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ALLIANCE DYNAMICS FOR ENTREPRENEURIAL FIRMS

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Abstract

Small firms are thought to encounter various difficulties implementing strategic alliances. Due to these problems, they may be less able to reap the benefits of alliance adaptation, and the changes that occur in alliances over time often will not coincide with the small firm's interests. The evidence we present on contractual renegotiations in alliances suggests that small firms are no more or less likely to experience contractual changes in general. However, small firms tend to bear inefficiencies of two kinds in their collaborations. They are less likely to adapt alliances in the presence of governance misalignments. Furthermore, they are prone to make greater transaction-specific investments without commensurate contractual safeguards, which can lead to *ex post* hold-up in the form of contractual renegotiations.

Keywords: Strategic Alliances, Entrepreneurial Firms, Small Firms, Contractual Renegotiation, Governance Misalignment

ALLIANCE DYNAMICS FOR ENTREPRENEURIAL FIRMS

Introduction

Strategic alliances hold out numerous potential benefits for small firms, including the ability to tap into new markets, access scale economies, obtain complementary resources in under-developed value chain activities, respond to environmental uncertainties, and receive endorsements from reputable incumbents, among others (e.g., D'Souza & McDougall, 1989; Deed & Hill, 1996; Dickson & Weaver, 1997; Eisenhardt & Schoonhoven, 1996; Gomes-Casseres, 1997; Hara & Kanai, 1994; Larson, 1991; Shan, 1990; Stuart, Hoang, & Hybels, 1999). It is equally clear, however, that small firms commonly encounter their share of challenges in formulating and implementing a collaborative strategy. Examples include maintaining a purpose that complements their partners' and building a workable interface with collaborators (Doz, 1988). Often, due to their lack of financial or other resources, bargaining power, or collaborative experience, small firms find that strategic alliances fail to meet their expectations (e.g., Alvarez & Barney, 2001).

In attempting to understand firms' experiences with alliances, it is worth beginning with the observation that the value that a firm ultimately derives, or fails to derive, from a collaborative agreement hinges upon the firm's management of a number of distinct, yet interrelated, stages. These stages include scanning for partners and selecting one, negotiating the alliance and establishing its design, implementing the agreement and possibly changing it over time, and finally terminating the alliance in one of several ways (e.g., Ring & Van de Ven 1994; Zajac & Olsen, 1993). By considering the unique challenges and attributes of small firms in alliances, as well as the managerial requirements of each of these stages of collaboration, it is possible to obtain a richer understanding of the obstacles and opportunities that small firms face in alliances.

Nevertheless, despite the wealth of research on strategic alliances, comparatively little work has considered the post-formation stages of collaboration. In recent years, more research has gone on to analyze alliance termination rather than just alliance formation (e.g., Park & Kim, 1997), but the events and collaborative dynamics preceding termination have gone relatively unexplored in empirical research (e.g., Ariño & de la Torre, 1998). However, it is likely that in these stages of collaboration entrepreneurial firms will face significant challenges in managing their collaborative relationships effectively (Niederkofler, 1991). Indeed, Doz and Hamel (1998) argue that how firms manage an alliance over time will be a

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more important determinant of the alliance's ultimate success or failure than how the collaboration was initially set up. Other researchers have similarly acknowledged the importance of the dynamic aspects of collaborative processes (e.g., Deeds & Hill, 1999; Egelhoff & Haklisch, 1994; Larson, 1992; Weaver & Dickson, 1998).

In this paper, we examine contractual renegotiation as one type of post-formation change in strategic alliances. Our specific objective is to bring transaction cost theory into the post-formation setting and examine the experiences of small firms in collaborative relationships as they evolve. This is important because existing empirical research that draws upon transaction cost theory has tended to assess firms' governance choices under the assumption that a selection environment acts to weed out inefficient structures before managers have the opportunity to adapt them (e.g., Williamson, 1991). By contrast, we allow for managerial discretion to remedy alliances subject to governance misalignment, but for several reasons we also suspect that smaller firms will be less able to use contractual changes and refine their alliances' governance. We also consider the possibility that smaller firms will be more exposed to the hazards of hold-up in alliances, as manifested in contractual renegotiations. By analyzing the extent to which small and other firms differ in their propensity to renegotiate alliances in general or due to more specific reasons such as these, we are able to isolate some of the particular mechanisms behind alliance dynamics as they are experienced uniquely by entrepreneurial firms.

The paper proceeds as follows: In the next section, we discuss in greater depth the challenges small firms face in managing the dynamics of alliances. Hypotheses are developed that relate firm size and attributes of the alliance to the likelihood of contractual renegotiation. The following section offers details on the research design. In brief, the present study contrasts recent qualitative research on alliance evolution by using econometric analysis to study the incidence and antecedents of contractual renegotiations in strategic alliances by relying on a survey of collaborative agreements formed by Spanish firms. The empirical evidence follows. Multivariate results demonstrate that small firms are no more or less likely to renegotiate alliances than other firms. However, the evidence suggests that smaller firms are less likely to adapt their alliances in the face of governance misalignment and its attendant inefficiencies. Smaller firms tend to make higher levels of transaction-specific investment in alliances without restricting partners through additional contractual safeguards, which triggers contractual changes in alliances. Implications and avenues for future research conclude.

