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The Interplay of Contracts and Trust: Untangling Between- and Within-Dyad Effects

Abstract

Purpose – Contracts and trust are two prominent governance mechanisms in buyer-supplier exchanges, yet controversy persists regarding the interplay between contracts and trust. This study provides a new perspective to understand the debate by differentiating between- from within-dyad effects of contracts–trust relationships.

Design/methodology/approach – Based on survey data of 250 Chinese buyer–supplier relationships collected over two time periods, we employed two-level hierarchical linear modeling (HLM) with repeated measures to test the influence of contracts (trust) on trust (contracts) over time.

Findings – We find that for major buyer–supplier exchanges, contracts and trust tend to complement each other when comparing across dyads, but they likely substitute for each other in within-dyad settings.

Research limitations/implication – First, to illustrate the dynamic interactions between contracts and trust, we collected data at two time periods and assumed continuous linear relationships of time with both contracts and trust. Further research should collect multiple waves of data to explore the complex, varying changes that arise over time. Second, our findings are based on buyer–supplier relationships in China, whose unique cultural features may limit the generalizability of the results to other settings.

Practical implications – Channel managers can structure exchanges by devising detailed contracts that align incentives and demonstrate commitment, which helps build trust in a

relationship. Channel managers should also pay special attention to the contingency effects of their transactional and relational features.

Originality – This study offers the first explicit test of the dynamic contracts–trust relationship, thereby establishing a more refined understanding of interplay between contracts and trust.

Keywords: trust; contracts; buyer–supplier exchanges; asset specificity; exchange history

Paper type: Research paper

1. INTRODUCTION

Contracts and trust have long been considered as two prominent governance mechanisms in marketing channels, which promote coordination and deter conflict (Bai, Sheng, and Li, 2021; Zhang, Jin, and Yang, 2020). Yet, controversy persists regarding their interplay (for a review, see Cao and Lumineau, 2015).¹ One side argues that trust and contracts are substitutive, such that one supplants the need for the other or even renders it counterproductive (Malhotra and Murnighan, 2002). In contrast, a complementarity view asserts that these two mechanisms function to support and reinforce each other (Mayer and Argyres, 2004; Poppo and Zenger, 2002).

To reconcile these conflicting findings, one research stream highlights the complexity of both constructs, in studies that differentiate either between the distinct functions of contracts (Faems et al., 2008) or between competence- and identity-based trust (Lumineau, 2017).² The other stream of research outlines relevant contingencies, including exchange-, market-, and institutional-level characteristics (Zhang et al., 2020).³ Although providing important insights, prior research suffers from two major limitations. Specifically, in interfirm exchanges, the between- and within-dyad effects jointly determine the contracts–trust relationship, yet, the

¹ The literature recognizes two different types of interplay: 1) whether the direct relationship between trust and contracts is positive or negative; 2) whether their joint effect on performance is positive or negative (Poppo and Zenger, 2002; Cao and Lumineau, 2015). This study focuses on the former.

² For example, Faems et al. (2008) reveal that a broad (vs. narrow) contractual structure with overlapping task divisions and information sharing clauses promotes (hampers) goodwill trust. Weber and Mayer (2011) suggest that promotion-framed contracts set expectations for exchange behaviors and nurture cooperative and trusting relationships, but prevention-framed contracts with detailed task specifications impede the development of trust. Lumineau (2017) also argues that calculative trust is compatible with contracts, but relationship- and goodwill-based trust relate negatively to contracts.

³ For example, Connelly, Miller, and Devers (2012) uncover a negative relationship between trust and contracts when the level of distrust is low, and Abdi and Aulakh (2017) argue that environmental uncertainty renders the relationship between contractual and relational governance more substitutive, whereas behavioral uncertainty makes it more complementary. Zhou and Poppo (2010) also show that contracts facilitate the development of trust, but this effect diminishes with greater legal enforceability.

extant literature tends to mix them up (Majchrzak, Jarvenpaa, and Bagherzadeh, 2015). The *between-dyad effect* refers to the trust and contracts associations across buyer-supplier dyads at a fixed time, whereas the *within-dyad effect* reflects how the use of trust (contracts) affects changes in contracts (trust) within a dyad over time (Certo, Withers, and Semadeni, 2017; Curran and Bauer, 2011). As the following two classic examples illustrate, these two could differ in direction and/or magnitude.

