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Contractual Renegotiations in Strategic Alliances

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This study provides an empirical investigation of the incidence and antecedents of contractual renegotiations in strategic alliances. We bring together initial conditions based on transaction cost theory and ex post contingencies highlighted by recent conceptual and qualitative research on the evolution of collaborative agreements. The results indicate that firms tend to change the governance of alliances when a misalignment exists between the chosen governance structure and features of the transaction. Further, we find that asset specificity affects alliance design as well as post-formation governance decisions. Contractual alterations are also more likely when firms employ less extensive contractual safeguards in their alliances and when a parent firm's strategy changes. We find no evidence that cross-border alliances are any more or less likely to experience contractual renegotiations than domestic alliances. © 2002 Elsevier Science Inc. All rights reserved.

Theoretical and empirical research on alliances has advanced significantly over the past decade or so. Streams of research drawing upon transaction cost economics (e.g., Hennart, 1988), real options theory (e.g., Kogut, 1991), the resource-based view (RBV) of the firm (e.g., Eisenhardt & Schoonhoven, 1996), resource dependence theory (e.g., Pfeffer & Nowak, 1976), relational and structural embedded perspectives (e.g., Gulati, 1998), and others, have furthered our understanding of alliance antecedents and the factors determining firms' governance decisions for interfirm collaboration.

Despite these advances, it is generally recognized that there are limits to existing static treatments of firms' investments in alliances. Williamson (1991), for instance, suggests that many alliances may be disequilibrium organizational forms. Research on alliance instability has documented the short life-spans of many alliances (e.g., Beamish, 1985; Franko, 1971;

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Killing, 1983; Reynolds, 1979; Stuckey, 1983), and Doz and Hamel (1998: XV) contend that “[m]anaging the alliance relationship over time is usually more important than crafting the initial formal design.” Based on these observations and the fact that firms make governance decisions in alliances not only at the formation stage but after they have been set up, one purpose of our study is to examine firms’ alliance governance decisions in the post-formation context. We focus on contractual renegotiation as one specific governance-based intervention firms make in on-going alliances.

The need to study post-formation alliance phenomena has recently triggered a number of studies on alliance termination. Researchers have identified many factors at different levels of analysis bringing about alliance termination. These include environmental or macro factors such as changing industry concentration levels (Kogut, 1989), industry demand shocks (Kogut, 1991), and national cultural differences (e.g., Barkema, Bell & Pennings, 1996; Barkema & Vermeulen, 1997; Park & Ungson, 1997). At the firm level, prior experiences with collaboration (Barkema, Shenkar, Vermeulen & Bell, 1997), firms’ learning abilities (Hamel, 1991), and partners’ evolving capabilities (Nakamura, Shaver & Yeung, 1996) are also relevant and, at the transaction level, factors such as opportunism (Park & Russo, 1996) and mode of entry (Li, 1995; Pennings, Barkema & Douma, 1994) are thought to influence survival.

Although the most recent research on alliances has begun to attend to their dynamics, this work has primarily focused on the termination stage of inter-firm collaboration rather than on the developmental paths and incremental governance changes that alliances experience (Reuer, 2001). Many researchers have acknowledged the importance of sociological and dynamic aspects of collaborative processes (Gulati, 1995; Jones, Hesterly, Fladmoe-Lindquist & Borgatti, 1998; Larson, 1992; Madhok & Tallman, 1998; Ring & Van de Ven, 1994), and recent conceptual contributions highlight the importance of changing resource commitments (Khanna, Gulati & Nohria, 1998), the relevance of bargaining power shifts (Inkpen & Beamish, 1997), and the embeddedness of alliances in firms’ evolving strategies (Koza & Lewin, 1998). However, little empirical attention has been given to the issue of alliance evolution.

This paper builds upon recent conceptual and qualitative research on alliance processes to empirically investigate governance changes in alliances. Zajac and Olsen (1993) discuss how firms’ alliance reconfiguration efforts cause them to cycle back through prior initializing and processing stages. Their perspective on alliance dynamics contrasts prior treatments of alliance adaptation within more linear life-cycle models (see Parkhe, 1996 for a review). Ring and Van de Ven (1994) also developed a process framework in which alliance evolution consists of iterative sequences of negotiation, commitment, and execution. Doz (1996) presents a framework of alliance evolution and learning that suggests partners re-evaluate the alliance and their adaptability, and readjustments serve to recalibrate initial conditions for the partnership. Ariño and de la Torre (1998) integrate this model with Ring and Van de Ven’s (1994) model to trace alliances’ evolutionary paths and to explore the roles of initial conditions, external shocks, and relationship quality. Similarly, Kumar and Nti (1998) propose that outcome or process discrepancies lead to alliance instability.

In the present study, we use econometric analyses to study the incidence and antecedents of contractual renegotiations in strategic alliances based on a survey on Spanish firms’ collaborative agreements. One objective of the study is to bring together governance

research with recent conceptual and qualitative work on alliance evolution. Given our focus on governance changes in alliances and the importance of transaction cost theory in research on alliance design, we focus on three initial conditions identified by transaction cost theory. By relaxing an assumption on the selection environment present in empirical research on alliances based on transaction cost theory, we are able to extend this theory into the post-formation setting of alliance adaptation. We also consider two *ex post* contingencies—environmental and strategic change—that potentially bear upon the post-formation dynamics of alliances. Hypotheses on these initial conditions and *ex post* contingencies are developed in ‘Development of Hypotheses’.

Results appear in a section following a discussion of the research design. We find that contractual renegotiations stem from initial conditions of governance misalignment, asset specificity, and low levels of contractual safeguards. The empirical evidence also indicates that strategic change brings about contractual renegotiations. These findings challenge governance research assuming that managers do not have the opportunity to exercise discretion over their alliances before competitive forces weed out theoretically inefficient governance forms. They also show that asset specificity influences firms’ governance decisions even after alliances have been formed. Environmental changes do not appear to affect contractual renegotiations, and while international research identifies instability as distinguishing features of cross-border collaboration (e.g., Blodgett, 1992; Killing, 1983; Yan & Zeng, 1999), we find no evidence that cross-border alliances are any more or less unstable than domestic ones. A concluding section discusses the implications of these findings and offers avenues for future research.