Theory and hypotheses

The Evolution of Small Firms' Alliances

Contractual changes in alliances may be viewed alternatively as an outcome of a collaborative relationship or as a specific post-formation governance decision made by a partner. When viewed as an outcome of the collaboration, several considerations suggest that contractual renegotiations may be expected to be more likely for small firms. First, such firms typically lack extensive alliance experience, which otherwise may allow firms to set up alliances effectively *ex ante* in response to features of the interfirm exchange, thereby avoiding the need for *ex post* adjustments. Extensive alliance experience may also enable a firm to anticipate some of the contingencies that might arise after the alliance has been established. Second, due to the lower bargaining power of small firms, contractual changes may also be thrust upon them by their partners, particularly as firms learn from one another

(e.g., Alvarez & Barney, 2001). Third, Zacharakis (1997) develops the argument that because less information tends to be available on smaller firms, they have an incentive to misrepresent their abilities in their collaborations. Once their true capabilities are recognized over time, alliance adjustments may follow. Finally, contractual changes in alliances may also stem from a small firm's financial constraints and the resulting allocation of control rights. Specifically, Lerner and Merges (1998) suggest that a small firm's lack of financial resources can contribute to a suboptimal allocation of control rights when the alliance is established. Their empirical analysis indicates that exogenous changes in the availability of funds for the small firm lead to subsequent shifts in control rights in alliances.

However, if contractual changes are viewed as decisions or actions taken by the firm, it becomes less clear if small firms will be more likely to engage in contractual renegotiations. This is because such decisions or actions depend not only on the firm's willingness to take them, but also on their ability to do so. For instance, contrary to the argument above, collaborative experience may facilitate *ex post* adjustments in alliances by enabling the firm to know when such changes are warranted and how to go about adapting the alliance. Thus, the tendency of smaller firms to have lower levels of alliance experience suggests that they may be less likely to take such actions when they are needed. Additionally, their lower bargaining power in a relationship also suggests that such changes may in practice be difficult to effect. These considerations lead us to specify the following competing hypotheses for the sake of completeness:

Hypothesis 1a: The likelihood of contractual renegotiation will be higher for small firms than others.

Hypothesis 1b: The likelihood of contractual renegotiation will be lower for small firms than others.

Although we wish to test the overall effects of firm size on the likelihood of contractual changes in alliances, the competing arguments noted above indicate the importance of understanding the contingencies that lead to contractual renegotiations. That is, they point to the need for a theory of contractual renegotiations in strategic alliances that is able to disentangle some of the alternative assertions and examine whether the experiences of small firms are truly unique.

Below we discuss two explanations for contractual renegotiations in alliances, as identified by transaction cost theory. First, firms may renegotiate an alliance to alleviate inefficiencies stemming from the initial design of the collaborative agreement if it does not suit the realities of the exchange relationship. The greater the inefficiencies arising from governance misalignment, the greater the incentive to bear the costs of renegotiation to adjust the alliance's governance. Second, a firm may be willing to renegotiate an alliance when it has made significant transaction-specific investment in an alliance and its partner recognizes the opportunity to hold-up the firm and appropriate this value. Contractual renegotiation, in this case, may reflect the presence of contractual hazards and *ex post* haggling.

While the first explanation implies that contractual renegotiations in alliances can be efficiency enhancing, in the second instance a transfer of value occurs between the parties and inefficiency can be exacerbated in the process of renegotiating the collaborative agreement's terms. Two questions arise: Are small firms more or less able to obtain the efficiencies from responding to governance misalignment? and Are small firms more or less susceptible to contractual hazards that bring forth contractual renegotiations to appropriate value? Based on the discussion above, it is plausible that small firms will be less able to reap

the benefits of alliance adaptation, and that the changes that do occur in alliances over time often will not coincide with the small firm's interests. We consider each of these possibilities in turn in the next two sections.

Governance Misalignment and Contractual Renegotiation

Because our goal is to extend transaction cost theory into the post-formation setting, it is important to point out two related propositions and assumptions that help in the development of research hypotheses. First, a fundamental tenet of transaction cost theory concerns 'discriminating alignment,' which maintains that the efficiency of a transaction will be positively related to the alignment between the chosen governance structure (and the syndrome of properties it represents) and the fundamental attributes of the transaction and the broader contracting environment (Williamson, 1991). Thus, transaction cost theory provides a contingent perspective arguing that no one governance structure is universally more or less efficient than others; rather, governance forms ranging from market-mediated exchange to hybrids to full internalization are efficient under certain circumstances.

Second, and closely related to the proposition of discriminating alignment, empirical research using transaction cost theory tends to use a selection approach to fit (e.g., Drazin & Van de Ven, 1985), whereby efficiency implications are drawn from reduced-form models of firms' governance choices. This is made possible by the assumption that competitive forces in the selection environment weed out inefficient governance decisions. It is plausible, however, that misaligned transactions may exist and even persist (e.g., Argyres & Libeskind, 1999). In studying *ex post* contractual changes in alliances, it is helpful for us to relax this assumption to allow for managerial discretion, which potentially enables firms to refine an alliance's governance before a maladapted collaborative relationship is selected out by competitive forces.

More precisely, inefficiencies generated by two types of governance misalignment may prompt firms to renegotiate their collaborative relationships. First, it is possible that 'excessive' governance was put in place for a comparatively simple exchange relationship. For instance, if alternative partners are available and a firm commits generic resources that can be readily redeployed, a simple contract may be used to govern the alliance. The incentives and controls provided by equity are not needed as the threat of opportunism and its implied risks are minimal. When firms use excessive governance instead, however, the result can be politicized or slow decision-making (Williamson, 1991).