Considering the relationship between heart attack and exercise: evidence has shown that people who exercise more are at lower risk of suffering a heart attack (i.e., a negative between-person effect), but any individual person also is more likely to experience a heart attack while exercising (i.e., a positive within-person effect) (Curran and Bauer, 2011). The “happiness–productivity” relationship attests to magnitude differences: happy workers may be a bit more productive than unhappy workers (i.e., between-person effect), whereas a worker is *much* more productive when s/he is happy than when s/he is unhappy (i.e., within-person effect) (Fisher, 2003).

In the context of buyer-supplier relationships, Toyota may serve as an example: for some suppliers, Toyota has relied on highly trusting relationships to source sophisticated component systems; meanwhile, it has developed clear and detailed clauses to safeguard such transactions. Hence, compared to other automaker-supplier dyads with low trust and detailed contracts, there is a positive trust/contracts association (i.e., between-dyad effect). Yet, over time, Toyota’s emphasis on trust gradually reduces the rigid application of contracts with those suppliers, resulting in a negative effect of trust on contracts (i.e., within-dyad effect) (Aoki and Lennerfors, 2013).

Furthermore, most prior studies rely on cross-sectional data, which can capture only between-dyad variance (Cao and Lumineau, 2015). Cross-sectional designs simply cannot compare between- with within-dyad effects, particularly when we consider that buyer-supplier exchanges are dynamic, and trust and contracts evolve over time (Argyres, Bercovitz, and Mayer, 2007; Zhang et al., 2016). Therefore, a longitudinal design is needed to capture the dynamic interplay of trust and contracts.

To address these limitations, we distinguish between- from within-dyad effects of the contracts–trust relationship to establish a more refined understanding of the interplay between contracts and trust. We argue that contracts and trust tend to complement each other when comparing across dyads, but they likely substitute for each other in within-dyad settings. In addition, a complete understanding of the between- and within-dyad effects requires a joint examination of transactional and relational features of buyer-supplier exchanges (Schepker et al., 2014). We consider two moderators in buyer-supplier dyads: asset specificity and exchange history (Chen, Park, and Newburry, 2009; Poppo, Zhou, and Ryu, 2008). Based on transactional cost economics, asset specificity is one key feature differentiating between different transactions: Drawing on relational exchange theory, partners interact over time, leading to greater length of prior experience. These two are aligned with the logics of between-dyad and within-dyad effects, respectively, thus changing the relative salience of competing mechanisms and moderating the between- & within-dyad effects. In consistent with our key line of reasoning, we argue that the between-dyad complementarity effect would be strengthened with greater asset specificity, whereas the within-dyad substitution effect gets stronger when exchange history is longer.

With results from survey data of 250 buyer–supplier dyads collected at two time periods that support these propositions, our study makes three major contributions. First, whereas the

dynamic nature of buyer-supplier exchanges is well recognized, this study offers an explicit test of the dynamic contracts–trust relationship, revealing that trust and contracts affect each other at both an absolute level and in terms of the degree of change over time. Second, given the specific context of the sample, our empirical results find that the between-dyad effect of contracts–trust relationship is complementary, whereas the within-dyad effect is substitutive, revealing the coexistence of substitution and complementarity effects. Accordingly, differentiating between- from within-dyad effects offers a new perspective to understand the long-standing debate. Third, we explicit the underlying mechanisms of between- and within-dyad effects in both directions and show that transactional and relational features characteristics would respectively affect the weight of different mechanisms thereby exhibiting moderating effects. Specifically, the complementary between-dyad effect increases with asset specificity, whereas the substitutive within-dyad effect is stronger with longer exchange history. These findings not only validate our theoretical arguments but also offer a more refined understanding of the contracts–trust relationship.

2. THEORETICAL FRAMEWORK

2.1 Economic and social views on marketing channel governance

Transaction cost economics (TCE) is the dominant economic perspective to explain buyer-supplier exchanges (Bai et al., 2021; Buvik, Andersen, and Gronhaug, 2014). According to TCE, firms design contracts to safeguard and coordinate their exchanges when potential opportunistic behavior and conflict threaten the realization of mutual gains (Williamson, 1985). *Detailed contracts* refer to the degree of specificity in written agreements that are used to regulate exchanges (Abdi and Aulakh, 2017; Krishnan, Geyskens, and Steenkamp, 2016). By specifying each party's rights, responsibilities, and obligations, detailed contracts safeguard the transactions,

provide adaptation rules and procedures, and coordinate partner behaviors (Mooi and Ghosh, 2010). The more detailed the contracts, the better the protection that exchange parties obtain (Krishnan et al., 2016).