Development of Hypotheses

In formulating hypotheses to identify factors that potentially shape governance changes in alliances, we sought to examine key initial conditions identified by prior governance research and *ex post* contingencies viewed as relevant to alliance evolution in more recent conceptual and qualitative studies of inter-firm collaboration. Drawing on transaction cost theory, we first discuss the roles of governance misfit, asset specificity, and contractual safeguards. We then turn to environmental and strategic changes that can affect the likelihood of contractual renegotiations in alliances.

Initial Conditions

Since early conceptual research on alliances by authors such as Anderson and Gatignon (1986), Beamish and Banks (1987), and Hennart (1988), transaction cost theory has been one of the dominant paradigms used to study alliances. Based on their work, theoretical research in transaction cost theory, and related perspectives such as internalization theory and the eclectic paradigm (e.g., Buckley & Casson, 1976; Caves, 1996; Dunning, 1988; Teece, 1986; Williamson, 1985), a vast number of studies have investigated firms’ alliance investment decisions and their alliance design choices.

Because our interest lies in firms’ governance decisions in the post-formation context, and because the studies in this stream of research have focused solely on firms’ *ex ante* gover-

nance decisions, it is important to point out two fundamental propositions and assumptions that underlie this body of research. The first is the basic proposition of 'discriminating alignment,' which states that the efficiency of a transaction will be enhanced when an alignment exists between the chosen governance structure and the fundamental attributes of the transaction and the broader contracting environment (Williamson, 1985). Following the notion that no one governance structure is universally superior or inferior, Williamson (1991) offers a model portraying how firms choose between market, intermediate, and internalized forms of governance in a selective fashion based on efficiency considerations.

Second, and building off the discriminating alignment proposition, empirical studies using transaction cost theory to specify governance models either explicitly or implicitly employ a selection approach to fit (e.g., Drazin & Van de Ven, 1985). Specifically, by assuming that inefficient governance decisions are rapidly weeded out by competitive forces (Williamson, 1994), researchers view observed governance choices as efficient and, therefore, use reduced-form governance choice models to draw efficiency implications from the factors affecting firms' governance decisions, even though costs or performance are not explicitly modeled. However, misaligned transactions may exist and persist (Argyres & Liebeskind, 1999; Williamson, 1999), and it is plausible that managers may have the opportunity to adapt an alliance before it is weeded out by the competitive environment under conditions of misalignment. This observation provides one rationale for studying whether and when firms make *ex post* changes to their alliances' governance structures.

Two scenarios arise for a misaligned collaborative agreement that may prompt firms to alter the alliance's governance mechanisms. In the first instance, 'excessive' governance is put in place for a comparatively simple exchange relationship. In our empirical setting, for example, a firm may use an equity alliance when a non-equity arrangement would suffice. In such circumstances, the incentives provided by shared equity and the control and monitoring rights provided by a joint board may not be necessary to achieve coordination (Borys & Jemison, 1989; Chi, 1994; Hennart, 1988; Pisano, 1989). For instance, for a well-specified relationship involving a single activity with modest coordination needs, the creation of a separate business entity with shared equity and the institution of controls and a board to oversee the collaboration is not required. The result of such excessive governance can be politicized or slow decision-making and higher bureaucracy costs (Williamson, 1985, 1991), which may stimulate managers to make governance changes in such an inefficient governance structure.

In the second instance, 'insufficient' governance is put in place for a more complex exchange relationship. In the case above, the firm puts costly governance mechanisms in place when the threat of opportunism is relatively low, but the opposite occurs in this second case: inadequate governance mechanisms are instituted when the threat of opportunism is substantial. For example, a firm using a non-equity arrangement to govern a commitment-intensive alliance with an R&D component and broad scope may be exposed to contractual hazards such as hold-up and moral hazard (e.g., Oxley, 1997). In such circumstances, for purely contractual alliances, parties' rights and obligations will be difficult to specify *ex ante*, monitoring and control are made difficult by the lack of a separate entity with a board in place, and incentives for cooperation are attenuated (Williamson, 1985, 1991). As above, governance misalignment costs can prompt firms to alter the alliance to better fit their needs, provided managers have the opportunity to exercise discretion before the alliance terminates.

Hypothesis 1: The likelihood of contractual renegotiation will be positively related to governance misfit.

While it is important to recognize that firms' governance decisions need not be once-and-for-all propositions that take place at the alliance design stage, it is also important to recognize that changing alliances over time involves costs and risks (e.g., Macaulay, 1963; Ring & Van de Ven, 1992; Williamson, 1985). For instance, the costs involved in attempting to alter an alliance—legal fees, reorganization expenses, opportunity costs due to management time, and so forth—may outweigh the efficiency gains from changing an alliance. In such cases, it might be better for the firm to allow the transaction to persist in misalignment or to terminate rather than attempting to alter its governance structure.

It follows, therefore, that firms will be selective when making governance changes in strategic alliances. It may be costly for management to monitor closely all of the firm's alliances, yet managers are likely to be more intimately involved in alliances in which the firm has made significant transaction-specific investments relative to collaborations requiring modest resource commitments that are more reversible. Managers are therefore, apt to be more cognizant of the need for change in such alliances in the first place. Moreover, when a firm makes transaction-specific investments in an alliance, the gap between these assets' first and second best use values provides motivation to incur *ex post* costs to renegotiate and adapt the alliance rather than lose the difference in these values for resources deployed to the alliance. It is also important to note that because the other party may recognize the firm is willing to renegotiate the alliance to protect these assets' values, this party may hold-up the firm and demand renegotiation of the collaborative agreement when asset specificity is substantial. The willingness of firms to renegotiate alliances in which they have made significant transaction-specific investments suggests that contractual renegotiation may often be a manifestation of hold-up behavior.

