THE EFFECTS OF CONTRACT DETAIL AND PRIOR TIES ON CONTRACT CHANGE: A LEARNING PERSPECTIVE

ABSTRACT

Despite the large literature on alliance contract design, we know little about how transacting parties change and amend their underlying contracts *during* the execution of strategic alliances. Drawing on existing research in the alliance contracting literature, we develop the empirical question of how contract detail and prior ties influence the *amount, direction* and *type* of change in such agreements *during* the collaboration. We generated a sample of 115 joint ventures by distributing a survey to JV board members or top managers and found that the *amount* of contract change is negatively associated with the level of detail in the initial contract but is positively associated with the number of prior ties between alliance partners. In relation to the *direction* of contract change, we find that the level of detail of the initial agreements negatively correlates with the likelihood of removing or weakening existing provisions and that prior collaborative experience positively correlates with the likelihood of strengthening of existing provisions or adding of new ones. We also find that prior ties affect the *type* of change in that JV parents prefer to change enforcement provisions more so than the coordination provisions in the contract. Our paper generates new insights on the complementarities between relational governance and transaction costs economics (TCE) perspectives on alliance contracting.

INTRODUCTION

While a great deal of research has examined how exchange partners design formal contracts to govern their collaborations (e.g., Mellewigt et al. 2007, Reuer and Ariño 2007), one key aspect of alliance governance that has received little attention is what drives transacting parties to alter their formal agreements *during* their collaboration (e.g., Reuer, Zollo, and Singh, 2002). There is a great deal of work on initial contract design (e.g., Faems et al. 2008, Reuer & Ariño 2007) and on how parties learn from their alliances and modify subsequent contracts (e.g., Mayer & Argyres 2004). However, we still know relatively little about how transacting parties learn during the course of their collaboration as well as what leads them to make changes to the existing contract *during* the execution of the alliance. This issue is relevant because if exchange partners fail to adapt after the contract is signed, they are more likely to experience problems in successfully completing their alliance. We therefore examine the effect of partners' learning during the collaboration and how this process influences partners' choice in making alterations to the underlying contractual agreement that supports the collaboration.

Managers face an important choice when they decide to deviate from a contract. They must determine whether they simply informally adjust and leave the contract alone, or whether they should update the contract and go through the associated approval process. Interestingly, we know little about *what types* of contractual changes may occur (i.e. what part of the contract is changed and whether it has become more or less detailed) as well as *what factors* are associated with these changes. Generating such insights will help improve our understanding of why repeated collaborations might cause a contract to be more detailed in general, but not necessarily more effective (Ryall & Sampson 2009). They will also address the issue of codification in contract adaptation that partners may not rely on relational contracting when the need for change during the execution of the alliance is present.

There are important tradeoffs regarding formally changing the contract. On the one hand, there are costs and risks involved with changing contracts during the alliance. For instance, exchange parties need to invest time and effect when renegotiating the terms (Ariño et al. 2008, Gil 2009). They might also be concerned that the involvement of additional people who are removed from the transaction itself (e.g.,

lawyers, higher-level managers) can create extra work that might also distract from the collaboration and the specific adaptations they see are needed. Additionally, changing contracts can potentially influence the quality of the relationship by sending a signal of a lack of trust to the parties involved (Ghoshal & Moran 1996, Malhotra & Murnighan 2002), particularly when partners decide to alter provisions about right-based disputes (Lumineau & Malhotra 2011). On the other hand, codifying the changes in the contract could be beneficial as well. Amendments during the execution of an alliance can improve the adaptive capacity of contracts (e.g., Mayer & Argyres, 2004; Parkhe, 1993). Codifying the changes not only makes it easier to deal with personnel turnover during the course of the alliance, it is also useful because it can have a bearing on future collaborations. Since the current contract tends to be used as a template for the firms if they work together again, having it reflect what they actually do helps ensure the new contract will line up with what the firms have learned about working together.

The potential determinants of contract amendments during the execution of an alliance could therefore be affected by several relationship and environmental factors. For example, the instability of alliances by nature requires careful consideration of conflicting forces (such as cooperation versus competition, rigidity versus flexibility, and short-term versus long-term considerations) which can potentially require more need for contract renegotiation (Das and Teng 2000). The complexity of the projects undertaken by transacting parties will not only affect the stability of the relationship but also affect the quality of the relationship which may lead to extensive contract amendments (Ariño and De La Torre 1998). Moreover, the environment that alliances operate in can change the dynamics in deciding when and what to change (Blodgett, 1992).

Among the abovementioned factors that drive contract change, two key perspectives—transaction cost economics (TCE, Williamson 1996, 1999) and organizational learning—in the alliance contracting literature focused on two forces—prior ties and contract detail—in explaining governance change. The extant literature offers ambiguous theoretical predictions as to how alliance partners may renegotiate their initial contracts. It is unclear whether repeated collaborations and detailed or complex initial contracts lead to more or less change. The detail of an initial contract may lead to a smaller amount of change given

that adaptation is less needed when the initial contract is detailed (Ariño et al. 2008, Batenburg et al. 2003, Gil 2009). However, this effect could be the opposite given that the level of detail in the initial contract signals exchange parties' intention of addressing exchange hazards by crafting detailed contracts (e.g., Gulati et al. 2005, Joskow 1988) and that JV partners are more willing to amend the contract during the course of the alliance as a consequence. Similarly, the effect of prior ties on contract change could be twofold. Prior ties may lead to fewer changes in the contract because partner-specific trust and routines will develop when exchange parties collaborate repeatedly and that they reduce the need for contract amendment as a consequence (Gulati 1995, Zaheer et al. 1998). The behaviors of partners are more predictable and they might have developed routines on how to address and deal with potential gaps in the contract. At the same time, previous research also suggests that prior ties can lower the cost of making contract changes and that partners see more value in pursuing such changes in order to better align contracts for future interactions (Fudenberg et al. 1994, Poppo et al. 2008, Radner 1986). Table 1 summarizes the mixed predictions and interpretations that provide the foundations for our study.

*** Insert Table 1 about here ****

We therefore draw from transaction cost economics (TCE) and organizational learning as we seek to study how contract detail and previous collaborative experience between partners (i.e., prior ties) affect the *amount*, *direction* and *type* of change in contractual agreements *during* the execution of an alliance. Similar to Ryall and Sampson (2009), given the lack of clear predictions from existing theory, we do not specify a model with hypothesized parameters to test nor do we intend to make any causal inferences, but instead opt for a more inductive approach and provide detailed descriptive results. Our inductive approach offers exploratory findings that shed light on what managers are doing in practice. We therefore explore data on the details of contractual change in alliances in order to discover nuances about the amount of change itself, as well as the direction and the type of change in alliance contracts.

We use primary data on contracts and contractual changes of international joint ventures (IJV) in China. Chinese IJVs offer an appropriate and interesting context to study contract change for several reasons. The Chinese government has required foreign firms to enter the Chinese market by forming IJVs

with local partners. In exchange for access to the Chinese market, foreign firms provide opportunities for their local partners to learn advanced technologies (Meyer, 2004). Given this institutional background, those IJVs require complex governance given the misappropriation concerns for such technologies (Mjoen and Tallman, 1997; Oxley, 1997). We therefore surveyed those IJV board members or top managers who directly participated in the management of the joint venture in order to capture their experience about governance and contractual alterations when they oversaw the collaboration.

This paper generates new insights into our understanding of the type, amount, and direction of contractual amendments that the literature has neglected in existing theoretical and empirical studies on alliance contracting to date. Our detailed data allow us to examine both weakening or removing of particular clauses as well as the adding or strengthening of clauses. This enables us to investigate more precisely what alliance characteristics are associated with such contract changes in the type of clauses and how different types of provisions are changed. We find that the level of detail in the initial contract and the amount of prior ties between alliance partners are associated with the amount, type, and direction of contract change. We thus contribute to the work on contract design and organizational learning by looking at how learning is codified in the context of longer-term interfirm relationships—an under-explored issue that is theoretically and managerially important.

EMPIRICAL CONTEXT: CHINESE INTERNATIONAL JOINT VENTURES

Since the Chinese government adopted the "reform and open-door policy" in 1978, China has become one of the largest recipients of foreign direct investment (Child & Tse, 2001). However, it is not costless for foreign firms to enter the Chinese market. Those foreign firms, in many industries, can only enter the Chinese market by forming IJVs with local partners, granting their local partners exposures to advanced technologies (Meyer, 2004). Due to the potential advantages and governmental policy, a large portion of foreign investments were entered through the mode of IJVs (Beamish, 1993). Under such an institutional backdrop, several issues may rise for partners intending to cooperate by the means of IJVs.

First of all, the foreign firm's strategic objective is to typically to gain access to the Chinese market in those IJVs, while Chinese firms generally aim to acquire technology and develop management skills (Si & Bruton, 1999; Walsh et al., 1999) as a means of climbing the value chain (Wan and Wu, 2017). Such technologies are often proprietary, and foreign firms may not want to transfer them due to concerns regarding misappropriation (Mjoen and Tallman, 1997). The inherent goal incongruence between foreign and Chinese partners can make their alliances particularly challenging. For example, research on Chinese IJVs found that the Chinese partners want to acquire foreign technology more quickly and effectively, while foreign partners prefer to increase market share in the local market (Yan & Gray, 1994). The goal incongruence may lead to conflicts over time, which increase the need for contract changes between partners.