Second, inefficiencies may arise if 'insufficient' governance is put in place for a more complex collaborative relationship. This case is the mirror image of the one noted above. Here, inadequate governance mechanisms are instituted when the threat of opportunism is high. As an illustration, 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, parties' rights and obligations can be very difficult to specify up front, monitoring and control are impeded by the lack of a separate entity with a board to coordinate activity, and incentive alignment is attenuated (Williamson, 1991). As before, the costs stemming from governance misalignment may prompt firms to renegotiate the alliance.

The question that comes to the fore is whether small firms will be more or less able to improve upon their alliances' initial governance structures through contractual changes. We anticipate they will be less likely to adapt their alliances for several reasons. The

tendency of small firms to lack extensive alliance experience suggests that they may be less able to detect the need for contractual renegotiation. Moreover, small firms' lack of extensive alliance experience also implies that they may be less able to make other changes that are associated with contractual renegotiation, such as altering the scope of markets served or restructuring the collaboration itself. That such changes can be costly and involve non-trivial risks also suggests that firms without slack financial resources may be less willing and able to undertake such adjustments in their alliances. Furthermore, the fact that small firms are often dependent on their alliance partners (e.g., Larson, 1991) also suggests that they may not wish to run the risk of disrupting the relationship as it stands, even if inefficiencies do arise. We therefore wish to test the following two hypotheses to determine if governance misalignment contributes to contractual renegotiations in alliances and if small firms experience greater difficulties in managing alliances over time due to this factor.

Hypothesis 2: The likelihood of contractual renegotiation will be positively related to governance misalignment.

Hypothesis 3: The positive effect of governance misalignment on the likelihood of contractual renegotiation will be lower for small firms than others.

Contractual Renegotiation as a Manifestation of Hold-Up

Although firms may make post-formation governance decisions to alleviate inefficiencies in alliances, they may also undergo contractual renegotiations because such changes are imposed upon them in well-defined circumstances. In particular, transaction cost theory suggests that in bilateral negotiations, a partner may attempt to appropriate value from the firm via contractual renegotiations when the firm has made transaction-specific investments in the alliance. In such situations, the gap between these assets' first and second best use values provides motivation to incur *ex post* costs to renegotiate the alliance's terms rather than lose this difference for resources deployed to the alliance. The greater the transaction-specific investment, the greater the value the partner is potentially able to capture in renegotiations. Thus, to the extent that such transfers of value are possible and stimulate haggling, contractual renegotiations may contribute to, rather than ameliorate, inefficiencies in strategic alliances. In short, contractual renegotiation can be a manifestation of hold-up behavior.

As before, the question that arises is whether small firms are more or less sensitive to such hazards in alliances. To the extent that they have less extensive experience with interfirm collaboration, small firms' hazard mitigating capabilities, or their abilities to collaborate in the face of such hazards, are likely to be lower (Delios & Henisz, 2000). This suggests that firms will be more exposed to contractual hazards for a given level of asset specificity. Moreover, when small firms have lower levels of bargaining power in alliances, the increased expected payoff from appropriation encourages their partners to engage in hold-up. Thus, we wish to test the following two hypotheses to determine if asset specificity contributes to contractual renegotiations in alliances and if small firms are more susceptible to these hazards.

Hypothesis 4: The likelihood of contractual renegotiation will be positively related to asset specificity.

Hypothesis 5: The positive effect of asset specificity on the likelihood of contractual renegotiation will be higher for small firms than others.

Data and methods

Sampling and Survey Design

We used Funk and Scott's Countries Index – Europe in order to find Spanish firms engaging in collaborative agreements and to locate a target population. The time period chosen was 1986-1992, which begins with Spain's adhesion to the EC and ends with the start of the Single European Market. We expected that this time period would create external opportunities and threats posed by the deregulation of markets and heightened competition that would stimulate inter-firm collaboration. Financial constraints limited the survey to Spain, and the fact one of the authors lives in Spain facilitated the follow-up process and improved the chances for a good response rate. A total of 674 dyadic alliances were identified, and we focused on those industries that were relatively more active in alliances and contained 65 percent of the alliances in the overall population contained in the Funk and Scott database.

In an effort to ensure the quality of responses, questionnaires were only sent out for the 189 alliances in which a knowledgeable respondent could be identified. A 48 percent response rate was attained (i.e., 91 alliances), which is likely due to the effort in identifying the key informant and the follow-up process, which included additional phone calls (Dillman, 1978). The appropriateness of key informants was revealed by the fact that 91 percent of respondents had been involved in the alliance since it was formed and, on average, respondents had been involved in the alliance for 4.9 years. Over 63 percent of the respondents were directly engaged in the alliance's negotiation. As an external validity check on the survey data for which secondary data are available, we examined whether the respondent firm is a Spanish company, a subsidiary, or a foreign company, as well as whether or not the firm is state-owned. Matches were obtained for 96 and 98 percent of the firms for these questions.

Early versions of the survey were reviewed by business school professors to ensure the face validity of the survey items. The survey was translated into Spanish and reviewed by two Spanish-speaking researchers. Following translation, the survey was pre-tested with six Spanish executives who were experienced in managing alliances. Several changes were made to the survey during 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 the dependent variable – whether or not the alliance experienced a contractual renegotiation – is an objective indicator of alliance change, we sought to allay concerns of possible consistency artifacts and common methods bias. Questionnaire items appeared so that subjective items preceded the question on contractual renegotiation (Salancik & Pfeffer, 1977). Furthermore, we employed Harman's (1967) single-factor test to determine if a significant amount of common methods variance is evident in the data in the form of a common underlying factor or a general factor that captures most of the variance in the data (Podsakoff & Organ, 1986). Unrotated factor analysis using the eigenvalue-greater-than-one criterion generated four factors, with the first factor capturing only 17.9 percent of the variance. This analysis therefore indicated that the multivariate findings are not subject to common methods bias.