Hypothesis 2: The likelihood of contractual renegotiation will be positively related to asset specificity.

The final initial condition highlighted by transaction cost theory that we hypothesize will influence the likelihood of *ex post* governance changes in alliances is the extent to which parent firms employ contractual safeguards (Joskow, 1990). Some firms may implement fairly simple and flexible contracts and then alter these arrangements as the collaboration proceeds and information is obtained about the relationship's challenges and particular needs (Bleeke & Ernst, 1991). Other firms may seek to avoid the risks associated with such *ex post* renegotiations by specifying more complete contracts by negotiating elaborate safeguards into their alliance agreements (Parkhe, 1993). While such safeguards may not shelter the firm against severe contractual hazards for which internal organization is better suited, conditional upon the choice of using a hybrid form of governance, increasing levels of contractual safeguards can reduce opportunistic behavior by increasing transparency, improving monitoring, and clarifying rights and duties up front. Thus, the process of negotiating contractual safeguards as well as the content of their *ex post* remedies are apt to reduce the firm's vulnerability to problems in managing the alliance over time and the necessity of formal contractual renegotiations.

Hypothesis 3: The likelihood of contractual renegotiation will be negatively related to the alliance's contractual safeguards.

Ex post Contingencies

The previous hypotheses considered three initial conditions highlighted by transaction cost theory that shape firms' willingness and ability to change the governance of alliances. Recent qualitative research on the evolutionary processes of alliances would suggest that *ex post* contingencies may also bring about contractual renegotiations. While this conceptual and qualitative research identifies many factors that potentially influence the evolution of an alliance, we focus on the roles played by environmental and strategic changes.

Conceptual research on alliance processes contends that environmental changes affect the dynamics of an alliance by altering parent firm's assessments of an alliance's value and collaborators' perceptions of equity. Zajac and Olsen (1993), for instance, suggest that changes in an alliance's environment lead to changes in the value of the alliance, prompting firms to transition from a processing stage to a reconfiguring stage, and then back through initializing and processing stages. Likewise, Ring and Van de Ven (1994) emphasize that legal and psychological contracts set the stage for the execution of the alliance through role and personal interactions. Partners' commitments and the execution of the alliance change over time based on partners' assessments of efficiency and equity. Assessments along the dimensions of efficiency and equity may be altered by a change in the alliance's environment, stimulating negotiation and commitment processes anew.

Recent qualitative research also suggests that environmental change may contribute to contractual renegotiations in alliances. Doz's (1996) model identifies a number of initial conditions (i.e., task definition, partners' routines, interface structure, and expectations) that facilitate or hamper learning on five dimensions—environment, task, process, skills, and goals. This learning leads to re-evaluations of efficiency, equity, and adaptability, contributing to readjustments and revised conditions. In his model, the environment is a source of learning, and shifts in the environment, therefore, bring about new opportunities for learning and contribute to new adjustment cycles. Ariño and de la Torre (1998) trace out various learning–action–reaction paths for alliances and the specific decision rules followed by collaborators in making adjustments. They also note that external changes trigger adjustment processes to restore equilibrium in equity and efficiency conditions.

Based on the arguments of conceptual research on alliance processes and the findings from recent qualitative studies of alliance evolution, we wish to test the following hypothesis.

Hypothesis 4: The likelihood of contractual renegotiation will be greater when a change in the environment affects the alliance.

This research also emphasizes that changes in a firm's strategy can contribute to adjustment in alliances. In Zajac and Olsen's (1993) model, the redefinition of strategy leads firms to cycle back through initializing and processing stages. In Doz's (1996) framework, changes in strategy can alter the value of alliance learning along the five dimensions he identifies, leading partners to revise their expectations of efficiency, equity, and

adaptability. Ariño and de la Torre (1998) discuss how the emergence of overlap in two parent firms' competitive strategies triggered readjustment in the alliance they studied.

Recent conceptual research on alliances also highlights the importance of strategic change to the dynamics of alliances. For instance, in Kumar and Nti's (1998) outcome and process discrepancy model of alliance dynamics, shifts in strategy potentially contribute to outcome discrepancies relating to the firm's ability to achieve its economic and learning objectives. Koza and Lewin (1998) emphasize that alliances are embedded in the strategies of parent firms and, as such, need to be understood as a component of firms' adaptation choices over time. If alliances co-evolve with firms' strategies as they suggest, then alliance adjustments such as contractual renegotiations should be associated with changes in strategy.

Hypothesis 5: The likelihood of contractual renegotiation will be greater when a change in the firm's strategy affects the alliance.

Methodology

Data

Sample. In order to identify a target population of collaborative agreements for this study, we examined Funk and Scott's *Countries Index—Europe* to identify Spanish firms engaging in alliance activity. The selected time period (1986–1992) begins with Spain's adherence to the European Community (1986), and concludes with the establishment of the single European market (1992), a period that can be expected *a priori* to induce alliance activity due to the opportunities and threats posed by the opening of markets and intensified competition. Financial constraints prevented us from extending the study to other countries in Europe, and the fact that one of the authors lives in Spain facilitated the follow-up process, increasing the chances of obtaining a satisfactory response rate. Firms engaging in 674 dyadic alliances were identified, but due to financial and time constraints our data collection efforts focused on those industries most active in alliances, which provided a total of 346 firms engaging in 436 alliances. Although we could have sent out questionnaires to explore all of these 436 alliances, we elected to sacrifice quantity for quality, and we only sent out questionnaires to firms in which a key informant directly related to the alliance could be identified.