Moreover, such situations might be further complicated by insufficient legal protections in China. The Chinese legal system not only is incompletely developed, but also lacks consistency in its enforcement (Meyer, 2011; Peng, 2003). This would elevate the transaction cost of doing business in China, including misappropriations of technology given weak protection of intellectual property in China (Zhang et. al., 2007). Under such an environment, foreign investors may have limited safeguards from local partners' opportunistic behaviors. As a consequence, they may seek to use complex and multidimensional contracts to protect their knowledge.

At the same time, *guanxi* (connections) plays an important role in Chinese society. Such informal institutions can substitute for formal institutions, especially when formal institutional supports are absent or unclear (e.g., Tsui, et. al., 2004; Zhang & Keh, 2010). Therefore, foreign partners would value Chinese partners' local knowledge and network, and may need to rely on informal mechanisms, such as mutual trust, to foster collaboration (Beamish, 1993; Dong & Glaister, 2006; Yan & Gray, 1994).

Given those challenges, the collaborations between Chinese and foreign partners require complex governance structures that are often subject to change. This context is, therefore, suitable for a study on contract renegotiation during the execution of alliances. Since China's legal system is far more

unpredictable than in the US or Europe, so changes in contracts (particularly enforcement provisions), for instance, are not likely to be purely in anticipation of court enforcement.

RESEARCH METHODS

Data and Sample

We collected primary data on contractual changes in joint venture agreements in China by using a self-administered survey. In order to identify potential respondents, we first compiled a list of possible participants by using two secondary data sources, namely the China Industrial Enterprise Statistical Database as well as the SDC database. We selected Chinese organizations that had formed joint ventures for the years 2007 through 2011 and obtained the names and contact details for potential respondents that worked for the joint venture. We then matched the respondents with the alumni contacts of a top Chinese business school at which two of the authors worked at the time of the distribution of the survey. Finally, we were able to identify 504 alumni who were in the position to complete the questionnaire.

We decided to opt for a key informant approach and targeted joint venture managers or directors specifically in order to reduce respondent bias. Relying on key informants is the most appropriate way to obtain data on contract changes given the confidential nature of the data as well as the lack of such data in secondary data sources. Given the nature of joint ventures (e.g., high staff turnover, relatively small size, private legal entity, etc.), obtaining responses from multiple participants is difficult (e.g., Kumar et al. 1993) and therefore research on collaborative agreements often uses single key informants (e.g., Klijn et al. 2013, Krishnan et al. 2006, Schreiner et al. 2009, White & Lui 2005). In order to minimize response bias, we constructed a respondent profile and assessed the appropriateness of the informants, which increased our confidence that respondents had managed or evaluated the JV or had directly taken part in its negotiation. Specifically, the tenure of our respondents in the JV was 8.84 years on average, 71% of them were involved in its negotiation, 62% of our respondents were the JV general manager and 45% served on the board of directors of the JV at the time of the administration of the survey.

In order to ensure face validity, we performed several tests to ascertain the quality of the data. First, we performed pre-tests with 12 senior executives from 12 different joint ventures in China. These directors were responsible for establishing joint ventures and served on the board of one or more JVs. In addition, we also carried out 4 interviews with alliance governance scholars. All the survey questions were initially worded in English and then translated into Chinese (Mandarin). We used a third, independent scholar to translate the Chinese version back into English in order to detect any translation issues. As deemed necessary, we made minor modifications to the survey instrument based on these sets of interviews and the process of back-translation.

After the distribution of our survey, we received 128 responses that contributed to a response rate of 25%. Among them, we have 115 responses that provided all the information that we needed about contract changes. This high percentage can be attributed to our efforts taken to identify knowledgeable respondents, the incentive of alumni to contribute, the follow-up procedures of sending reminder emails and making supplementary phone calls, and guarantees of confidentiality as well as access to the study's findings (e.g., Dillman 1978). Given the fact that regional institutions have different effects on JVs (Chan et al. 2010), we have considered the potential non-independence of observations. More specifically, in the regression models presented in the next section, we estimated robust standard errors by clustering residuals by province in order to accommodate for regional institutional differences in China.

We undertook several analyses to ascertain the quality of our primary data. First, we assessed potential non-response bias by investigating differences between early and late respondents under the assumption that late respondents are similar to non-respondents (Armstrong & Overton 1977). Chi-square tests for independence revealed no significant differences between the sectoral or temporal distributions of early and late respondents' IJVs (i.e., χ^2=-1.07, n.s. and χ^2=-1.13 n.s., respectively). In addition, we examined whether significant differences exist across early and late respondents for our key variables, and none of these tests provided evidence that the data are subject to non-response bias (i.e., amount of contractual changes: *t*-value = 1.15, n.s.; contractual detail: *t*-value = -0.90, n.s.; prior ties: *t*-value = -0.21, n.s.). Second, we investigated whether our data are subject to common method bias. We performed

Harman's (1967) single-factor test to identify whether a significant amount of common variance exists in the data (e.g., Podsakoff & Organ 1986). By using unrotated factor analysis and the eigenvalue-greater-than-one criterion, our results generated seven factors and none of them explained a significant part of the variance in the data (i.e., the first factor explained 12% of the variance). To corroborate this result, we also used a general factor covariate technique by adding the first unrotated factor as a control in the multiple regression models (Podsakoff et al. 2003). The inclusion of this factor in our model also showed that the results presented below cannot be attributed to common method bias.

Variables and Measurement

Contract change. The overall construct that we used to capture contractual alterations was derived from Parkhe's (1993) measure of contractual complexity. This measure is well-established in the alliance literature (e.g., Malhotra & Lumineau 2011, Reuer & Ariño 2007) and contains eight provisions (Parkhe, 1993; hereafter see Appendix for the measurement scale). First, we asked respondents to indicate whether or not each of these eight types of contractual provisions was adopted in the JV agreement when the JV was formed. We then asked respondents whether each of these contractual safeguards was added, strengthened, weakened, removed, or maintained over the course of the venture. We constructed a series of dummy variables that each had a score of 1 for a safeguard that was altered, and 0 otherwise. The amount of contract change was a variable ranging from 0-8 to capture changes in these eight provisions for each joint venture (i.e., *amount of contract change*).

We also used this information to measure the type and direction of change. First, we constructed a new categorical measure to recognize the *type* of change, namely whether there was a change in enforcement provisions or coordination provisions. In classifying the types of safeguards, we followed Reuer and Ariño's (2007) categorization of provisions, and these two categories were confirmed using factor analysis of tetrachoric correlations. We observed that the first three safeguards can be termed '*coordination provisions*' and the remaining five safeguards '*enforcement provisions*.' We calculated how many coordination provisions and enforcement provisions are changed, respectively.

We also provided more detail on the *direction* of change for both these provisions. We summated all the revised provisions in cases whether they were either strengthened/added or weakened/dropped. In addition to the amount of changes in each direction, we conducted the ratio of each direction of change by dividing the two counts (i.e., *amount of add/strengthen* and *weaken/drop*) by the total number of change and non-change (i.e., *the ratio of weakened/ dropped* and *the ratio of added/ strengthened*). We also generated four classifications for the substance of change by subcategorizing whether enforcement provisions as well as coordination provisions were either "added or strengthened", or "weakened or dropped".

Finally, we performed several robustness tests for our contract measures by incorporating the suggestion by Malhotra and Lumineau (2011) to leave out alterations of arbitration-related provisions for all the regression models. These supplemental tests revealed similar and significant findings for all the models presented below (available from the authors upon request). Moreover, since the amount, type and direction of change could vary by how many of those 8 safeguards are included in the contract initially, we controlled the number of initial safeguards (i.e., *Initial safeguards)* included when the JV was formed and controlled this variable in our analyses. Therefore, we were able to capture the exposure of contractual provisions to potential change.

Focal Variables. ***Prior ties***. We asked respondents how many prior collaborations were formed with the partner(s) before setting up the focal JV (e.g., Gulati 1995)[1].

Contract detail. We relied on Luo's (2002) measure of term specificity (i.e., *contractual detail*). Reliability test showed that the Cronbach's alpha for this construct was 0.81. We also performed an exploratory factor analysis in order to assess the unidimensionality of this construct. A principal component analysis showed that all four items loaded on a single common factor that explained 64.1% of the variance.

[1] We also tested our models using a log transformation of the variable and the results are similar. We presented our results using the untransformed measurement for the ease of interpretation.

Other Variables. We introduced several other variables in our analyses in order to account for additional factors that can potentially be related to changes in JV agreements or the formal or relational governance mechanisms firms rely upon in their collaboration. First, we included a variable at the *focal firm level* that captures the collaborative experience of the partner, assuming that experience affects partners' ability to realize the need for contractual adaptation (Ariño, Ragozzino, and Reuer, 2008). Our measure for partner experience is the total number of previous JVs established by the responding firm prior to the focal JV (i.e., *JV Experience*).