Relational exchange theory (RET) instead suggests that because economic exchanges are embedded in social contexts, buyer-supplier relationships always entail relational and social forms of trust (Bai et al., 2021; Paswan, Blankson, and Guzman, 2011; Zaheer and Venkatraman, 1995). *Trust* is the positive expectation hold by exchange parties that the other can be relied on to fulfill obligations, behave in a predictable manner, and act fairly when the possibility for opportunism is present (Canning and Hanmer-Lloyd, 2007; Zaheer, McEvily, and Perrone, 1998). Unlike contracts that seek to control hazards directly, trust implies an acceptance of risk, based on beliefs about the sincere intentions of the partner (Dagger and O'Brien, 2010; McEvily, Perrone, and Zaheer, 2003). With these positive beliefs, trust reduces friction and facilitates coordination in exchanges (Mellewigt et al., 2017; Terawatanavong, Whitwell, and Widing, 2007).

Whereas both contracts and trust are critical to buyer-supplier exchanges, the extant literature has debated their inter-relationships and provided various ways of addressing this controversy (Cao and Lumineau, 2015). Departing from prior studies, we suggest that distinguishing between- from within-dyad effects is one new way to understand prior debate.

2.2 Between-dyad versus within-dyad effects

Researchers in sociology, psychology and organizational behavior have highlighted the importance of distinguishing between- from within-person effects (Curran and Bauer, 2011; Hoffman and Stawski, 2009; see Dalal, Bhave, and Fiset, 2014 for a review). Most recently, Certo et al. (2017) emphasize that strategy research must also consider such distinctions to

disentangle the between- from within-firm effects: the former reflects cross-sectional strategic differences across firms, whereas the latter represents longitudinal strategic changes within a firm over time.

Extending this line of logic to buyer-supplier exchanges, the between-dyad effect pertains to comparisons across *different dyads* at *fixed time* point, such that it reflects the *structural* traits of a given dyadic relationship compared with other dyadic relationships. The within-dyad effect involves a comparison across different states of the *same dyad*, emphasizing *ongoing processes* within the dyad *over time*. For example, trust and contracts may complement each other (i.e., they are positively related). For such a positive association, a between-dyad interpretation implies that exchanges with higher levels of trust are associated with more detailed contracts as compared with exchanges with lower levels of trust; a within-dyad interpretation instead suggests that an exchange with higher levels of trust will lead to the use of more detailed contracts in the future relative to what it had in the past. Because between- and within-effects coexist, it is pivotal to disentangle them and explicate the exact effect of interest (Certo et al., 2017; Curran and Bauer, 2011; Dalal et al., 2014; Hoffman and Stawski, 2009).

The between- and within-effects are likely driven by distinct mechanisms with varied time ranges (Dalal et al., 2014). Based on a pooled cross-section of firms, the between-effect extracts insights at a fix time point and its underlying mechanisms are on more immediate influences with neglectable time lags. Contrastingly, the within-effect looks into the ongoing dyadic relationships by taking accumulated impacts into account to explain what contributes to the change and how things develop over time (Langley et al., 2013). Furthermore, the between-effect acknowledges the designing and structuring of detailed contracts before a specific time point while the within-effect focuses on contract application and utilization throughout its

duration (Dean, Griffith, and Calantone, 2016). Thus, differentiating the between- from within-effects helps develop precise hypotheses and enrich theoretical development (Dalal et al., 2014).

Despite the importance of such a distinction, prior studies have largely overlooked it, conflating the between-/within-dyad effects when arguing for the complementarity and substitution of trust and contracts. This motivates us to adopt a comprehensive approach that include both effects and further distinguish them both conceptually and empirically. When reviewing the literature, we identify the key arguments related to between- and within-dyad effects and summarize them in Table 1.