Of the 189 surveys mailed, we received 91 responses, which represents a 48% response rate. Table 1 provides a distribution of the base sample and the responses. We attribute this high response rate to the care taken in identifying the appropriate respondent and to the follow-up procedure used (Dillman, 1978), which included supplemental phone calls. Moreover, respondents were assured of confidentiality and access to the study's findings. As an indication of the competence of key informants, over 63% of the respondents had participated directly in the negotiation of the alliance in question. On average they had been involved in the alliance for 4.9 years, with 91% having been involved at least since the alliance formation, and 4.5% during its first year of operation. In order to provide some external validity check using secondary data that is available and for which we have the

Table 1
Industries and responses

Industry description	Number of surveys mailed	No. of responses	Percentage of responses	Response rate (%)
Energy (petroleum and electricity)	19	6	6.6	31.6
Chemicals and allied products	15	14	15.4	93.3
Machinery except electrical	7	5	5.5	71.4
Electronic equipment	7	4	4.4	57.1
Transportation equipment	5	4	4.4	80.0
Transportation	8	6	6.6	75.0
Communications	2	0	0	0
Financial services	95	37	40.6	38.9
Other services	31	15	16.5	48.4
Total	189	91	100.0	48.2

exact survey items, we examined whether or not the respondent firm is state-owned and whether the partner firm is a Spanish company, a subsidiary, or a foreign company. Matches were present for 98 and 96% of the cases, respectively.

After accounting for missing data and outliers, 71 alliances (37.6%) involving 63 companies were available for analysis. In this sample, six companies were involved in more than one alliance (i.e., four firms were involved in two alliances, and two firms were involved in three), and supplemental regression analyses using a single, randomly-chosen alliance per firm yielded results consistent with the interpretations presented in 'Results'. In order to avoid survival bias, we did not exclude from the sample 17 alliances that had subsequently terminated.

In order to examine potential nonresponse bias, we assessed possible differences in alliances' industries and in firm size, measured by the number of employees, between early and late respondents under the assumption that late respondents are more similar to non-respondents than early respondents are to non-respondents (Armstrong & Overton, 1977). An analysis comparing the sectoral distribution of alliances for early and late respondents yielded an insignificant Chi-square value of 8.54 (8 df), and a one-way ANOVA for firm size across these groups gave an insignificant F -value of .67 (i.e., 86 df, $p = .42$). We also calculated a Chi-square statistic to compare the sectoral distribution for respondents and non-respondents, which was similarly insignificant ($\chi^2 = 13.52$, 8 df), again providing no indication of response bias. However, given the large number of sampled alliances within the financial services sector relative to the target population (i.e., $\chi^2 = 21.85$, 8 df), we ran the models explaining contractual renegotiations with and without a control for whether the alliances operated in the financial services sector, and all of the findings presented below were robust to the inclusion or exclusion of this control. Additional descriptive statistics on the sample appear in 'Results'.

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 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.

Although our dependent variable (i.e., based on whether or not the alliance experienced a contractual renegotiation) is an objective indicator of alliance change, we sought to address the possibility of consistency artifacts and common method bias. First, we arranged the questionnaire items so that the subjective items appeared prior to the question on contractual renegotiation (Salancik & Pfeffer, 1977). Second, we used Harman's (1967) single-factor test to examine whether a significant amount of common method variance exists in the data. If so, a factor analysis of all of the variables will generate a single factor or a general factor that accounts for most of the variance in the data (e.g., Podsakoff & Organ, 1986). Unrotated factor analysis using the eigenvalue-greater-than-one criterion revealed four factors, and the first factor explained only 17.9% of the variance in the data. Thus, we concluded that the analysis was not subject to common method bias.

Model Specifications and Measures

Model specification. The basic structure of the models testing antecedents of contractual renegotiation is as follows:

$$\begin{aligned} &\text{contractual renegotiation} \\ &= \gamma_0 + \gamma_1 \text{ governance misfit} + \gamma_2 \text{ asset specificity} \\ &\quad + \gamma_3 \text{ contractual safeguards} + \gamma_4 \text{ environmental change} \\ &\quad + \gamma_5 \text{ strategic change} + \gamma_6 \text{ cross-border} \\ &\quad + \gamma_7 \text{ alliance age} + \gamma_8 \text{ financial services} + \varepsilon. \end{aligned} \quad (1)$$

Contractual renegotiation. We determined whether the parent firm altered its collaborative agreement by asking respondents whether the initial alliance contract was renegotiated during the course of the alliance. Contractual renegotiation, therefore, takes on a value of one if the alliance contract was altered, and zero otherwise.

Initial condition variables. The first explanatory variable we considered to test Hypothesis 1 is the degree of misalignment between the firm's choice of alliance governance structure and the attributes of the alliance as well as its broader contracting environment. Following prior research by Anderson (1988) and Silverman, Nickerson and Freeman (1997), we measured governance misfit by employing a first-stage governance choice model to determine how firms' actual alliance design decisions correspond with those implied by transactional features (see Eq. (2)). We first needed to partition the alliance portion of the governance continuum (e.g., Hennart, 1993), so we followed prior work distinguishing equity from non-equity agreements (e.g., Gulati, 1995; Osborn & Baughn, 1990; Pisano, 1989, 1990). Thus, equity assumes a value of one for alliances with an equity component, and zero for purely contractual alliances. While alternative taxonomies might be employed, there is no consensus on this issue, and non-equity and equity alliances clearly have different governance properties, the latter offering control and incentives provided by joint board oversight

and residual claimancy (Chi, 1994; Hennart, 1988). Governance misfit was then defined as $1 - p$ for an equity alliance, and p for a non-equity alliance, where p is the probability estimate for an equity alliance, which was modeled using the following specification:

$$\begin{aligned} \text{equity alliance} = & \beta_0 + \beta_1 \text{ asset specificity} + \beta_2 \text{ potential partners} \\ & + \beta_3 \text{ prior ties} + \beta_4 \text{ cross-border} + \beta_5 \text{ firm size} + \varepsilon. \end{aligned} \quad (2)$$

While our interest centers on the effects of governance misfit on the likelihood of contractual renegotiations in alliances (i.e., as portrayed in Eq. (1)), we will first discuss this model and its constituent variables. We then turn to the other explanatory variables that appear in the model for contractual renegotiations.