Moreover, we included six variables that capture the *exchange characteristics*. First, the hold-up problems associated with non-trivial levels of asset specificity can occasion renegotiation (Coles & Hesterly, 1998; Reuer & Ariño, 2002). Our measure for asset specificity was developed by creating an unweighted index based on six Likert-type indicators ranging from negligible to substantial. These items were adopted from Reuer and Ariño (2002). Our measure of asset specificity has a Cronbach's alpha of 0.77. We also conducted an exploratory factor analysis to ascertain the unidimensionality of the construct and noted that all items loaded on a single factor that explains 69.3% of the variance (i.e., *Asset specificity*). Second, we also measured the extent to which JV parents competed in similar end-markets. Such contexts involving inter-partner competition affect the likelihood of conflicts and behavioral uncertainty (e.g., Oxley, 1997; Oxley & Sampson, 2004) and can potentially influence the need to renegotiate contracts after the JV is formed. We summed three five-point Likert-type items that measure the degree to which firms operate in three functional areas. The Cronbach alpha for this construct was 0.81 (i.e., *Similarity*). In supplemental analyses, we also created a multiplicative measure for similarity under the assumption that more overlap in any of these areas (e.g., geographic markets) will increase competition when there is already overlap on another dimension (e.g., customer segments), and we found similar results. A third exchange characteristic is the uncertainty that partners face. In particular, we measured the uncertainty of the JVs external environment given the difficulties to anticipate future contingencies that can ultimately lead to a change in the JV agreement (e.g., Carlson, *et al.*, 2006; Reuer & Ariño, 2002). We relied on Kumar and Seth's (1998) construct by asking respondents to assess the

degree to which five external factors were predictable. We then created a weighted measure of the uncertainty score (i.e., *Uncertainty*). A fourth variable related to deal characteristics measures JV complexity. We adopted a vertical or functional definition of the scope of collaborations (e.g., Kalaignanam et al. 2007, Oxley 1997). Complexity was measured as the total number of the functional activities encompassed by the JV (i.e., *Project complexity*). A fifth variable captured the extent that JV partners can adjust their own behavior to accommodate each other's needs using a three point Likert scale (Pearce 2001). We aggregated these three items and took the mean for our analysis (Cronbach's alpha = 0.67). (i.e., *Flexibility*). Lastly, we also measured the difference in equity between the partners by calculating the absolute difference between the equity percentages among the partners (i.e., *Share differences*).

In addition, we studied alternative *governance characteristics* that may affect contract renegotiation. First, the amount, direction, and types of contract change on the eight provisions mentioned above will likely be related to the inclusion of these provisions in the initial agreement. We asked respondents to select which of the eight safeguards from Parkhe (1993) were included in the initial agreement. We then summed the total number of provisions (i.e., *Initial safeguards*). We also decided to measure the size of the JV board of directors as it can potentially fill contract gaps , thus reducing the need for renegotiation (e.g., Williamson 1991a). More specifically, we asked respondents to answer how many executive and non-executive directors serve on the JV board (i.e., *Board size*).

Lastly, we included several variables that reflect the *nature of the JV*. Joint venture age was measured as the number of years that the JV was in operation at the time of the survey or at the time the JV was discontinued (i.e., *JV age*). In order to assess the scale of JV operations, we asked respondents about the number of employees working for the venture. Due to its significant positive skewness, we used a logarithmic transformation (e.g., *Log employees*). Finally, given that a significant number of collaborations operated in manufacturing, we also controlled for the JV's industry by incorporating a dummy variable for manufacturing (i.e., *Manufacturing JV)*. This variable had a score of 1 if it operated in this sector, and 0 otherwise.

RESULTS

Descriptive Overview

In the descriptive summary provided in Table 2a, we are able to discern several interesting patterns. First, we find that approximately 51% of all the joint ventures in our sample operated in the manufacturing industry. The average joint venture had 746 employees and was approximately 13 years old. The collaborations in our sample were governed by a board of directors that consists on average of 7.28 directors. Parent firms had formed approximately four collaborations in the past on average, which indicates that the firms in our sample were relatively experienced in establishing collaborations. More specifically, fifty percent of the partners had formed a single collaboration in the past whereas two organizations had established more than 50 strategic alliances prior to the establishment of the focal joint venture. In terms of the equity distribution, 23% of JV partners divide equity evenly (i.e., 50-50 JVs). We also investigated whether our measures that capture the contract detail are in line with existing alliance governance studies. The mean level of detail of the agreement in our sample was 3.62 on a scale of 1 to 5. This seems to be in line with other research. For instance, Luo's (2002) equivalent measure averaged 3.07 and Klijn et al. (2013) observed an average score of 3.58.

In relation to our focal variables, we witnessed some intriguing patterns. In 86% of the cases, JV partners have collaborated with one another in the past. This average tends to be higher than other studies that focused on alliance governance. For instance, in Lioukas and Reuer's (2018) sample, in 31% of the cases partners had formed collaborations with each other in the past. Gulati (1995) noted that prior ties averaged 12%. In total JV partners established 1.82 collaborations with each other in the past prior to the focal JV and the maximum number of collaborations formed with one another was 21[2]. We also observed that 5. 13 (out of 8) safeguards were initially put in place in the JV agreement. This average is slightly higher than was observed in a comparative study by Reuer and Ariño (2007), who observed a total of 3.69 safeguards that were implemented in the agreement.

[2] We have performed robustness tests by excluding the outlier (i.e., prior ties equal 21) and found consistent results throughout all models.

*** Insert Table 2a about here ***

Table 2b provides a detailed overview of the contractual revisions. We look at three aspects of contract renegotiation: the amount of change (i.e., how many provisions are changed), the direction of change (i.e., more detail or less detail), and the type of change (i.e., which types of provisions are changed). In relation to the occurrence that renegotiation between JV partners took place, we observed that in 87% of the cases partners decided to renegotiate the initial contract. This average is higher than the results obtained in other alliance studies. For instance, Reuer and Ariño (2002) observed that renegotiation occurred in 20 percent of their cases. Duplat et al. (2018) noted that 36.2% of the JV partners altered their initial safeguards over time. One possible explanation for this difference is that the Chinese context has changed considerably and this has led partners to alter their contracts to adapt to changing conditions.

We also observe that enforcement provisions were changed in 81% of the JVs, while coordination provisions were changed in 82% of the JVs. Partners therefore tend to change both types of provisions in their initial contract. In only 11% of the cases did JV partners decide to change *only* the contractual enforcement provisions or the coordination provisions. It also occurs more frequently that safeguards are strengthened or added (59% of the cases) than they are weakened or dropped (28%) or not changed (13%). This is consistent with previous research that firms generally tend to add more details and make more complete contracts in the following transactions (Ryall and Sampson 2009). Our findings show that existing provisions are adjusted over time and we observe fewer instances of them being removed or weakened as firm seek to align the contract with current exchange processes. In other words, contractual renegotiation is primarily concerned about strengthening or adding clarity to existing provisions, rather than weakening or removing existing ones.

We are able to discern several patterns from our descriptive statistics. First, in case a contract was changed, on average partners altered 3.33 out of the 5 enforcement provisions. For coordination provisions, on average 2.32 out of the 3 provisions are changed. This implies that when partners renegotiate the coordination provisions, they tend to alter multiple provisions accordingly (i.e., periodic

written reports, prompt written notices about any departure of the agreement, as well as the right to examine and audit relevant records). We also decided to explore the direction of change. Transacting parties on average strengthened 2.47 different safeguards if they decide to change the contract. On average, they seem to weaken or drop only 1.17 provision, so these changes are less extensive in terms of the number of provisions altered.

Finally, we also studied the changes in the individual items (see Table 2c). Interestingly, provisions about periodic written reports for all relevant transaction were altered the most (81.1%) and changes in arbitration-related provisions or lawsuit provisions were changed the least (57.1% for either type of provisions respectively). This finding corresponds to Parkhe's (1993) observation that the latter provisions are more stringent, so they are apt to be the more difficult ones to renegotiate.

*** Insert Table 2b & 2c about here ****

Given that we have four different types of change (i.e., adding, strengthening, removing and weakening) and multiple types of contractual provisions, graphical representation of changes is also informative. As shown in Figure 1, we see the likelihood of change for each provision. In the majority of the cases, provisions are strengthened, but in line with our earlier observation, this tends to occur less frequently for arbitration-related provisions as well as lawsuit provisions. Interestingly, Figure 1 shows that not many types of provisions are weakened, with the exception of "prompt written notice of any departure from the agreement" where it tends to occur more frequently. One possible explanation is that during radical change (such as the transitions in the Chinese economy over time), partners might delegate more responsibilities to the JV managers (Reuer et al. 2014) and not require the other parties involved to constantly provide written notice for deviations from the JV agreement. A final observation is that both arbitration-related provisions and lawsuit provisions are less subject to change. While they were occasionally altered, they were never removed.