We also sought to assess potential nonresponse bias in several ways. We did this by comparing 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). First, we examined possible differences in the distribution of alliances across industries for early and late respondents. This analysis yielded an insignificant Chi-square value of 8.54 (8 d.f.). A similar test statistic comparing respondents and non-respondents was insignificant ($\chi^2 = 13.52$, 8 d.f.). We also compared the size of respondents and late respondents, and a one-way ANOVA for firm size across these groups gave an insignificant F-value of 0.67 (i.e., 86 d.f., $p = 0.42$).

Missing data on the variables used in the analysis reduced the final sample size to 71 alliances (for a 38 percent response rate) involving 63 firms. In this sample, six firms were engaged in more than one alliance. Specifically, four firms were engaged in two alliances, and two firms had entered three collaborations. A supplemental analysis using a single, randomly-chosen alliance per firm provided interpretations consistent with those offered in the results and discussion sections below. Seventeen alliances had terminated, but these collaborations were not excluded from the sample in order to avoid a survival bias.

Measures and Models

Contractual Renegotiation

Respondents were asked whether the initial alliance contract was renegotiated during the course of the alliance. Thus, the dependent is a binary variable, where Contractual Renegotiation equals one if the contract was altered, and zero otherwise.

Explanatory Variables

The hypotheses developed above seek to test whether small firms are more or less likely to experience contractual renegotiations in alliances as well as isolate the mechanisms behind such changes for small firms. *Small Firm* equals 1 if the firm had 500 or fewer employees, and zero otherwise. This definition is the one used by the US Commerce Department (e.g., Roy & Simpson, 1981).

The theory section suggested that governance misalignment may prompt contractual renegotiation to adapt the alliance in order to rectify inefficiencies owing to excessive or inadequate governance. To measure governance misalignment, we first estimated a first stage model to compare firms' actual alliance governance decisions with those implied by the underlying attributes of the collaboration. To do so, a typology of alliances is needed that highlights their unique governance properties. Distinguishing equity from non-equity collaborative agreements served this purpose as the former involve more extensive control rights as well as the introduction of incentive alignment through joint residual claimancy (e.g., Hennart, 1988). Although consensus is lacking on an alliance typology, this bifurcation of the governance continuum within the hybrid region is common (e.g., Gulati, 1995, Osborn & Baughn, 1990; Pisano, 1989). Following the general approach laid out in Anderson (1988) as well as Silverman, Nickerson, and Freeman (1997), *Governance Misalignment* was then calculated as $1-p$ when the firm employed an equity alliance, and p for non-equity collaborative agreements, where p is the probability estimate for an equity alliance, which was modeled as follows:

$$(1) \text{ Equity} = \beta_0 + \beta_1 \text{Asset Specificity} + \beta_2 \text{Potential Partners} + \beta_3 \text{Prior Ties} \\ + \beta_4 \text{Cross-Border} + \beta_5 \text{Small Firm} + \epsilon.$$

Equity is equal to 1 for equity alliances, and zero for non-equity alliances. The governance choice model portrayed in equation (1) was estimated using a probit model. Although our primary interest centers on the effects of governance misalignment on the likelihood of contractual renegotiation, we will first discuss the regressors constituting the first-stage model.

Asset specificity is the first regressor in the model and, according to transaction cost research, it should also be a key determinant of firms' governance choices in alliances. Based on transaction cost theory's prediction that opportunism poses greater risks to collaborators in the presence of transaction-specific investment (e.g., Williamson, 1991), and that the incentives and controls offered by equity structures can mitigate these hazards, we anticipate a positive coefficient for asset specificity. In the second stage model containing the antecedents of contractual renegotiation, asset specificity also appears since asset specificity will influence a firm's willingness to bear the costs of contractual change in both equity and non-equity alliances.

Asset Specificity was measured as an unweighted index based on four indicators reflecting the firm's transaction-specific investment in the alliance. Each of the following items 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 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). The asset specificity measure had a Chronbach alpha of 0.74, which indicated satisfactory reliability (Nunnally, 1978).

The *Potential Partners* variable captures the number of other available alliance partners and, therefore, is a negative indicator of small numbers bargaining. As the number of potential partners declines, contractual hazards such as moral hazard and hold-up increase since the difficulty of switching partners also increases (Williamson, 1975). If the control and incentive features of equity alliances ameliorate these hazards, a negative parameter estimate should result. In a study of alliances in the US biotechnology industry, Pisano (1989) reports that firms turn to equity alliances rather than non-equity agreements as the number of potential partners diminishes. *Potential Partners* was measured on a four-point scale based on the number of other firms with the necessary skills to carry out the partner's activity.

The *Prior Ties* variable accounts for whether or not the parties to the collaboration had prior alliances with each other. Firms who have a collaborative history together are thought to exhibit greater trust (Gulati, 1995), which can mitigate the threat of opportunism and the need for more complex governance arrangements. Prior ties can also lead to the development of collaborative routines that substitute for formal governance mechanisms (e.g., Dyer & Singh, 1998). Thus, prior research on alliances suggests a negative coefficient for prior ties in equation (1). *Prior Ties* equals one if the firms had a prior collaborative agreement, and zero otherwise.