Asset specificity was constructed as an unweighed index based on four indicators, each of which were measured on a 5-point scale ranging from negligible to substantial: “Our investment in dedicated personnel specific to this venture is . . .,” “Our investment in dedicated facilities 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 & Weitz, 1992; Parkhe, 1993). With a Cronbach alpha of .74, this index for asset specificity demonstrated satisfactory reliability (Nunnally, 1978). In an unrestricted factor analysis, these four items loaded on a single factor with an eigenvalue of 2.21 based on the eigenvalue-greater-than-one criterion, and their factor loadings were .75, .82, .67, and .72, respectively. Because asset specificity increases hold-up risks (Klein, Crawford & Alchian, 1978) and more hierarchical, equity-based alliances will be appropriate relative to purely contractual collaborations under these conditions (Williamson, 1991), we expect a positive coefficient for asset specificity in the governance choice model. This variable also represents our second initial condition variable used in the contractual renegotiation model as we expect asset specificity to influence the willingness of firms to bear the costs of renegotiation in equity as well as non-equity alliances.

Potential partners was measured as the number of other available alliance partners. Specifically, respondents were asked to indicate the number of firms with the necessary skills that are available to carry out the same activity. This variable was measured on a 4-point scale (i.e., 1 corresponds to none, 2 to 1–2, 3 to 3–10, and 4 to more than 10). The potential partners variable, therefore, serves as an inverse proxy for small numbers bargaining. As the number of potential partners decreases, the firm is more exposed to contractual hazards such as moral hazard and hold-up since switching partners is difficult and costly (Williamson, 1975). In such instances, the control and incentives provided by equity alliances can prove valuable, so we expect a negative coefficient for potential partners in the governance choice model. Pisano (1989) provides supporting evidence in that the likelihood that a firm will use an equity alliance rather than a pure contractual alliance in the biotechnology industry declines as the number of potential partners increases.

Prior ties captures whether or not the collaborators had prior alliances with each other. Therefore, prior ties equals one if the partners had a prior collaborative agreement together, and zero otherwise. Partners who have had prior alliances are thought to exhibit greater trust (Gulati, 1995) and, given a lower threat of opportunism, they are able to rely on less

complex governance arrangements to achieve their alliance objectives (Williamson, 1979). Prior ties can also promote the development of relational capabilities (e.g., Dyer & Singh, 1998) that may substitute for more formal governance mechanisms. Thus, we expect that prior ties will have a negative coefficient in the governance choice model.

To account for broader features of the contracting environment, we introduced a control for whether or not the alliance is cross-border or domestic. The variable *cross-border* takes on a value of one if the two partners are from different countries, and zero otherwise. Gulati (1995) suggests that international alliances are more apt to be structured as equity alliances than contractual agreements because greater information is available about domestic firms, reputational consequences of opportunism are more severe in the domestic setting, and character-based trust (Zucker, 1986) emerges between firms that are socially similar.

Finally, to address parent firm resources and other potential influences at the firm level, we incorporated *firm size* as a control variable. Inclusion of this variable was also motivated by the recent debate on whether alliance phenomena and efficiency are influenced solely by transactional features (e.g., Oxley, 1997) or by parent firm factors (e.g., Koza & Lewin, 1998). Respondents were asked to indicate the number of employees in their firm on a 7-point scale (i.e., 1 corresponds to less than 50, 2 to 51–150, 3 to 151–250, 4 to 251–500, 5 to 501–1000, 6 to 1001–5000, and 7 to more than 5000).

Our third hypothesis predicted that alliances with more extensive contractual safeguards will be less likely to experience contractual renegotiation than other alliances. The measure we used in testing this hypothesis was developed by Parkhe (1993) and is based on a checklist of contractual safeguards first obtained from a computer-aided search of the legal literature (e.g., Macneil, 1978, 1981; Narasimhan, 1989; Practising Law Institute, 1986). Specifically, respondents were asked to indicate which contractual safeguards were put into the agreement: (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. With these safeguards arrayed in increasing order of stringency as shown, the composite index was constructed as follows:

$$\text{contractual safeguards} = \frac{1}{36} \sum_{i=1}^8 D_i, \quad (3)$$

where D_i equals i if the i th safeguard was employed, and zero otherwise. In other words, D_i equals one if the first safeguard was employed, zero otherwise; two if the second safeguard 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 safeguards listed above are in place, whereas when the variable assumes its maximum value of one, all of the eight safeguards appear in the alliance agreement.

Ex post contingency variables. Our fourth and fifth hypotheses considered the possible effects of changes in the venture's environment and changes in the firm's strategy on the

Table 2
Descriptive statistics and correlation matrix for variables in the governance choice model^a

Variable	Mean	S.D.	(1)	(2)	(3)	(4)	(5)
(1) Equity alliance	.45	.50	–				
(2) Asset specificity	9.21	3.35	.32**	–			
(3) Potential partners	2.83	1.03	–.06	–.06	–		
(4) Prior ties	.20	.40	.24*	.06	.30**	–	
(5) Cross-border	.84	.37	–.08	.04	.02	.05	–
(6) Firm size	4.40	2.13	.02	–.32**	.14	.17	.08

^a $N = 80$.

* $p < .05$.

** $p < .01$.

likelihood of contractual renegotiations. Respondents indicated whether or not there had been any changes in the venture's environment (i.e., environmental change) or in the firm's strategy (i.e., strategic change) that substantially affected the venture.