*** Insert Figure 1 about here***

Table 3 provides a correlation matrix in addition to our descriptive findings. We observe some interesting correlations among the key variables. First, it appears that fewer contractual changes take

place when the initial contracts contain a greater number of clauses and when initial contracts are more detailed (i.e., in terms of how the JV is set up, managed, operated, etc.). These findings seem to support the notion that well-designed and detailed contracts at the outset of the collaboration require partners to renegotiate to a lesser extent. It may also suggest that there is less of a need to formally renegotiate when the initial contract is detailed. Second, we find no correlation between prior ties and contract detail. This finding is interesting because claims in the alliance literature have been made that prior ties reduce the need for a detailed and complete contract at the outset of the collaboration (e.g., Argyres et al. 2007). However, this may also suggest that instead of a sequential effect, prior ties and contract detail may affect contract change separately.

Regressions on the amount of contract change

Given the considerable amount of heterogeneity in the amount, direction and types of contractual change, we also investigated factors that may affect contractual adaptation. We build on Mayer and Argyres' (2004) main proposition that changes in contractual structures are an outcome of learning and that partners' experiences lead to adaptations in agreements from one collaboration to the next. However, learning during the alliance can also potentially affect contractual changes and it would be interesting to identify how these effects influence the nature and amount of adjustments. In the first set of regression analyses below, we first explore the amount of change in contractual structures by performing a negative binomial regression analysis[3]. A post-estimation goodness of fit test for over-dispersion confirmed that this regression technique was appropriate relative to Poisson models that assume the mean and variance of response are the same (1/df Pearson = 1.93)[4]. In all the count models we measured the exposure of provisions to potential change by controlling for the total number of safeguards identified in the initial contract when the JV was formed (*initial safeguards*).

[3] We compared the value of log likelihood and AIC for NB1 and NB2 models and found that NB2 models assuming mean dispersion fits our data better, for all the negative binomial models we used in this paper.

[4] The alpha value for over-dispersion test is not applicable as we clustered our error terms at province lever. Instead, we compute the Pearson chi-squared test using generalized linear models to determine whether Poisson model is the best fit. We found that the (1/df) Pearson value is greater than 1, suggesting that over-dispersion exists.

In Table 4, Model (1) is a baseline model and Model (2) is the full model that includes both focal and other variables. The positive coefficient estimates for prior ties in Model (2) show that partners' previous experiences positively correlates with the amount of change in contract structures (p=0.001). Calculating the incident rate ratio of prior ties in Model (2), we find that for one unit increase in prior ties, the expected amount of contract change would be an increase of 3%, while holding all other variables in the model constant. Model (2) also shows a negative coefficient estimate for contract detail (p =0.011). This suggests that for a one unit increase in contract detail, the expected amount of contract change would decrease by 4%. The finding indicates that negotiating more complete contracts at the outset of collaborations is associated with fewer alterations to the agreement during execution of the collaboration. We discuss the theoretical implications of these findings in the discussion section of the paper.

*** Insert Table 4 about here***

Regressions on the direction of contract change

Tables 5 show the results for the direction of changes in contract structures as well as the ratio of change. We performed bivariate count outcome models that allow for the specification of two correlated count outcomes with one common covariate list using a copula function approach (Xu and Hardin 2016). This regression technique also allows for various link functions (i.e., Poisson or negative binomial) for each dependent variable and provides likelihood-ratio tests to help determine which link function to use. Results obtained by Pearson tests on over-dispersion confirmed that both dependent variables fit better with negative binomial models. In Table 5, Model (3a) and Model (3b) consist of other variables only, while Model (4a) and Model (4b) contain all the variables. We found that the error terms in Model (4a) and Model (4b) are highly correlated (θ = 0.340**), suggesting the appropriateness of the bivariate count model. In Model (5a) and Model (5b), we replicated the full model using seemingly unrelated regressions examining the ratio of weakened or dropped provisions with respect to all directions of change and the ratio of added or strengthened provisions. First, in relation to the number of added or strengthened provisions, we find a positive coefficient estimate for prior ties in Model (4a) (p = 0.000). Similarly, in Model (4b), Prior ties also positively correlate with the number of clauses being dropped or weakened,

although the association is less significant (p = 0.019). The coefficients suggest that for one unit increase in the number of prior ties, 6% more clauses will be added or strengthened, and 9% more clauses will be dropped or weakened. We also find that contract detail is associated with a lesser amount of weakening or dropping safeguards implying that partners who prefer to specify detailed contracts like to keep them specific. The significant coefficient of contract detail in Model (4b) translates to the effect that for a one unit increase in contract detail, 21% fewer clauses will be weakened or dropped. However, the correlation between contract detail and the number of clauses that are being added or strengthened is insignificant.

*** Insert Table 5 about here ****

Regressions on the type of contract change

We also wanted to explore how prior ties and contract detail affect the changes in the types of provisions. In doing so, we utilized Reuer and Ariño's (2007) categorization of enforcement and coordination provisions. While coordination provisions primarily focus on the alignment of partners' expectations, enforcement provisions deal with mitigating opportunism (Reuer and Ariño, 2007). Table 6 shows the results of our tests. Model (6a) and Model (6b) are the baseline models and Model (7a) and (7b) are our full models that include our focal variables. A bivariate count outcome model was performed in order to test for the effect on the types of change. A Pearson test for over-dispersion indicated the need to use Poison models for the changes in coordination models but negative binomial models to generate results for enforcement provisions. We found that the error terms of the above two models (Model (7a) and Model (7b)) are significantly correlated ($\theta = 0.665$, $p<0.001$). Interestingly, prior ties do not have an effect on coordination provisions, but we find a positive coefficient estimate, albeit weak, in the changes of enforcement provisions (p=0.018 in Model (7b)). The significant coefficient suggests that for one unit increase in prior ties, the amount of change towards enforcement clauses will increase by 2%. Contract detail also has a significant effect on enforcement clauses (p=0.034 in Model (7b)). The coefficient translates to an effect that for one unit increase in contract detail, the amount of change towards enforcement clauses will drop by 4%.

Finally, we decided to explore the changes in enforcement provisions in greater detail and study the effects of prior ties and contract detail on both the strengthening and adding of such type of provisions as well as the extent that these types of safeguards are weakened or dropped. We performed a bivariate count model in order to show their effects and we presented our results in Models (8a) and (8b). First, we find that prior ties have a significant positive effect on the number of added or strengthened provisions ($p < 0.001$ in Model (8a)). Specifically, for one unit increase in prior ties, the number of enforcement clauses added or strengthened will increase by 7%. We find a negatively significant coefficient for contract detail on the dropping or weakening enforcement provisions ($p=0.046$ for Model (8b). Indeed, for a one unit increase in contract detail, the number of enforcement clauses weakened or dropped will decrease by 12%. This suggests that partners who negotiated detailed contracts at the outset of the collaborations may not remove these types of provisions and keep the contract detailed. At the same time, we do not find a significant correlation between contract detail and adding/strengthening provisions.

*** Insert Table 6 about here ****

Other factors that may be correlated with contract change

There are several intriguing findings in relation to variables used in the models to capture other factors that may be correlated with contract change. The focal firm's experience with JVs does not seem to be correlated with the amount of change. Particularly, collaborating with more experienced parent firms is associated with fewer instances of dropping or weakening contract clauses. In relations to governance characteristics, we find that the number of initial safeguards adopted is negatively associated with the amount of change. We also find in Table 5 that the initial safeguards negatively correlate with the number of provisions that are weakened or dropped but positively correlate with those that are added or strengthened. These findings further support the idea that those partners' who specify more complete contracts tend to renegotiate less (Batenburg et al. 2003) but also indicate that they prefer to keep their contract detailed and update them as necessary, presumable to keep them aligned with actual processes used in the JV.

In terms of exchange characteristics that we examine in Table 4, we find that the hold-up concerns associated with asset specificity are correlated with more extensive contractual changes. Interestingly, the inherent exchange hazards associated with asset specificity affect partners' desires to match the contract structure with the level of dedicated investments, because it affects both directions of change in a positive way. We do not observe similar patterns for the other exchange specific attributes that we studied in our models. While these characteristics do not affect the amount of contractual change, they do have an influence on the direction of change. Several findings are noteworthy. First, when partners face difficulties in anticipating future contingencies due to the turbulent environments in which their JV operates, they also avoid activities that may involve strengthening or adding new provisions. One possibility is that the environment makes the exact specification of safeguards difficult. In addition, such conditions would also affect the cost and risk of renegotiations given that these conditions create goal misalignment and exchange hazards (e.g., Carson, *et al.*, 2006). Moreover, environmental uncertainty does not have an effect on the removal of contractual provisions. This reinforces the point that there is difficulty in specifying the contract in the presence of uncertainty.

Project complexity is negatively correlated with the number of weakened or removed provisions, but positively correlated with the strengthening of contracts. In contrast to uncertainty, when project complexity is high, partners need to understand during the course of the alliance whether the contract is misaligned with the activities that are undertaken in the focal JV. Yet, the existing contract structure is not weakened under these conditions as can be seen in Table 5. Partners may enhance the contract structure under these conditions in order to align the JV agreement with project complexity. This finding reinforces that partners learn during their alliance and opt to change contract structures so as to minimize exchange hazards. Besides, when organizations become more complex due to their size, there tends to be a higher need for adding or strengthening the provisions. One potential explanation is that partners face higher risks in such kind of collaborations and make the contract more extensive in order to reduce risk. In particular, partners may tend to focus on renegotiating the enforcement provisions under these conditions.