For similar reasons, a variable indicating whether or not the alliance is cross-border or domestic was included in the specification. Gulati (1995) suggests that cross-border alliances are more likely to require the controls and incentives provided by equity because character-based trust emerges more readily between socially-similar firms, reputational consequences of opportunism are more severe in the domestic setting, and more information is available on domestic firms. Thus, a positive coefficient is expected for the *Cross-Border*

variable, which takes on a value of one if the two partners are from different countries, and zero otherwise. Finally, the control for firm size was introduced into the first-stage model. This variable accounts for parent firm resources and other potential influences at the firm level.

Specification of the Contractual Renegotiation Model

Having discussed the theoretical variables of interest that may explain post-formation contractual changes in alliances, we can specify the second-stage model as follows:

$$(2) \text{ Contractual Renegotiation} = \gamma_0 + \gamma_1 \text{Small Firm} + \gamma_2 \text{Governance Misalignment} + \gamma_3 \text{Asset Specificity} + \gamma_4 \text{Small Firm} \times \text{Governance Misfit} + \gamma_5 \text{Small Firm} \times \text{Asset Specificity} + \gamma_6 \text{Contractual Safeguards} + \gamma_7 \text{Cross-Border} + \gamma_8 \text{Environmental Change} + \gamma_9 \text{Strategic Change} + \gamma_{10} \text{Alliance Age} + \varepsilon.$$

Based on the hypotheses discussed above, it is ambiguous whether the propensity to contractual change is higher or lower for small firms in general. However, if small firms are less able to adapt alliances over time and are more susceptible to hold-up for a given level of transaction-specific investment, then $\gamma_4 < 0$ and $\gamma_5 > 0$.

Although our objective was to develop a parsimonious model of contractual renegotiation in alliances to examine the experiences of small firms, we also sought to control for other initial conditions and *ex post* changes that may have a bearing on the likelihood of contractual renegotiation. First, we controlled for the level of contractual safeguards in the alliance contract. Such provisions are apt to be used when firms make transaction-specific investments in alliances, and they also may leave less room for hold-up behavior. The measure we used for contractual safeguards was developed by Parkhe (1993), who conducted a computer-aided search of the legal literature to create a checklist of contractual provisions. Respondents indicated which of the following safeguards appeared in their alliance 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. These safeguards were arrayed in increasing order of stringency (as shown), and the *Contractual Safeguards* variable was calculated as follows:

$$(3) \text{ Contractual Safeguards} = \frac{1}{36} \sum_{i=1}^8 D_i,$$

where D_i equals i if the i th safeguard was employed, and zero otherwise. In other words, D_1 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.

We also introduced a control for whether the collaboration was a domestic alliance or between firms from different countries. Inclusion of this control is justified by the notion

that cross-border alliances may benefit from additional controls, as noted above, and that instability in general is regarded as a defining feature of international alliances (e.g., Inkpen & Beamish, 1997). Prior research on the termination of cross-border collaborations has yielded somewhat mixed evidence (e.g., Park & Ungson, 1997), but we sought to determine if cross-border alliances are more susceptible to instability in the form of contractual changes.

In addition to these variables that control for characteristics of the alliance and its initial design, we also sought to account for *ex post* contingencies that might reflect such conditions and also be related to the likelihood of alterations in alliances' contracts. For instance, models of alliance evolution note that changes in an alliance's environment can trigger adjustments in the collaboration to restore initial conditions of equity and efficiency (e.g., Ariño and de la Torre, 1998; Doz, 1996; Zajac & Olsen, 1993). Changes in a parent firm's strategy can similarly lead firms to revisit the initial agreement (e.g., Koza & Lewin, 1998; Kumar & Nti, 1998). 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. Finally, to account for other influences at the alliance level and recognize that older alliances might be more likely to be adjusted simply due to the passage of time, we introduced a control for alliance age, measured in years.

Results

Descriptive statistics and a correlation matrix for variables appearing in the first stage governance choice model can be found in Table 1. Forty-five percent of the collaborative agreements involved equity, and one-fifth of the collaborators had prior alliances with their partners. Most of the alliances, 84 percent, were between firms from different countries. Slightly under half of the firms were small firms, and these firms tended to make more transaction-specific investments in their alliances ($p < 0.01$). While small firms might be expected to economize on search costs in establishing alliances, they are no more likely to take on domestic partners than larger organizations, which might be attributable to the economic threats and opportunities posed by economic integration in Europe. Taken together, the correlations among the variables are generally modest, and the maximum variance inflation factor (VIF) for the variables in the first-stage model is only 1.15.