Control variables. While we sought to develop a parsimonious model of factors potentially influencing contractual renegotiations in alliances, we also wanted to control for relevant contingencies that might influence alliance dynamics and might be related to an alliance's initial conditions or *ex post* contingencies considered in the hypotheses. First, we controlled for whether the alliance was a cross-border or domestic collaboration. Instability is regarded as a distinguishing feature of international alliances (e.g., Inkpen & Beamish, 1997; Parkhe, 1991), yet empirical research provides mixed evidence on the instability of international alliances (e.g., Barkema, Bell & Pennings, 1996; Barkema & Vermeulen, 1997; Park & Ungson, 1997). While prior research has assessed the termination of cross-border collaborations, we wish to examine whether cross-border alliances are more or less likely to experience contractual alterations, which can be seen as instability of a more incremental kind. Second, we controlled for the age of the alliance, measured in years. Older alliances are more likely to be subject to different sources of instability simply due to the passage of time (Kogut, 1988), and it is also important to control for the opportunities a firm has had to make adjustments in the contractual agreement. Finally, we controlled for whether or not the alliance operated in the financial services industry given the relatively large number of sampled alliances from this sector.

Results

Table 2 presents descriptive statistics and a correlation matrix for variables appearing in the governance choice model. Forty-five percent of the collaborative agreements were equity alliances, and 20% of the collaborators had prior alliances with each other. A majority of the alliances, 84%, were cross-border collaborations. The median firm had between 501 and 1000 employees. The correlations among the explanatory variables are modest in general, and the maximum variance inflation factor (VIF) for variables in the governance choice model is 1.17, well below the accepted rule of thumb value of 10 indicating multicollinearity problems (Neter, Wasserman & Kutner, 1985).

Table 3
Governance choice model estimation results^a

Independent variable	Dependent variable: equity alliance
Intercept	-.72 (.83)
Asset specificity	.16** (.05)
Potential partners	-.39* (.17)
Prior ties	1.15* (.45)
Cross-border	-.51 (.42)
Firm size	.10 (.08)
χ^2	20.51***

^a $N = 80$. Standard errors appear in parentheses. Positive coefficients indicate that increases in the variable raise the likelihood of an equity alliance (i.e., equity alliance = 1) vis-à-vis a non-equity alliance (i.e., equity alliance = 0).

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 3 presents estimation results for the governance choice model used to calculate the *governance misfit* variable. The model is significant on an overall basis ($p < .001$). The parameter estimates are consistent with the fundamental predictions of transaction cost theory: firms adopt equity structures over purely contractual alliances when making transaction-specific investments ($p < .01$) and when few alternative partners are available to provide the option to switch ($p < .05$). Contrary to prior research on the role of trust in alliances (Gulati, 1995), the findings suggest that equity structures are more prevalent among firms that have collaborated in the past ($p < .01$), and cross-border alliances are no more or less likely to be equity structures than are domestic collaborations.

Descriptive statistics and a correlation matrix for variables in the contractual renegotiation model appear in Table 4. One-fifth of the sampled alliances underwent a contractual renegotiation. Of the alliances experiencing a contractual renegotiation, the average age was 7.3 years, whereas the average age of the other alliances was 3.1 years ($p < .01$). Twenty percent of the alliances witnessed an environmental change that substantially affected the collaboration. Fewer alliances, 10%, were subject to a strategic change by a parent firm. Of the alliances subject to an environmental or strategic change, 83.3% experienced one but not the other, while only 16.7% experienced both. As one would expect, older alliances were also more likely to have experienced these changes (both $p < .01$). As before, we assessed VIFs to check for multicollinearity, but the maximum VIF of 1.29 for variables appearing in the contractual renegotiation models provided no evidence of such problems.

Table 5 presents parameter estimates for factors influencing contractual renegotiation in alliances. Model I presents a baseline specification consisting of the control variables only. Model II adds the explanatory variables for the alliances' initial conditions and *ex post* contingencies. A log likelihood value is provided for each Model k (i.e., $L(\beta_k)$), where $k = 1, 2$, or 3, to draw comparisons across the three models. Models I and II are significant

Table 4
Descriptive statistics and correlation matrix for variables in the contractual renegotiation model^a

Variable	Mean	S.D.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Contractual renegotiation	.20	.40	-							
(2) Governance misfit	.39	.20	.20*	-						
(3) Asset specificity	9.18	3.47	.31***	-.12	-					
(4) Contractual safeguards	.46	.33	-.09	-.06	.16	-				
(5) Environmental change	.20	.40	.29**	-.04	.14	.23*	-			
(6) Strategic change	.10	.30	.31***	.13	-.07	.15	.19	-		
(7) Cross-border	.83	.38	.13	-.15	.05	.16	.13	.15	-	
(8) Alliance age	3.89	4.79	.32***	-.003	.05	.19	.35***	.37***	.16	-
(9) Financial services	.44	.50	-.09	-.01	-.19	.00	-.01	.14	.18	-.06

^a N = 71.

* $p < .10$.

** $p < .05$.

*** $p < .01$.

Table 5
Antecedents of contractual renegotiations in strategic alliances^a

Variable	Model I	Model II	Model III
Intercept	-1.55*** (.55)	-5.41**** (1.57)	-5.29**** (1.60)
Cross-border	.44 (.56)	.38 (.71)	.34 (.72)
Alliance age	.33 (.07)	.35* (.09)	.33 (.09)
Financial services	-.25 (.37)	.22 (.56)	.23 (.57)
Governance misfit	-	2.80** (1.33)	-
Governance overfit	-	-	3.05** (1.40)
Governance underfit	-	-	1.72 (1.67)
Asset specificity	-	.30*** (.10)	.31*** (.10)
Contractual safeguards	-	-2.77** (1.15)	-2.88** (1.16)
Environmental change	-	.87 (.61)	.88 (.61)
Strategic change	-	1.80** (.86)	1.74** (.86)
χ^2	8.50**	27.14****	27.99****
Log likelihood, $L(\beta_k)$	-31.26	-18.24	-17.66
$-2[L(\beta_I) - L(\beta_k)]$	-	26.05****	27.21****
$-2[L(\beta_{II}) - L(\beta_{III})]$	-	-	1.16 (n.s.)