Finally, we also find that flexibility[5] affects changes in contracts. We find that partners that are flexible also experience a larger amount of contract change in their JVs, although this effect is marginal. However, while flexibility does correlate with adding or strengthening provisions, particularly enforcement provisions, it does not have an effect on weakening or dropping provisions. Thus, while there might be a need for weakening or dropping clauses in the contract, partners may not do that even though they are flexible to cope with misalignment in case contracts are too detailed, despite that flexibility provides partners the opportunity to renegotiate underspecified contracts and help them strengthen and add provisions more extensively.

DISCUSSION

Over the last few decades, a significant body of alliance governance research has focused on the design of contractual agreements to support collaborations (e.g., Mellewigt et al. 2007, Reuer and Ariño 2007, Ryall and Sampson 2009, 2016). While these studies have generated a significant improvement in our understanding how partners align contracts to the underlying transaction attributes (Mayer and Argyres 2004, Parkhe 1993), and how repeated collaborations help partners to make changes from one contract to the next (e.g., Mayer and Argyres, 2004), less is known on how partners adjust their contract structures *during the focal* alliance (Reuer and Ariño 2002; Reuer, Zollo, and Singh, 2002). We believe that there are structural differences between contractual changes that happen *between* successive alliances as well as *within* an existing alliance. While in both cases, the partners face challenges in coming to an agreement, in the case of renegotiation, partners dedicate time and effort to change the underlying contract structure during the course of the alliance. Previous studies looking at changes between successive alliances focus on the addition or dropping of certain clauses (Ryall & Sampson 2009). However, in within-alliance renegotiation, we are still able to observe a significant amount of change, including modifying existing clauses (in both directions). This finding might be context specific as it is

[5] Flexibility may only capture the relationship between partners and does not affect any governance choices. However, the exclusion of flexibility does not affect our results.

more likely to be found in longer-term alliances in which the formal contract plays an important role, such as JVs. Additionally, the need for change may be greater in a turbulent environment such as China was during the time the JVs in our sample were operating.

We observe several patterns in relation to the *amount* of change. First, we find that transacting parties with prior collaborations made more alterations to the contract during the alliance itself. This finding is in line with the literature that collaborative experience lowers renegotiation costs and risks when partners have formed alliances in the past. It may also suggest that the extent to which the formal contract is renegotiated is affected by the partners' interest in using the contract as a planning and tracking device (Llewellyn 1931) that can be an effective template for their future deals (Das and Teng 1998, Poppo and Zenger 2002). The knowledge that partners gain by collaborating in the focal JV may help them to resolve collaboration issues, and strategic solutions are incorporated into the JV agreement to increase the chances that they are incorporated into future collaboration agreements. This finding may also support Mayer and Argyres's (2004) claim that adjusted contracts serve as a repositories of knowledge as they codify the partners' knowledge about efficient ways to collaborate in the future. Our results, however, are different from the proposition that familiarity, trust, and learning generated from prior ties reduce the need for contractual renegotiation (e.g., Gulati 1995, Gulati and Singh 1998, Uzzi 1997). In addition, our findings conflict with arguments that strengthening formal mechanisms may signal suspicion and a lack of belief in partners' goodwill or competence so that partners with prior ties tend to renegotiate less extensive agreements (Ghoshal and Moran 1996, Malhotra and Murnighan 2002).

Second, we find that the level of contractual detail is negatively associated with the number of contract alterations. This finding is in line with the idea that well-design contracts provide the benefits of better safeguarding and adaptive capacity (Parkhe, 1993). Detailed, and more complete, contracts specifying alternatives may be able to align partners' expectations more adequately (Mayer & Argyres, 2004). More detailed alliance contracts are correlated with fewer contractual changes, potentially because transacting parties may have dedicated more time and effort to specify roles and responsibilities, reducing the amount of adjustment during the execution stages of the collaboration.

In addition to the *amount* of change, we also observe that the initial contract structure is associated with the *direction* of making changes—by either adding or removing terms. Our results suggest that while partners with initially detailed contracts make fewer changes in general, they may do so because they are less willing to remove the extent terms and provisions, not because they are unwilling to add or strengthen them. These findings suggest that partners took time to carefully consider what provisions they should include initially, and thus they are less likely to remove detail. These results also indicate that previous collaborative experiences between partners could probably reduce renegotiation costs and risks and that they facilitate contract changes. Contrary to the relational governance argument, we found that prior ties are associated with more adding and strengthening of contract clauses—making the contract more detailed. Although our analysis is purely correlational, this finding is consistent with previous research suggesting that prior ties lead to a more detailed contract (e.g., Ryall and Sampson, 2009), or a more customized contract (Poppo and Zenger 2002). The findings are also in line with our earlier conjecture that transacting parties strengthen their JV agreements because they wish to keep track of their learning about the focal JV transaction and use their contract as a repository of knowledge and information for future collaborative endeavors (Mayer and Argyres, 2004).

Finally, we draw on prior work (e.g., Macaulay 1963) on alliances that highlight important differences between the *type* of provisions, namely enforcement versus coordination (e.g., Reuer & Ariño, 2007). Our results indicate that contractual alterations by parties with more collaborative experience are associated with minor process-based (coordination) adjustments, but with more extensive changes that involve enforcement provisions. This is consistent with the findings by Ryall and Sampson (2009), who argued that clauses relating to output specifications tend to increase when partners have collaborations in the past, while those concerned with allocating intellectual property rights decrease. We also find that the existence of detailed prior contracts does not affect coordination clauses, instead, it is correlated with fewer changes to enforcement clauses. This finding is consistent with our speculation that adaptation is less needed when the initial contract is detailed (Ariño et al. 2008, Batenburg et al. 2003, Gil 2009), particularly for extensive changes regarding enforcement provisions.

Limitation and future research

Since we rely on a cross sectional survey to explore contract renegotiation during the execution of alliances, we have limited implications for any causal relationships. Therefore, it is difficult for our study to discover the rationales behind the patterns we find. First, our findings that prior ties are positively associated with more changes seem to run contrary to Ryall and Sampson (2009)'s conclusion that prior ties could have the effect of reducing the use or level of detail of certain clauses. However, they did not claim that this negative relationship was an effect that would be pertinent in all cases and instead, they suggested that we needed more work to determine when this result would emerge compared to seeing no effect of prior ties or even having prior ties lead to more detailed contracts. Relatedly, they recently suggested that while prior ties reduce the ambiguity in the new transaction, clauses about action requirements still prevail, while clauses about deliverable requirements are not favored (Ryall and Sampson 2016). Future work could build on our study and Ryall and Sampson's (2009, 2016) work to further explore the mechanisms and boundary conditions on when and how prior ties might affect different kinds of contract clauses.

Second, our findings that prior ties are associated with changes towards enforcement clauses instead of coordination clauses seem to go against the rationales suggested by relational governance scholars. Relational governance is concerned with how the relationship between the parties can lead to trust, which can serve as an effective lubricant to facilitate inter-firm collaboration (Faems et al. 2008, Gulati 1995, Hoetker and Mellewigt 2009) by reducing moral hazard. One possible explanation for our finding could be that the learning effects that partners gain by collaborating repeatedly are likely to enrich their knowledge of how they work together well (Dekker and Van den Abbeele 2010), which may facilitate informal adaptation to facilitate coordination and/or the routines they develop based on their joint experience may be more flexible in nature.

Alternatively, it also seems that the shadow of the future weighs heavily on parent firms' renegotiation of enforcement provision given that they both value the need for future collaborations and want to minimize opportunism. Hence, contracts are a repository of knowledge, but specifically in

relation to enforcement because of the value of enforcement provisions in a contract template. Firms tend to use the prior contract as a template for the next transaction because it reflects key elements of the relationship such as enforcement issues. The nuances of how the firms will coordinate are often transaction specific, so there is less need to keep these updated in terms of maintaining a strong contract template for interactions between these two parties. This finding is also at odds with Mayer and Argyres (2004), but the contracts they examined were statements of work that did not include enforcement provisions (enforcements provisions were addressed in a master agreement). This suggests that international JVs are likely to be different from smaller development alliances in important ways that need to be carefully considered. Therefore, future research could help explore which mechanisms could explain our findings, and whether contract adaptation in JVs are different from that in none-equity involved alliances. In addition, future work could more carefully categorize alliances and seek to be more precise about the types of alliances to which different results may generalize.

Moreover, one may wonder why JVs with prior ties were more focused on adding or strengthening enforcement clauses which are not typically directly related to the day-to-day activities of the JV but are important in terms of dealing with issues that might arise in the future. The firms can use learning and trust from prior ties to adapt their operations and coordinate activities, but they need more formality to ensure things like dispute resolution are addressed. This provides interesting new insight into the potential complementarity between findings from research using relational governance and TCE perspectives. In some areas, firms evidently prefer to document what they are doing (such as enforcement clauses), while in other parts of the contract prior ties may lead to the ability to adapt informally without changing the contract. Future research can also explore this interesting interaction of relational governance and TCE when examining governance adaptation.

