the future that exists in open-ended collaborations, and the greater ease of predicting relevant contingencies. However, firms are less likely to adopt contractual provisions relating to the monitoring and control of alliances that have pre-specified durations. This result may reflect diminished expectations for adjustment cycles or changes in partners' strategic priorities for time-bound alliances (Doz, 1996; Ring and Van de Ven, 1994; Zajac & Olsen, 1993).

Beyond the research suggestions offered above, we see several avenues for additional work on the contractual heterogeneity of alliances that stem from limitations of the present study. Our analysis considers some of the benefits of incorporating contractual provisions in alliances, yet equal attention has not been given to contracting costs. One of the key objectives of firms entering alliances is to enhance their flexibility, so attention could be given to whether flexibility losses or other drawbacks accompany greater complexity in alliance contracts. Our focus has been on the initial design of alliances by contracting parties, so additional research is needed on the consequences of these decisions for alliance evolution and for the outcomes of collaboration. Finally, we have examined eight classes of contractual provisions that firms can utilize in designing alliances, and extensions could pursue each of these provisions in considerably more detail since multiple design alternatives are available for each of the contractual provisions. Research along these lines will be helpful in considering alliances as multifaceted contractual forms and in moving beyond taxonomies such as the equity/nonequity dichotomy in order to capture more of the richness in firms' alliance design choices.

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