^a $N = 71$. Standard errors appear in parentheses. Positive coefficients indicate that increases in the variable raise the likelihood of contractual renegotiation (i.e., contractual renegotiation = 1). $L(\beta_k)$ refers to the log likelihood value for Model k .

* $p < .10$.

** $p < .05$.

*** $p < .01$.

**** $p < .001$.

on an overall basis ($p < .05$ and $p < .001$, respectively), and Model II provides a significant improvement in explanatory power over Model I ($p < .001$). Further, likelihood ratio tests indicated that Model II represents a significant improvement in explanatory power relative to a model that incorporates only the controls and initial conditions ($\chi^2 = 7.86$, $p < .05$) and relative to a model that incorporates only the controls and *ex post* contingencies ($\chi^2 = 20.08$, $p < .001$).

It is worth noting that Model II restricts the effects of excessive or insufficient governance to be equal. As noted earlier in the theory section, governance "overfit" occurs when the firm adopts an equity governance structure for relatively simple transactions, and governance "underfit" occurs when the firm adopts a non-equity governance structure in the face of significant contractual hazards. Since the effects of governance overfit and underfit may or may not be symmetric empirically, Model III offers an unconstrained specification that disaggregates governance misfit into these two components. In particular, for equity alliances governance overfit is defined as $1 - p$ and governance underfit as zero, while for non-equity alliances governance overfit is defined as zero and governance underfit as p . It can be shown that governance overfit + governance underfit = governance misfit. Consequently, if γ_1 is the coefficient for governance misfit in Model II, and γ_1' and γ_1'' are the coefficients for governance overfit and governance underfit, respectively, in Model III, a likelihood ratio test comparing Models II and III assesses whether excessive governance and insufficient governance affect alliances equally (i.e., $\gamma_1' = \gamma_1'' = \gamma_1$). The insignificant test statistic (i.e., $\chi^2 = 1.16$, n.s.) suggests that the effects of excessive and insufficient governance

on the likelihood of contractual renegotiation are equivalent, so the restricted specification appearing as Model II is appropriate.

In addition to separating out the potential effects of excessive and insufficient governance, we performed supplementary tests to examine the sensitivity of the results and alternative specifications relative to Model II. These tests explored whether initial conditions and *ex post* contingencies affect the likelihood of contractual change independently or interactively. One might anticipate, for instance, that the influence of asset specificity is exacerbated by an exogenous shock or the effects of contractual incompleteness are magnified by changes in the firm's strategy. However, separate tests indicated that environmental change does not moderate the effects of asset specificity (i.e., $p = .19$) or governance misfit (i.e., $p = .44$) nor does strategic change (i.e., $p = .89$ and $p = .68$, respectively). Similarly, separate tests revealed that neither strategic change (i.e., $p = .81$) nor environmental change (i.e., $p = .38$) interact with contractual safeguards in influencing the likelihood of contractual renegotiations. These tests supported the specification of initial conditions and *ex post* contingencies as independent effects.

Our first hypothesis argued that firms will tend to renegotiate alliance contracts when a misalignment is present between the chosen alliance governance structure and the attributes of the transaction and the contracting environment. The results bear out this prediction as governance misfit relates positively to the likelihood of contractual renegotiation ($p < .05$).

The second hypothesis suggested that the likelihood of contractual renegotiations will increase with asset specificity. The results provide support for this prediction. The greater the transaction-specific investment the firm makes in the alliance, the greater the odds are that it will alter the collaborative agreement after forming the alliance ($p < .01$).

The third hypothesis argued that alliances with more extensive contractual safeguards are less likely to experience contractual renegotiations. The results provide support for Hypothesis 3 since the extensiveness of contractual safeguards relates negatively to the likelihood of contractual renegotiation ($p < .05$). Since the measure we used for contractual safeguards gives greater weight to more stringent clauses, we wished to determine whether the results were sensitive to the weighting scheme employed. We reconstructed this measure to weight all clauses equivalently by simply summing the number of safeguards in an alliance agreement. Using this unweighed measure, we also found that alliances with more extensive contractual safeguards are less likely to experience contractual renegotiations ($p < .05$).

The remaining hypotheses considered the potential influence of *ex post* contingencies on alliances' post-formation governance changes. Firms appear to be no more or less likely to alter the contracts of alliances subject to environmental change (i.e., Hypothesis 4) yet, consistent with Hypothesis 5, firms are more likely to renegotiate alliances when there has been a strategic change affecting the collaborative agreement ($p < .05$).

Finally, the controls deserve some comment. While prior research has often considered instability to be an important characteristic of international collaboration, we find no evidence that cross-border ventures are more likely to experience contractual renegotiations than domestic alliances. The findings also do not indicate that older or younger alliances are more likely to experience contractual alterations after accounting for other explanatory factors related to alliance age. Lastly, alliances in the financial services sector did not experience a greater propensity to be renegotiated than other alliances.

Discussion

Our findings on the incidence of contractual renegotiations indicate the relevance of studying post-formation governance changes in alliances. Alliance research historically has attended to issues surrounding the formation of collaborative agreements and recently has begun to study alliance dynamics by investigating alliance termination, yet intermediate phenomena relating to governance changes in alliances have been subject to comparatively little investigation. Our focus is on one type of governance change in an alliance, contractual renegotiation, which is a single event in the developmental evolution of an alliance, so future research might examine other formal or informal means by which parent firms alter their collaborative agreements. Beyond this, the development of a typology for alliance adaptation would significantly advance the field and match the research and understanding that now exists on alliance formation and design issues. It would also be valuable to investigate empirically the decisions and possible tradeoffs firms make regarding the ways in which they adapt their collaborative relationships because multiple tools are apt to be at their disposal (e.g., control changes, personnel changes, ownership changes, etc.).