Lastly, some aspects of our findings could be context specific. The Chinese context is unique since trust is unlikely to be sufficient as a safeguard and thus the benefits of trust may manifest in different ways compared a small contractual alliance in a country like the United States. The institutional barriers in the Chinese market are nontrivial (Chang and Wu, 2014). The JVs are established under the

expectations of Chinese government that Chinese firms can learn proprietary knowledge from foreign firms. Although those incumbents try to learn from entrants and build on their technologies, they may pose threat to the entrants (Giustiziero, Kaul, & Wu, 2019). Even though foreign firms can thus gain access to the Chinese market, their concerns regarding misappropriation are significant. Therefore, the pattern that exchange parties prefer changing enforcement clauses in our sample, which is incongruent with prior work, could be largely about context. JVs that are established in a constantly changing country like China may require more adaptation than shorter-term traditional contractual alliances in a single country.

Contributions

We contribute to existing theory and empirical work by conducting one of the first examinations of when and how firms make changes to their existing contracts—an important adaptation question in TCE that has received little theoretical or empirical attention. By contrasting prior findings from TCE and organizational learning, we find that prior ties are associated with a greater likelihood of making a change to a contract during execution, which provides evidence of short-term learning within a single transaction, while prior work has focused more on how prior ties affect the design of future contracts (e.g., Mayer & Agyres, 2004; Ryall & Sampson, 2009).

Our data, however, allow us to move beyond simply the presence of a change versus no change, in order to look at (1) what contract terms are changing, and (2) how those terms are changing (specifically adding detail versus removing detail). We show that, counter to prevailing wisdom, firms in JVs are more likely to make changes to contracts in order to enhance enforcement related issues in the presence of longer-term relationships, even within a developing market with relatively weak enforcement institutions such as China. Consistent with prior work by Mayer and Argyres (2004), our findings are in accord with a perspective that foresight can be limited and firms go through a learning process that involves making mistakes when working with new partners. But given the longer-term nature of international JVs, firms incorporate their learning into the current contract rather than waiting for the next contract.

Finally, we shed light on how JVs in China make adaptations based on the experience of the parties involved and the details in the JV contract. We explored a unique context where a large amount of renegotiation took places (87% in our sample). China has been a turbulent policy and market environment, and the firms in our sample have had to deal with that environmental uncertainty while managing complex, long-term international JVs. The results presented here also give us insight into how firms navigate this kind of complex landscape by using JVs between foreign and domestic firms and adapting their contractual foundations over time. Moreover, our findings also help shed light on policy making in dynamic markets like China where competition between incumbents and entrants (both domestic and foreign) could be shaped by institutions (Chang and Wu, 2014; Giustiziero et al. 2019).

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TABLE 1
Summary of previous research on the effects of contract detail and prior ties on contract change

Contract detail is associated with more contractual change because:	**Prior tie is associated with more contractual change because:**
• Transacting parties prefer to integrate more detail in the contract so that it actually reflects what they do in their collaboration as agreements will always be incomplete (Anderson and Dekker 2005). • The level of detail of the initial contract acts as a signal about parties' future intentions in regards to their incentives to address the salient hazards and coordination challenges that were identified during their collaboration (e.g., Gulati et al. 2005, Joskow 1988).	• Prior ties streamline the renegotiation process in a smooth and collaborative manner and thus make it more probable for collaborators to alter their contractual agreements (Bradach & Eccles 1989). • Prior ties are frequently related to future business opportunities between the partners (e.g., Poppo et al. 2008). While the shadow of the future might support continuity of the focal collaboration in the face of gaps in contracts that emerge, parties might also be more inclined to align contracts with the existing exchange hazards because they see the value of preparing for future interactions (Fudenberg et al. 1994, Radner 1986).
Contract detail is associated with less contractual change because:	**Prior tie is associated with less contractual change because:**
• Initially well-specified and often times more complete governance structures provide the benefits of better safeguards and adaptive capacity (Mayer & Argyres, 2004; Parkhe, 1993); • It is difficult for alliance parties to reach an agreement and to codify a greater number of more detailed clauses when contracts are already well specified (Batenburg et al. 2003).	• Previous collaborative experience leads parties to develop mutual trust (Gulati 1995) and this increases their engagement in extensive communication as well as informal information sharing (Poppo et al. 2008, Ring & Van de Ven 1994). • Repeated interactions enable transacting parties to accumulate knowledge about each other's internal structures and decision-making styles (Doz 1996) which lead to the development of partner-specific routines about the way they share information (Cyert & March 1963, Zollo et al. 2002). • Strengthening formal mechanisms may signal suspicion and a lack of belief in partners' goodwill or competence (Ghoshal and Moran 1996, Malhotra & Murnighan 2002).

TABLE 2a
Descriptive analysis for JV Characteristics

	Mean	SD	Minimum	Maximum
Amount of change	4.91	3.03	0	8
Prior ties	1.82	2.53	0	21
Presence of prior ties between partners	0.86	0.18	0	1
Contract detail	3.62	0.77	1	5
JV experience	4.30	8.00	0	52
Asset specificity	3.27	0.56	1	5
Similarity (multiplicate measure)	27.92	28.07	3	125
Operate in similar customer segments	2.78	1.21	1	5
Operate in similar product segments	3.06	1.31	1	5
Operate in similar geographic segments	2.43	1.15	1	5
Uncertainty	2.72	1.87	1	21.50
Project complexity	3.81	2.49	1	7
Flexibility	3.55	0.53	2	5
Share differences	23.45	28.39	0	95
Initial safeguards	5.13	2.83	0	8
Board size	1.98	0.44	0	3.40
Number of directors on the JV board	7.28	4.13	1	36
Age	12.77	7.57	0	33
Log employees	4.48	2.01	0.69	10.12
Number of employees working in the JV	745.62	2718.30	2	25,000
Manufacturing JV	0.51	0.50	0	1

TABLE 2b
Descriptive Analysis for JV Agreements

	Mean	SD	Minimum	Maximum
Occurrence of changes in:				
Contractual agreement	0.87	0.34	0	1
Enforcement provisions	0.81	0.40	0	1
Coordination provisions	0.82	0.38	0	1
Occurrence that safeguards were:				
either strengthened or added	0.59	0.49	0	1
either weakened or dropped	0.28	0.45	0	1
If renegotiation took place (in 87% of the cases)				
# of contractual changes	5.65	2.53	1	8
# of changes in enforcement provisions	3.33	1.84	0	5
# of changes in coordination provisions	2.32	0.96	0	3
# of provisions that are strengthened or added in relation to:				
Contractual agreement	2.47	2.54	0	8
Enforcement provisions	1.40	1.68	0	5
Coordination provisions	1.07	1.12	0	3
# of provisions that are weakened or dropped in relation to:				
Contractual agreement	1.17	2.16	0	8
Enforcement provisions	0.72	1.41	0	5
Coordination provisions	0.45	0.91	0	3

TABLE 2c
Descriptive Analysis for Types of Individual Safeguards

	Type of provision	Mean	SD
If renegotiation took place, occurrence of changes in:			
Clause 1. Periodic written reports of all relevant transactions	Coordination	0.81	0.39
Clause 2. Prompt written notice of any departure from the agreement	Coordination	0.79	0.41
Clause 3. The right to examine and audit all relevant records through a firm of Certified Public Accountants	Coordination	0.71	0.46
Clause 4. Designation of certain information as proprietary and subject to confidentiality provisions	Enforcement	0.77	0.42
Clause 5. Non-use of proprietary information even after termination of the agreement	Enforcement	0.81	0.39
Clause 6. Termination provisions for the agreement	Enforcement	0.61	0.49
Clause 7. Arbitration clauses	Enforcement	0.57	0.50
Clause 8. Lawsuit provisions	Enforcement	0.57	0.50

TABLE 3
Descriptive Statistics and Correlation Matrix

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
1. Amount of changes	1.000														
2. Prior ties	0.109	1.000													
3. Contract detail	-0.171	-0.063	1.000												
4. JV experience	-0.059	0.143	0.034	1.000											
5. Asset specificity	0.101	-0.016	0.191	0.102	1.000										
6. Similarity	0.121	-0.047	0.046	0.129	0.271	1.000									
7. Uncertainty	0.098	-0.062	-0.090	-0.084	0.051	-0.019	1.000								
8. Project complexity	-0.052	0.169	0.015	0.211	0.066	-0.115	-0.120	1.000							
9. Flexibility	0.106	0.069	0.167	0.106	0.144	0.140	0.217	-0.020	1.000						
10. Share differences	0.016	0.075	-0.008	-0.198	-0.025	0.019	0.219	0.096	0.050	1.000					
11. Initial safeguards	-0.306	0.045	0.179	-0.042	0.017	-0.080	-0.030	0.065	-0.009	-0.015	1.000				
12. Board size	0.164	0.135	-0.087	-0.009	-0.029	-0.039	0.128	-0.050	-0.002	-0.143	-0.122	1.000			
13. Age	0.147	-0.080	-0.011	-0.082	0.054	0.159	0.004	-0.152	0.107	-0.186	-0.111	0.238	1.000		
14. Log employees	0.023	0.137	-0.132	0.017	-0.008	-0.049	-0.086	0.035	-0.141	-0.048	0.003	0.302	0.206	1.000	
15. Manufacturing JV	-0.074	-0.009	-0.172	0.013	0.088	-0.125	-0.102	0.178	-0.044	0.168	-0.029	0.005	0.099	0.281	1.000