Table 1. Descriptive Statistics and Correlation Matrix (Governance Choice Model Variables)^a

Variable	Mean	S.D.	(1)	(2)	(3)	(4)	(5)
(1) Equity Alliance	0.45	0.50	—				
(2) Asset Specificity	9.21	3.35	0.32**	—			
(3) Potential Partners	2.83	1.03	-0.06	-0.06	—		
(4) Prior Ties	0.20	0.40	0.24*	0.06	0.30**	—	
(5) Cross-Border	0.84	0.37	-0.08	0.04	0.02	0.05	—
(6) Small Firm	0.47	0.50	-0.02	0.31**	-0.10	-0.16	-0.03

^aN=80. † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Estimation results for the governance choice model used to calculate the *Governance Misalignment* variable appear in Table 2. The model is highly significant on an overall basis ($p < 0.001$). Consistent with the predictions of transaction cost economics, firms turn to equity alliances over non-equity collaborative agreements when making transaction-specific investments in their collaborations ($p < 0.01$) and when a small number of alternative partners are available ($p < 0.01$). Interestingly, firms with prior ties use equity alliances rather than non-equity alliances, and cross-border alliances are no more or less likely to implement the controls and incentives offered by equity structures. Both of these findings run counter to trust-based explanations of firms' governance choices (c.f., Gulati, 1995). After controlling for other influences at the transaction level, small firms are no more prone to use equity or non-equity alliances than other firms.

Table 2. Governance Choice Model^b

Independent Variable	Dependent Variable: Equity Alliance
Intercept	-0.40 (0.74)
Asset Specificity	0.18** (0.06)
Potential Partners	-0.46** (0.18)
Prior Ties	1.31** (0.47)
Cross-Border	-0.25 (0.44)
Small Firm	-0.42 (0.35)
χ^2	23.72***

^bN=80. Standard errors appear in parentheses. † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 3 presents descriptive statistics and a correlation matrix for the variables appearing in the contractual renegotiation model. One-fifth of sampled alliances underwent a contractual change. Small firms were no more or less likely to experience contractual changes than others ($\chi^2 = 0.51$). Although small firms are apt to make greater transaction-specific investments in their alliances ($p < 0.01$), they do not tend to experience governance misalignments more frequently than larger firms. Chi-square tests and two-sample t-tests indicate that firm size is not related to any of the other explanatory variables either. Thus, although small firms tend to make greater transaction-specific investments in their alliances, they do not tend to include greater safeguards in their collaborative agreements to restrict their partners.

Table 3. Descriptive Statistics and Correlation Matrix (Contractual Renegotiation Model Variables)^c

Variable	Mean	S.D.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Contractual Renegotiation	0.20	0.40	—							
(2) Small Firm	0.45	0.50	0.09	—						
(3) Governance Misalignment	0.39	0.20	0.20 [†]	-0.01	—					
(4) Asset Specificity	9.18	3.47	0.31 ^{**}	0.30 [*]	-0.12	—				
(5) Contractual Safeguards	0.46	0.33	-0.09	-0.09	-0.06	0.16	—			
(6) Cross-Border	0.83	0.38	0.13	-0.08	-0.15	0.05	0.16	—		
(7) Environmental Change	0.20	0.40	0.29 [*]	-0.09	-0.04	0.14	0.23 [†]	0.13	—	
(8) Strategic Change	0.10	0.30	0.31 ^{**}	-0.11	0.13	-0.07	0.15	0.15	0.19	—
(9) Alliance Age	3.89	4.79	0.32 ^{**}	-0.14	-0.003	0.05	0.19	0.16	0.35 ^{**}	0.37 ^{**}

^cN=71. [†] p<0.10, * p<0.05, ** p<0.01, *** p<0.001.

Of the firms that did go through a contractual renegotiation, the mean alliance age was 7.3, whereas the average age of other alliances was 3.1 years ($p<0.01$). Twenty percent of the alliances were subject to an environmental change that affected the collaboration, whereas only ten percent of the alliances witnessed a strategic change by the parent firms. The greater the age of the alliance, the more likely that strategic or environmental changes would occur (both $p<0.01$), and these changes make it more likely for parent firms to find themselves renegotiating the alliance contract ($p<0.05$ and $p<0.01$, respectively). However, the significant correlations among many of the explanatory variables indicate the importance of using multivariate methods to isolate the antecedents of contractual renegotiations in alliances. These correlations also indicate the possibility of multicollinearity problems, however. The maximum VIF for the direct effects for the variables appearing in Table 3 is only 1.30, yet the incorporation of the interaction terms raises the maximum VIF to 15.84. Accordingly, we standardized the *Governance Misalignment* and *Asset Specificity* variables prior to forming the multiplicative terms, which reduced the maximum VIF to a more acceptable level of 2.53.

Multivariate estimation results for the contractual renegotiation models appear in Table 4. Model I presents a specification containing the control variables along with the firm size indicator. Model II augments this model by including the direct effects of *Governance Misalignment* and *Asset Specificity*. Finally, Model III includes the two interaction terms. A log likelihood value is provided for each Model k (i.e., $L(\beta_k)$), where $k = 1, 2, \text{ or } 3$, to draw comparisons across the three models. All three models demonstrate satisfactory fit ($p<0.01$, $p<0.001$, and $p<0.001$, respectively). Likelihood ratio tests also indicate that Models II and III improve upon the baseline specification in Model I ($\chi^2=13.58$, $p<0.01$ and $\chi^2=23.24$,

$p < 0.001$, respectively). Finally, incorporation of the interaction terms in Model III leads to better model fit relative to the direct-effects only specification of Model II ($\chi^2 = 9.66$, $p < 0.01$).