To study the antecedents of contractual renegotiations in alliances, we brought together initial conditions and *ex post* contingencies discussed in disjunct streams of research on alliances. The empirical evidence indicates that both initial conditions highlighted by transaction cost theory and *ex post* contingencies highlighted by recent conceptual and qualitative research on alliance evolution bear upon the post-formation governance changes in alliances. Thus, both perspectives on alliances contribute to the understanding of contractual renegotiations in collaborative agreements. Just as there is a need to consider other types of alliance adaptation in future research, opportunities exist to investigate other factors identified by these or other perspectives that influence the trajectories or more complex paths that alliances follow. For instance, although we draw upon transaction cost theory to identify salient initial conditions, other perspectives such as real options, RBV, and structural and relational embeddedness may also be helpful in pointing out factors that shape alliance evolution. Our focus has been on initial conditions at the transaction level, but variables at other levels of analysis such as the firm level (e.g., alliance capabilities) or industry level (e.g., network structure) may also be relevant. Similarly, we have focused on two *ex post* contingencies emphasized in conceptual and qualitative research on alliance dynamics, but other factors discussed in recent work in these areas may also prove to be important.

Our study has theoretical implications for the individual perspectives employed to understand the antecedents of contractual renegotiations. For transaction cost theory, the findings show that firms alter alliance contracts in response to governance misalignment. Although transaction cost treatments of firms' governance decisions often assume that a selection environment exists that is sufficiently strong to weed out theoretically inefficient organizational forms quickly (e.g., Williamson, 1991, 1994), we find that managers exercise discretion in intervening in misaligned governance structures prior to alliance termination. Although the effects of misalignment due to contractual hazards attending non-equity alliances need not be equivalent to those due to equity structures' governance costs, we found that governance underfit and overfit have the same implications for contractual renegotiations.

Our empirical evidence also reveals that asset specificity has an impact on firms' governance decisions at the alliance formation stage as well as during post-formation stages of

collaboration. While prior research has investigated the implications of asset specificity for alliance design (e.g., Oxley, 1997), our results demonstrate that the effects of asset specificity extend beyond alliance formation into firms' collaborative relationships. The fact that firms tend to renegotiate alliances to which they have made transaction-specific investments suggests that firms selectively renegotiate collaborative relationships and that such changes in alliances may be manifestations of hold-up problems. Along similar lines, the results indicate that contractual renegotiations tend to occur in alliances with less extensive contractual safeguards relative to alliances that have more complete contracts *ex ante*.

Consistent with conceptual and qualitative research on alliance evolution, we find that *ex post* contingencies also exert an influence on the likelihood of contractual renegotiations. Specifically, alliances are likely to experience contractual alterations when a strategic change affects the collaborative relationship. This finding is consistent with the perspective that alliances should be viewed within the context of parent firms' evolving strategies (e.g., Franko, 1971; Koza & Lewin, 1998). Research on alliances' developmental processes identifies a number of mechanisms by which strategic change may affect alliances yet, due to the coarseness of our *ex post* contingency measures, we cannot draw conclusions on the dimensions of strategic change or the precise mechanisms that appear to be most important. With this limitation in mind, our results suggest that strategic change appears to be influential rather than environmental change, but future research is also needed to examine specific dimensions of environmental change that affect alliances in different collaborative contexts (e.g., currency shifts in cross-border alliances, the resolution of technological uncertainty in biotech ventures, political or legal changes in emerging markets, etc.).

Finally, our results show that cross-border alliances are no more or less likely to experience contractual renegotiations than domestic alliances. This finding contrasts prior arguments that instability is a distinctive feature of international alliances (e.g., Inkpen & Beamish, 1997; Yan & Zeng, 1999) and that trust accumulates more readily in domestic alliances (e.g., Gulati, 1995). Clearly, additional research using different base samples is needed to explore the generalizability of our evidence based on Spanish firms' alliances and examine potential differences in the negotiation and renegotiation of alliances in domestic and cross-border contexts.

In attempting to bring together and extend research on governance design and recent work on alliance evolution, our study has other limitations that might be addressed in future work. First, recent conceptual and qualitative research on alliance evolution has proposed complex frameworks on alliance processes that are difficult to model empirically in full due to their chains of moderated relationships and feedback loops. Future empirical analyses of alliance dynamics with larger samples and more fine-grained information may be able to accommodate more of this complexity using structural models. While our study has focused on a number of key variables identified by transaction cost theory and qualitative studies on alliances, other factors are also likely to influence the post-formation dynamics of alliances. For instance, alliance capabilities developed through experience accumulation may enable firms to adapt their alliances better, but may also enable collaborators to set up alliances more effectively such that *ex post* adjustments are needed less often.

Second, like most other studies of strategic alliances, our research is limited in gathering data on one firm per alliance (cf., Lane & Lubatkin, 1998). While data on both sides of the dyad are usually difficult to collect, alliance adaptation, like alliance formation, is a

negotiated outcome involving at least two parties. Opportunities, therefore, exist to explore differences in partners' perceptions, roles, actions, and outcomes in the process of managing alliances over time. Collecting data from respondents on both sides of the dyad would also permit additional analysis of the reliability of survey responses. Extensions might also explore the generalizability of our findings to alliances with more than two partners.

Third, our model is limited by its cross-sectional construction based on survey data. Future studies with access to longitudinal data on alliance changes and their drivers would be able to examine important questions surrounding the timing of contractual renegotiation or other forms of alliance adaptation, changes in governance misalignment and other factors influencing the dynamics of alliances, repeat renegotiations in collaborative agreements, and the linkages between different types of alliance adaptation and termination.

Finally, our study is silent on the efficiency or performance implications of *ex post* governance changes in alliances. It remains for future research to examine if alliances subject to contractual renegotiations suffer efficiency or other penalties relative to alliances designed with better-aligned governance structures or with more extensive contractual safeguards up front. Given the relevance of alliance evolution and the many practical issues surrounding the relative importance of contractual completeness vs. relationship flexibility as well as alliance design vs. alliance management, we believe there are opportunities for research on many different aspects of alliance dynamics that can deepen the field's understanding of inter-firm collaboration.

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