TABLE 4
Negative binomial regression on the amount of contract change [a]

VARIABLES	Model (1)	Model (2)
Prior ties		0.027***
		(0.008)
Contract detail		-0.037**
		(0.014)
Focal firm:		
JV experience	-0.009	-0.010
	(0.007)	(0.007)
Exchange characteristics:		
Asset specificity	0.019†	0.029*
	(0.011)	(0.012)
Similarity	0.002	0.002
	(0.002)	(0.002)
Uncertainty	0.008	0.002
	(0.014)	(0.013)
Project complexity	0.001	0.004
	(0.001)	(0.003)
Flexibility	0.030	0.037†
	(0.021)	(0.021)
Share differences	0.001	0.001
	(0.003)	(0.003)
Governance characteristics:		
Initial safeguards	-0.063**	-0.060**
	(0.021)	(0.020)
Board size	0.161	0.126
	(0.132)	(0.120)
Nature of the JV:		
Age	0.005	0.007
	(0.009)	(0.008)
Log employees	0.025	0.018
	(0.039)	(0.036)
Manufacture	-0.159	-0.208†
	(0.102)	(0.111)
Constant	0.680†	1.027*
	(0.405)	(0.419)
Ln (α)	-1.473***	-1.587***
	(0.374)	(0.442)
Log-likelihood	-272.016	-269.770
χ^2	100.75	1033.89

[a] N = 115. Hubert/ white/ sandwich errors clustered at province level appear in parentheses. *** p<0.001, ** p<0.01, * p<0.05, † p<0.10

TABLE 5
Regressions on the direction of change

	# of added or strengthened clauses		# of dropped or weakened clauses		Ratio of added/ strengthened clauses	Ratio of dropped/ weakened clauses
VARIABLES	Model (3a)	Model (4a)	Model (3b)	Model (4b)	Model (5a)	Model (5b)
Prior ties	---	0.054***	---	0.084*	0.009	0.002
		(0.014)		(0.036)	(0.011)	(0.009)
Contract detail	---	-0.023	---	-0.240***	0.002	-0.010
		(0.025)		0.050	(0.009)	(0.007)
Focal firm:						
JV experience	0.004	-0.007	-0.043*	-0.048*	0.001	-0.002
	(0.007)	(0.007)	(0.020)	(0.022)	(0.003)	(0.003)
Exchange Characteristics:						
Asset specificity	0.084*	0.092**	0.064	0.138***	0.016*	0.012†
	(0.038)	(0.032)	(0.042)	(0.301)	(0.008)	(0.067)
Similarity	0.002	0.002	0.004	0.002	-0.001	-0.001
	(0.003)	(0.003)	(0.010)	(0.101)	(0.001)	(0.001)
Uncertainty	-0.124†	-0.121*	-0.177	-0.263†	-0.015	-0.231†
	(0.076)	(0.061)	(0.148)	(0.158)	(0.015)	(0.001)
Project complexity	0.137*	0.132**	-0.073	-0.124†	0.036***	0.011
	(0.046)	(0.049)	(0.066)	(0.078)	(0.011)	(0.009)
Flexibility	0.079*	-0.080	-0.133	0.001	0.038*	0.009
	(0.035)	(0.043)	(0.153)	(0.013)	(0.017)	(0.014)
Share differences	-0.002	-0.003	-0.004	0.001	-0.001	0.013†
	(0.005)	(0.005)	(0.006)	(0.006)	(0.001)	(0.001)
Governance characteristics:						
Initial safeguards	0.083**	0.083**	-0.241**	-0.247***	0.032***	-0.022**
	(0.027)	(0.029)	(0.067)	(0.066)	(0.009)	(0.008)
Board size	0.052	-0.030	0.373	0.382	-0.033	0.027
	(0.213)	(0.202)	(0.383)	(0.302)	(0.064)	(0.052)
Nature of the JV:						
Age	0.038†	-0.043*	-0.051†	-0.022	0.009*	-0.003
	(0.020)	(0.019)	(0.031)	(0.032)	(0.004)	(0.003)
Log employees	0.145***	0.123**	0.112	0.074	0.033*	-0.003
	(0.041)	(0.042)	(0.106)	(0.012)	(0.014)	(0.012)
Manufacture	-0.426†	-0.417**	-0.480	-0.762	-0.108†	-0.037
	(0.177)	(0.150)	(0.435)	(0.014)	(0.058)	(0.048)
Constant	-3.581***	-3.302***	1.666	2.110	-0.821**	0.151
	(0.723)	(0.711)	(2.199)	(2.356)	(0.272)	(0.222)
Ln (α)	-0.403	-0.488	-0.403	-0.488	---	---
	(0.320)	(0.344)	(0.320)	(0.344)	---	---
Log Pseudolikelihood	-316.776	-312.618	-316.776	-312.618	---	---
R^2					0.338	0.153

[a] N = 115. Hubert/ white/ sandwich errors clustered at province level appear in parentheses. *** p<0.001, ** p<0.01, * p<0.05, † p<0.10

TABLE 6
Regression on changes in coordination provisions and enforcement provisions

	# of changes in coordination clauses		# of changes in enforcement clauses		# of added / strengthened enforcement clauses	# of dropped/ weakened enforcement clauses
VARIABLES	Model (6a)	Model (7a)	Model (6b)	Model (7b)	Model (8a)	Model (8b)
Prior ties	---	0.011	---	0.022*	0.066***	0.073
		(0.009)		(0.009)	(0.017)	(0.054)
Contract detail	---	-0.018	---	-0.038*	-0.015	-0.122*
		(0.011)		(0.018)	(0.029)	(0.061)
Focal firm:						
JV experience	0.002	0.002	-0.007	-0.008	-0.009	-0.045***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.010)	(0.014)
Exchange Characteristics:						
Asset specificity	0.005	0.009	0.021	0.031*	0.110***	0.105*
	(0.012)	(0.126)	(0.013)	(0.013)	(0.035)	(0.043)
Similarity	0.001	0.001	0.001	0.001	0.003	-0.003
	(0.001)	(0.001)	(0.002)	(0.002)	(0.003)	(0.007)
Uncertainty	-0.004	-0.007	0.001	-0.005	-0.105	-0.139
	(0.013)	(0.014)	(0.015)	(0.154)	(0.084)	(0.155)
Project complexity	-0.005	-0.007	0.009	0.006	0.159**	-0.001
	(0.018)	(0.018)	(0.029)	(0.032)	(0.064)	(0.001)
Flexibility	0.056†	0.061	0.058*	0.065**	0.056	0.027
	(0.034)	(0.039)	(0.025)	(0.025)	(0.064)	(0.094)
Share differences	-0.001	0.001	0.001	0.001	-0.006	0.004
	(0.002)	(0.001)	(0.003)	(0.003)	(0.004)	(0.007)
Governance characteristics:						
Initial safeguards	-0.024	-0.023	-0.067**	-0.065**	0.061†	-0.232**
	(0.015)	(0.014)	(0.021)	(0.025)	(0.033)	(0.077)
Board size	0.052	0.390	0.202	0.176	0.144	-0.009
	(0.118)	(0.113)	(0.137)	(0.126)	(0.196)	(0.053)
Nature of the JV:						
Age	0.120*	0.013*	0.005	0.006	0.047†	-0.043†
	(0.056)	(0.005)	(0.009)	(0.009)	(0.026)	(0.025)
Log employees	0.027	-0.001	0.037	0.030	0.118***	0.014
	(0.246)	(0.024)	(0.036)	(0.337)	(0.028)	(0.103)
Manufacture	-0.030	-0.055	-0.223†	-0.027*	-0.053**	-0.239
	(0.089)	(0.086)	(0.121)	(0.130)	(0.193)	(0.556)
Constant	-0.142	0.023	-0.230	-0.118	-4.519**	0.996
	(0.343)	(0.038)	(0.410)	(0.049)	(0.808)	2.434
Ln (α)	-1.147***	-1.270**	0.811***	-1.270**	---	---
	(0.372)	(0.501)	(0.034)	(0.501)	---	---
Log Pseudolikelihood	-354.093	-352.559	-354.093	-352.559	-258.421	-258.421

[a] N = 115. Hubert/ white/ sandwich errors clustered at province level appear in parentheses. *** p<0.001, ** p<0.01, * p<0.05, † p<0.10