Table 4. Contractual Renegotiation Model^d

Variable	Model I	Model II	Model III
Intercept	-1.77* (0.71)	-1.59* (0.75)	-3.28† -(1.71)
Contractual Safeguards	-1.58* (0.77)	-2.48* (1.06)	-4.05* (1.60)
Cross-Border	0.47 (0.67)	0.42 (0.74)	0.25 (0.92)
Environmental Change	1.05* (0.51)	0.77 (0.61)	1.96* (0.98)
Strategic Change	1.22† (0.63)	1.71* (0.75)	2.23† (1.35)
Alliance Age	0.10 (0.08)	0.15† (0.09)	0.16 (0.19)
Small Firm	0.65 (0.43)	-0.25 (0.58)	1.87 (1.39)
Governance Misalignment	—	0.64* (0.32)	3.67* (1.50)
Asset Specificity	—	1.03** (0.39)	4.45* (2.18)
Small Firm x Governance Misalignment	—	—	-4.05* (1.70)
Small Firm x Asset Specificity	—	—	-3.34 (2.07)
χ^2	49.39**	34.80***	25.14***
Log Likelihood, $L(\beta_k)$	-24.19	-17.40	-12.57
$-2[L(\beta_I) - L(\beta_k)]$	—	13.58**	23.24***
$-2[L(\beta_{II}) - L(\beta_{III})]$	—	—	9.66**

^dN=71. Standard errors appear in parentheses. The *Governance Misalignment* and *Asset Specificity* variables have been standardized. $L(\beta_k)$ refers to the log likelihood value for model k. † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

The parameter estimate for the *Small Firm* variable is positive in Model I, but only reaches significance at the 0.13 level. If *Governance Misalignment* is included in this specification, the parameter estimate is still positive and reaches significance at the 0.09 level, providing modest evidence at best that small firms are more apt to experience contractual renegotiations in alliances. However, the fact that firm size matters can be demonstrated more convincingly using the specification in Model III. A likelihood ratio test that drops the direct effects of the *Small Firm* variable as well as its interactions produces a chi-square value of 9.83 ($p=0.02$), indicating that firm size does influence contractual changes in alliances, but perhaps in a more complex fashion than in the direct, linear fashion as specified in Model I.

Given the negative correlation between firm size and asset specificity noted above, it is perhaps not surprising that inclusion of the *Governance Misalignment* and *Asset Specificity* regressors changes the results for firm size. The parameter estimate changes signs and is no longer significant at any reasonable level, but the likelihood of contractual changes is positively related to asset specificity ($p<0.01$). To illustrate the practical significance of these relationships, we bifurcated the sample based on firms' transaction-specific investments at the median value. For small firms that did not make transaction-specific investments in their alliances, the incidence of contractual changes is 8.33 percent. The incidence of contractual changes increases to 36.84 for small firms that did make significant transaction-specific investments in their collaborative agreements, which compares to 7.6 percent for large firms. Model II also indicates that the likelihood of contractual renegotiation is positively related to governance misalignment ($p<0.05$) and its attendant inefficiencies. This underscores the point made early on that contractual renegotiation may be beneficial to collaborators by enhancing the efficiency of collaborative relationships, but it can also be a manifestation of hold-up in alliances.

The interaction terms appearing in Model III demonstrate a negative interaction between governance misalignment and the *Small Firm* variable ($p<0.05$). This result is consistent with the argument that smaller firms will be less able to adapt alliances over time and thus bear the inefficiencies associated with governance misalignment. Larger firms are in a better position to exercise discretion and adapt their relationships over time. To explore whether the effects of excessive and inadequate governance are equivalent, we separated the *Governance Misalignment* variable into two components – governance overfit (i.e., $Governance\ Overfit = 1-p$ for equity alliances and 0 for nonequity alliances) and governance underfit (i.e., $Governance\ Underfit = p$ for nonequity alliances and 0 for equity alliances, where $Governance\ Misalignment = Governance\ Overfit + Governance\ Underfit$) – but there was no evidence that the effects differed. Notably, no positive interaction is present for firm size and asset specificity. The results discussed above indicate that while firms are not more exposed to hold-up problems for a given level of asset specificity, they tend to make greater transaction-specific investments that bring about contractual changes.

Finally, the control variables deserve some comment. All three models indicate that the extensiveness of contractual safeguards relates negatively to the likelihood of contractual changes ($p<0.05$). Alliances with less complete contracts are those that are the most likely to be renegotiated. However, none of the models suggests that cross-border collaborations are any more or less likely to be renegotiated than domestic collaborations. There is mixed evidence that changes in the venture's environment prompt contractual changes ($p<0.05$ in Models I and III), and it is apparent that changes in a firm's strategy often lead to contractual renegotiation in its alliances ($p<0.05$ in Model II and $p<0.10$ in Models I and III).

In order to explore whether small firms are any more or less affected by these *ex post* contingencies in alliances, we interacted the *Small Firm* variable with the *Environmental Change* and *Strategic Change* variables, but no significant interactions were found. Thus, the effects of these *ex post* contingencies generalize to small firms and others in alliances, and no differences are evident that would suggest that small firms are more or less sensitive to such changes. Similarly, the effects of contractual safeguards, alliance age, and whether or not the alliance was a cross-border collaboration did not differ for small firms and others.

Discussion

Our findings demonstrate the relevance of studying the evolution of strategic alliances, or the changes and events that occur after an alliance has been set up but before it has been terminated. Historically, alliance research has focused on the formation of alliances and, more recently, has given more attention to alliance termination (e.g., Park & Kim, 1997). Because alliances hold out many opportunities for small firms (Larson, 1991) and also present serious challenges to them (e.g., Alvarez & Barney, 2001), it is important to understand how small firms manage all of the stages of inter-firm collaboration that must be managed effectively for alliances to yield the greatest results (e.g., Deeds & Hill, 1999; Doz & Hamel, 1998; Niederkofler, 1991; Weaver & Dickson, 1998).