----- Insert Table 1 about Here -----

The contingencies: The transactional and relational feature of buyer-supplier exchanges

To validate these arguments, we further consider two moderators concerning the between- and within-dyad effects, respectively; that is, asset specificity and exchange history (Hegde et al., 2005; Poppo et al., 2008). *Asset specificity* is defined as the significant investments in tangible and/or intangible assets that have little or no value outside of the dyadic relationship (Cannon and Perreault, 1999). According to TCE, asset specificity is one critical dimension with respect to how transacting dyads differ (Crook et al., 2013; Williamson, 1985). As asset specificity deepens, terminating the relationship entails increasing economic losses for one or both parties (Svendsen et al., 2011). Further, the dyadic relationship moves away from pure autonomous market-based one towards encompassing a complex system of transactions in favor of stability and synergy (Kang, Mahoney, and Tan, 2009; Poppo et al., 2008; Rokkan, Heide, and Wathne, 2003). As we attribute the complementary between-dyad effects to the transaction complexity associated with high levels of trust/contracts, asset specificity likely moderates the between-dyad effects between trust and contracts.

Exchange history refers to how long partners have been doing business with each other (Buvik et al., 2014; Poppo et al., 2008; Wang, Jin, and Zhou, 2019). Within a particular buyer-supplier dyad, prior exchange history accumulates and facilitates the development of routines, which constitutes a valuable relational asset for the dyad (Elfenbein and Zenger, 2014). We suggest that the within-dyad effects pertain to interorganizational routines developed over time, thus the complementarity or substitution view likely applies to different stages of an exchange. Therefore, we examine how prior exchange history might moderate within-dyad effects.

3. HYPOTHESES

3.1 Between-dyad effects

The between-dyad effect centers on trust and contracts associations across different buyer-supplier exchanges. Prior literature suggests two major reasons for the positive effect of contracts on trust: signaling value and opportunism deterrence. In devising explicit and detailed contracts, partners engage in deliberate, purposeful negotiating activities; this costly, resource-consuming process entails great efforts and by itself constitutes a specific investment (Woolthuis, Hillebrand, and Nooteboom, 2005). Hence, detailed contracts signal partner commitment and are associated with higher trustworthiness. Furthermore, contracts deter potential opportunistic behaviors by limiting opportunities and incentives, which protects exchange parties from negative consequences and engenders trust (Goo et al., 2009; Luo, 2002; Poppo et al., 2008). In parallel, trust provides the basis for openness and psychological safety, which are essential ingredients for negotiating and drawing up detailed contracts that often contains sensitive issues (Woolthuis et al., 2005). By reducing negotiation costs, trust helps exchange partners reach mutual agreements with explicit details (Gulati and Nickerson, 2008; Zaheer et al., 1998). Because trust increases commitment and shared value (Kingshott and Pecotich, 2007), partners are willing to invest time and effort to devise costly contracts tailored to their exchanges (Zhou and Poppo, 2010).

Regarding the substitution view, we identify two influential arguments. First, formal control underlying detailed contracts runs against the relational links between exchange partners, designing a detailed contract may signal a lack of trust towards exchange partners (Ghoshal and Moran, 1996; Jap and Ganesan, 2000). Similarly, a high level of trust signals goodwill and partners may avoid detailed contracts with formal and explicit rules that could harm the relationship (Zaheer and Venkatraman, 1995). Second, contracts and trust act as functional equivalents and offer similar benefits (e.g., reduced uncertainty and enhanced coordination), so there is no need for the other if one is in place, given the economy of governance (Das and Teng, 2001). This cost-saving consideration implies that detailed contracts should spare exchange parties from investing in trust, and high levels of trust make it unnecessary to contractually specify detailed clauses (Ring and Van de Ven, 1992).

The moderating effect of asset specificity

While both effects are plausible, we propose that the complementarity view is more evident for dyads with higher asset specificity. Concerning the between-dyad effect of contracts on trust, when an exchange involves significant relation-specific investments that alter the nature of the exchange, drafting detailed contracts may be better justified (Reuer and Ariño, 2007). Specific exchanges tend to be complex and aim at joint value maximization. Detailed contracts thus may include detailed task planning, job specification, and contingency planning (Argyres, Bercovitz, and Mayer, 2007). As a result, exchange parties likely view the purpose of such contracts as to align expectations and foster adaptation, showing a sign of commitment rather than a lack of trust. Thus, the impact of a positive signalling of contracts on trust tend to overtake the negative one. Moreover, when the exchange is highly specific, there are great gains for “hold-up” or “opportunism” through using ex post bargaining or threats of termination, which

strongly dampen the overall functioning and performance of the dyadic exchange (Lui, Wong, and Liu, 2009). In such conditions, having detailed contracts is especially important to remove obstacles, thus ensuring a trusting relationship. In contrast, exchanges without significant relation-specific investments resemble arm-length market transactions, which are often “autonomous” as requiring simple adaptation based on price (Crook et al., 2013). For such exchanges, drafting detailed contracts likely invokes deliberative cost-benefit analyses, which leads to intrusive and interfering acts that damage trust and alienate partners.