FIGURE 1
Overview of type of change for each contractual safeguard

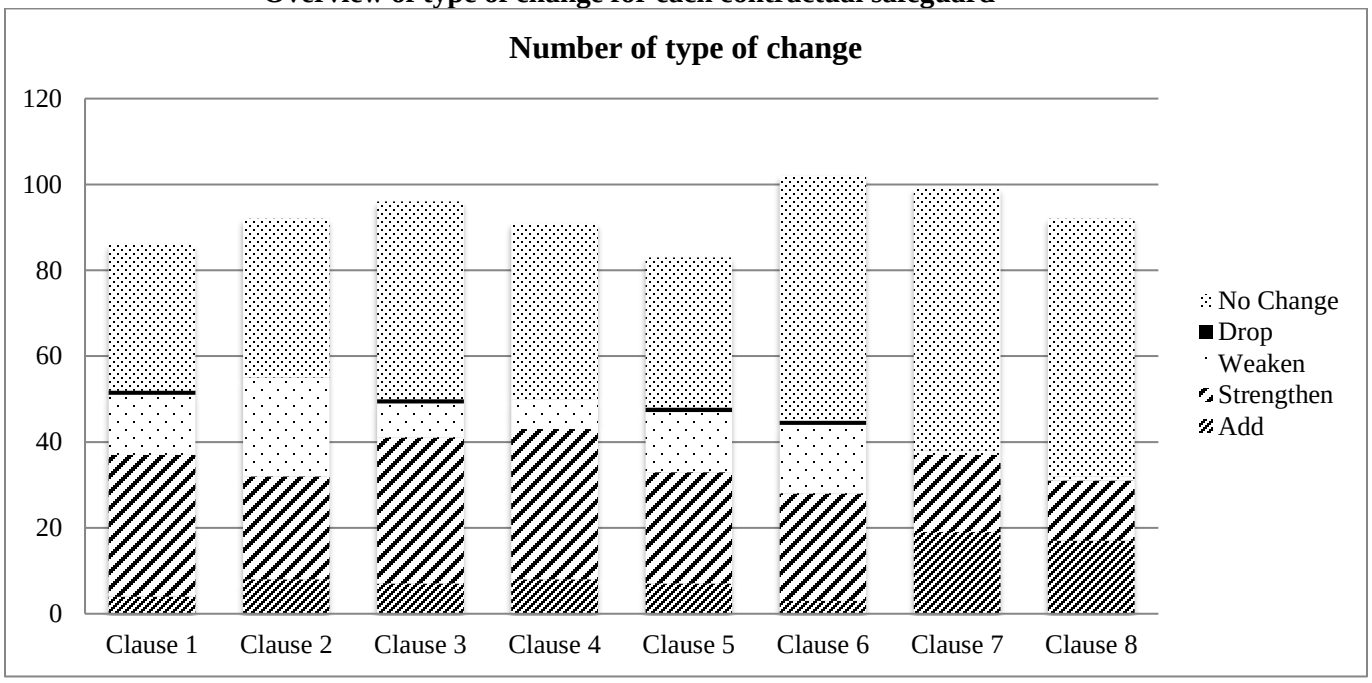
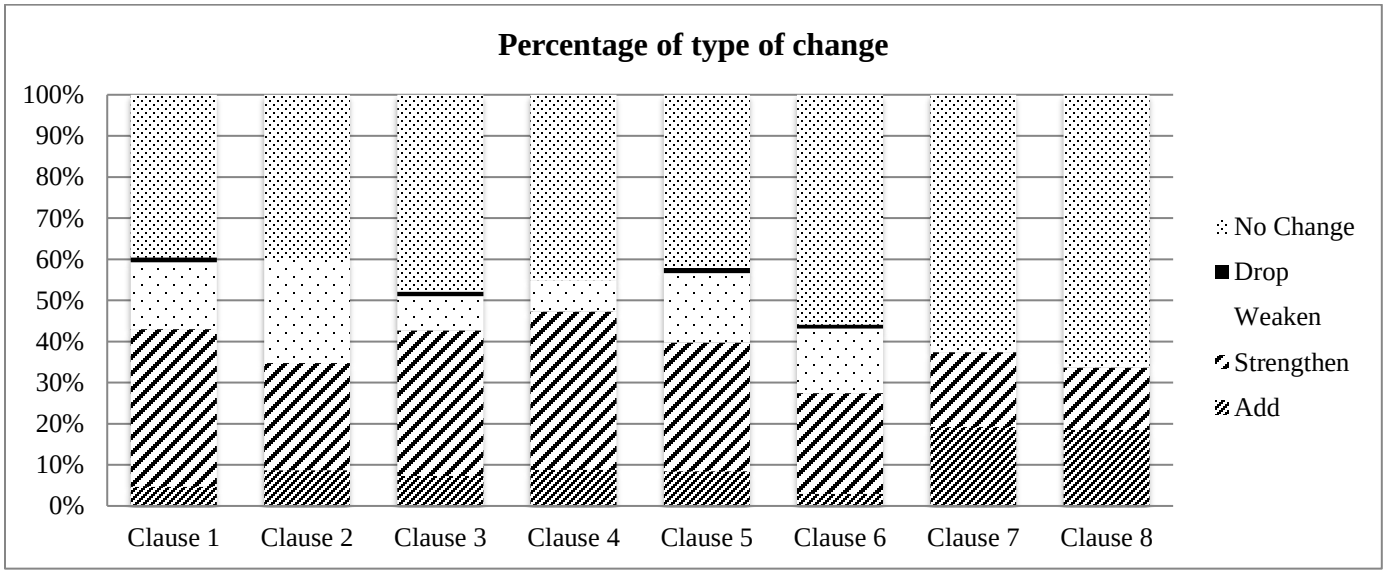


Figure 2: Overview of percentage likelihood of change for each contractual safeguard



Coordination provisions: Clause 1: Periodic written reports of all relevant transactions; Clause 2: Prompt written notice of any departure from the agreement; Clause 3: The right to examine and audit all relevant records through a firm of Certified Public Accountants. *Enforcement provisions*: Clause 4. Designation of certain information as proprietary and subject to confidentiality provisions; Clause 5: Non-use of proprietary information even after termination of the agreement; Clause 6: Termination provisions for the agreement; Clause 7: Arbitration clauses; Clause 8: Lawsuit provisions

APPENDIX: MEASUREMENT SCALES

Contract change. Respondents were asked, "Which safeguards listed below were put into the formal agreement of this venture? Whether each of these contractual safeguards was added, strengthened, weakened, removed, or maintained over the course of the venture (tick all that apply)"

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
8. Lawsuit provisions

Contract detail. Respondents were asked, "When the joint venture was formed, to what degree did the contract specify relevant terms and clauses concerning the following:"

1. How the joint venture will be set up
2. How the JV will be managed and operated
3. How partners will cooperate and resolve conflicts
4. How the partners will handle termination

Asset specificity. Respondents were asked to determine the resource requirement regarding the following six items. The five-point scale was anchored at either extreme with the labels "neglectable" and "substantial".

1. Our investment in dedicated personnel specific to this venture is…
2. Our investment in dedicated facilities to this venture is…
3. 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…
4. The time required to learn about our partner's style has been…
5. The time and effort of coordination with our partner required to perform our tasks in the venture have been…
6. If this venture were to dissolve, our non-recoverable investments in equipment, people, etc. would be…

Similarity. Respondents were asked to indicate, on a five-point scale ranging from "strongly disagree" to "strongly agree," the following question: "How similar were your firm and your partner(s) before the joint venture in terms of…?" They were asked this question for the following three dimensions of market overlap, which were then multiplied or summed to create an overall measure of market overlap:

1. Products/services offered
2. Geographic markets served
3. Customer segments served

Environmental uncertainty. Respondents were first asked to indicate the degree to which the external environment was predictable, using a five-point scale anchored at the extreme values of "not at all predictable" to "accurately predictable." Specifically, they were asked "to what extent could you predict each of the following external factors?" for the following five aspects of the external environment:

1. Government policies and regulations

2. Customer demand
3. Supply of raw materials and equipment
4. Competitive climate
5. Technological trends

Because these aspects of the external environment can differ in importance across joint ventures in shaping the overall level of environmental uncertainty for an IJV, respondents were also separately asked the following question to determine appropriate weights to use to with the reverse-coded items above to calculate the environmental uncertainty measure described in the text:

"Please allocate 100 points among the following external factors according to their importance in determining the ultimate success of the joint venture (e.g., 50 customer demand, 50 competitive climate, 0 everything else):"

					= 100 points
Government policies and regulation	Customer demand	Supply of raw materials and equipment	Competitive climate	Technological trends	Total

Given that certain aspects of the JVs operating environment might matter more or less for specific collaborations, we weighted these items by asking respondents to allocate 100 points among these five factors based on their importance in determining the ultimate success of the joint venture (i.e., w_i, i=1 to 5). Our measure was the combination of the weights multiplied by the individual uncertainty scores as shown in the following formula:

Environmental uncertainty = $\frac{1}{100}\sum_{i=1}^{5} w_i, u_i$ (1)

Project complexity. Respondents were asked to indicate which of the following activities were undertaken by the JV:

1. Basic research
2. New product or process development
3. Testing and obtaining regulatory approval
4. Manufacturing
5. Marketing
6. Sales and distribution

Flexibility. We asked respondents to what extent they agreed with the following statements about flexibility. We used Likert-type indicators ranging from 1 "completely disagree" to 5 "completely agree" for the following questions:

1. When an unexpected situation arises, the parents would rather work out a new deal than hold each other to the original terms
2. The parent companies are open to modifying their agreement if unexpected events occur
3. Changes in 'fixed' terms are willingly made by the parents, if it is considered necessary