Our models focus on just one type of post-formation change that takes place in alliances, contractual renegotiations. Future research, therefore, could consider other types of post-formation changes in alliances and ideally would develop a taxonomy of them in order for managers to understand their alternatives and the tradeoffs involved. Some changes, such as changing a joint venture's board or its scope, will tend to be more formal, whereas other changes in collaborative agreements may be more informal in nature.

Based on the empirical results we present, it is interesting to note that in many respects small firms' experiences in alliances parallel those of larger organizations. For example, although instability has been regarded as a distinguishing feature of cross-border collaborations, we find that such alliances are no more likely to experience contractual adjustments than others, and the effects do not differ across small firms and others. Further, as noted above, contractual renegotiations tend to stem from strategic changes surrounding the alliance and from possibilities for appropriating value due to transaction-specific investments and contractual incompleteness, but the effects of these factors also do not differ across small firms and others. By controlling for relevant alliance design variables, attributes of the collaborative agreement, and changes surrounding the collaboration, we are also able to show that small firms are no more or less likely to experience contractual renegotiations in general. Thus, in broad terms, the results point to the value of contingency perspectives in the study of entrepreneurial firms in alliances, as well as research designs such as ours that enable the isolation of small firms' unique experiences.

More specifically, our results indicate the value of taking transaction cost perspectives of firms' governance decisions into the post-formation setting. By maintaining the fundamental proposition of discriminating alignment while relaxing assumptions concerning the selection environment (Williamson, 1991), we allow for managerial discretion and the possibility that firms can adapt their relationships and refine the governance of their strategic alliances through contractual renegotiations. Although firms tend to respond to the inefficiencies associated with governance misalignment, it is apparent that small firms are less likely to make contractual adjustments in their alliances in the face of such inefficiencies. Extensions to the present study could consider the specific attributes of small firms, whether

less extensive alliance experience or the lack of other resources, that account for their lower degree of responsiveness to governance misalignment. Clinical research would be helpful in this effort, allowing researchers to examine situations in which firms attempt to adapt their relationships yet fail and to sort out why such changes are difficult for some firms.

Despite the fact that small firms will often lack bargaining power and extensive alliance experience that can provide hazard-mitigating capabilities, the results indicate that they are no more exposed to contractual hazards than other firms, for a given level of asset specificity. A firm's transaction-specific investment in alliances emerges as a key variable affecting the dynamics of collaborations, however. In simple models without the asset specificity variable, there is modest evidence that small firms are more likely to renegotiate alliances, yet inclusion of the asset specificity variable indicates that this variable, rather than firm size *per se*, contributes to contractual renegotiation. Thus, while contractual renegotiation may be used to mitigate inefficiencies due to governance misalignment, it also may exacerbate inefficiencies due to opportunities for hold-up. While small firms are no more exposed to such contractual hazards for a given level of asset specificity, they do tend to make more transaction-specific investment in alliances without incorporating commensurate contractual safeguards into their collaborative agreements. The completeness of the alliance contract as well as the level of transaction-specific investment both in turn relate to the likelihood of contractual renegotiations.

In attempting to bring transaction cost theory into the post-formation setting and examine the experiences of small firms as their alliances evolve, our study has limitations that present additional opportunities for future research. First, we suspect that extensions may be able to isolate other antecedents of contractual renegotiations. In contrast to our models, which draw primarily on transaction cost theory, other perspectives may prove useful in this regard. For example, research drawing upon game theory, property rights literature, agency theory, and other perspectives may be fruitful in identifying other factors that stimulate post-formation changes in alliances. Indeed, recent conceptual and qualitative studies on alliance evolution have developed models that are quite complex, so studies with larger samples and more extensive survey data may be able to capture more of this richness.

In common with most studies of alliances, our research involved collecting data on one firm per alliance. Collecting sufficient data on both sides of alliance dyads is challenging, but it would allow for a more complete assessment of partners' renegotiation efforts by considering parties' differing perceptions, roles, and outcomes. Moreover, because our sample is restricted to alliances with two partners, extensions could examine how alliance dynamics play out in collaborations with more partners and whether the current findings generalize more broadly.

Our models are also limited by their cross-sectional construction based on survey data. Thus, future research with access to longitudinal data will be able to address new questions concerning temporal changes in governance misalignment and other covariates, the timing of contractual renegotiations or other types of change in strategic alliances, and repeated changes of a specific type in collaborations. Recent conceptual research on alliance evolution has proposed frameworks including feedback loops (e.g., Ariño & de la Torre, 1998, Zajac & Olsen, 1993), so datasets with access to longitudinal information would be helpful in testing these predictions on the causes and consequences of alliance dynamics.

Finally, our study ultimately is silent on the performance implications of *ex post* changes in alliances. Although indirect inferences may be made concerning efficiency from the linkages between governance misalignment and contractual renegotiations or between

asset specificity and contractual renegotiations, it would be attractive to study more directly the implications of contractual renegotiations and other post-formation changes in alliances. Future research could examine how such changes affect the longevity of alliances, under what circumstances alliance adaptation is beneficial or unfavorable vis-à-vis different types of termination, and how such changes shape collaborators' performance outcomes. Such work could also draw conclusions on the relative importance of different alliance life-cycle stages. Relative to other areas of research on alliance formation and termination, the topic of alliance dynamics remains relatively uncharted territory and presents many new avenues for inquiry in entrepreneurship research.

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