Similarly, the complementary effect of trust on contracts gets strengthened in specific exchanges. Trust, by providing openness and psychological safety, exerts a greater effect on promoting the draft of detailed contracts in specific exchanges than non-specific ones. Specific exchanges are complex and subject to great potential hazards. A foundation built on trust enables partners to discuss potential concerns and contingencies, which helps draft more detailed contracts. Despite potential negative signalling effect, when specific investments are involved, partners with high levels of trust may still prefer to the assurance that formal contracts provide, given the inherent limitations of informal control (Villena, Revilla, and Choi, 2011). Partners are more willing to devote great efforts to structure a relationship to ensure its success; they will therefore channel valuable resources into such exchanges (Chen et al., 2009). However, for exchanges without significant relation-specific investments, trust would spare partners to engage in crafting detailed contracts, considering the potential negative impact on the dyadic relationship. Such exchanges also tend to receive limited resources and attention (Tsang, 2002), and therefore likely suffer from resource constraints and become highly cost-sensitive. Thus, the cost-saving consideration of the substitution effect is stronger for non-specific than for specific exchanges.

Taken together, we expect that the between-dyad complementarity effect matters more for specific exchanges, whereas the between-dyad substitution effect works mostly for simple and standard exchanges. Because major buyer-supplier exchanges (as in our context) often feature certain levels of specificity that is tailored to the partners (Jap and Ganesan, 2000), we suggest that the overall main effect is complementary. Consistent with our logic, Cao and Lumineau (2015) show a positive correlation between trust and contracts ($r = 0.22$) in their meta-analysis of prior studies, which consist primarily of cross-sectional samples of major exchanges. Moreover, in line with our key arguments, we expect exchange asset specificity to positively moderate the between-dyad effect. Thus, we state our between-dyad hypotheses as

Hypothesis 1a (Between-dyad effect): Compared with other buyer-supplier dyads, higher levels of trust (contracts) between a buyer and supplier are associated with higher levels of contracts (trust).

Hypothesis 1b: Asset specificity positively moderates the between-dyad effect between trust and contracts. When asset specificity is high, contracts lead to higher level of trust and trust leads to higher levels of contracts.

3.2 Within-dyad effects

The within-dyad effect deals with how the use of contracts (or trust) leads to the changes of trust (or contracts) within the same exchange over time. Whereas no prior empirical studies have examined the within-dyad effect, we identify the key reasoning based on their conceptual arguments related to the exchange process. In this respect, the complementarity view suggests *learning* as the key mechanism. By specifying clear roles and responsibilities, detailed contracts establish a formal foundation for partners to learn about each other, make sense of the collaboration, reduce misinterpretations or misunderstandings, and build a shared identity (Lumineau, 2017; Vlaar, Van den Bosch, and Volberda, 2006). Over time, relying on detailed contracts facilitates the development of a reliable relationship associated with greater trust. A similar learning argument works in reverse. Because trusting relationships encourage mutual

learning and adjustment (Ryall and Sampson, 2009), when partners codify prior lessons and experiences, they refine contractual agreements and make them more detailed (Mayer and Argyres, 2004; Vanneste and Puranam, 2010).

The substitution view on the other hand uses *routine* as the key argument. Partner-specific routines reflect each firm's accumulation of experience with its partner, so they can support everyday interactions and communication (Zollo, Reuer, and Singh, 2002). If a relationship is governed by detailed contracts, formal routines likely emerge based on which partners exchange information, mitigate disputes, and resolve problems (Li, Poppo, and Zhou, 2010; Samaha, Palmatier, and Dant, 2011). As a relationship persists, it becomes increasingly efficient for both parties to collaborate and coordinate through their contractual routines, which in turn mitigates the need for high levels of trust that involve a fundamentally different set of routines. Similarly, heavy reliance on trust may decrease the use of detailed contracts in ongoing relationships (Antia and Frazier, 2001). Based on informal social norms, trust functions as a heuristic that helps exchange partners adapt and make quick decisions (Dyer and Singh, 1998; McEvily et al., 2003). Because the use of trust establishes informal routines and improvisational behaviors that are incompatible with formal rules and control (Zheng and Yang, 2015), it reduces the use of detailed contracts in a relationship over time.

The moderating effect of exchange history

We argue that the learning mechanism underlying the complementary within-dyad effect likely concentrates in the initial stage of relationship while the substitutive within-dyad effect would become prominent for mature exchanges. At the outset of an exchange, the relationship tends to be vulnerable (Ring and Van de Ven, 1994). Misunderstanding and uncertainty prevail, originating from partner differences, including different structures, cultures, functional

capabilities, cognitive frames, and management styles (Vlaar et al., 2006). Also, the early stage features abundant learning opportunities and trial-and-error processes (Mayer and Argyres, 2004). At this stage, learning plays a critical role in the dyadic relationship. When an exchange enters the mature stage, stable interaction routines likely emerge (Wang et al., 2019; Zollo et al., 2002). As routines guide and facilitate the response to the demand of exchange partners and external situations, they serve as templates for cognition and behavior in the future. By affirming certainty, efficiency, and compliance, routines are self-reinforcing and allow exchanges to function smoothly over time (Bercovitz and Tyler, 2016). Because of the self-enforcing nature of routines, the substitution effect likely dominates mature exchanges. Meanwhile, the learning effect is minimal in mature exchanges, which often feature collective blindness that limits openness to novel information and undermines new knowledge acquisition (Zhou et al., 2014).

Specifically for the within-dyad impact of contracts on trust, learning facilitated by detailed contracts happens mostly during the initial contractual design and implementation, as partners get to know each other, reduce misunderstanding, and develop a trusting relationship over time (Faems et al. 2008). In face of trial-and-error processes in the early phase, contracts likely foster the increasing use of trust as time goes. Once stable patterns of interaction emerge, learning becomes incremental and limited in scope; the routinized behaviors would feature the exchange, giving rise to the dominance of the substitution effect. That is, reliance on formal routines leads to the decrease of informal processes over time. In a similar vein, trust can stimulate high learning rates and increase the formalization of past experience into contractual details in the early stage. Over time, when informal routines dominant, trust leads to decreasing use of contracts.

Whereas major buyer-supplier exchanges (as in our context) have varied relationship lengths, they often move beyond the initial stage of transactions (Jap and Ganesan, 2000). So we expect to find an overall negative within-dyad effect. Moreover, for dyads with longer exchange histories, the negative effect would be stronger. Thus, we predict that

Hypothesis 2a (With-dyad effect): Within a buyer-supplier dyad, high levels of trust (contracts) lead to a reduction in contracts (trust) over time.

Hypothesis 2b: Exchange history negatively moderates the within-dyad effect between contracts and trust. When prior history is long, contracts lead to greater reduction in trust **and** trust leads to greater reduction in the level of contracts over time.

4. METHODOLOGY

4.1 Data collection

The empirical setting for our study spans major buyer–supplier relationships between Chinese manufacturing firms. Firms in China have a long tradition of doing business on the basis of personal relations and trust, but contracts have become increasingly important for governing buyer-supplier exchanges as China transitions toward a market economy (Zhou and Poppo, 2010). It therefore constitutes a suitable context for testing the dynamic interplay between trust and contracts. Because it is often buyers who initiate transactions, we take a buyer perspective to assess these dyadic relationships (Poppo, Zhou, and Li, 2016).

We followed the guidelines of Gerbing and Anderson (1988) to develop the survey instruments. On the basis of a comprehensive literature review, we constructed research questions and measures in English, then translated the questionnaire into Chinese and back-translated it into English with the help of two bilingual experts to ensure semantic equivalence. In six in-depth interviews with senior purchasing managers, we checked the meaningfulness and clarity of the measures and made minor changes to improve their content and face validity.

To increase our survey response rates and ensure the quality of data collection, we cooperated with a market research firm to conduct the interviews. We and the market research

firm conducted a pilot study with 20 senior managers and finalized the survey according to their feedback. For the formal survey, we randomly selected a sample of 1,200 manufacturing firms, located in three economic regions of China (i.e., Beijing, Shanghai, Guangdong, and surrounding areas) that operated within the four-digit Chinese Industrial Classification codes 1311–4290. These firms cover a wide range of industries, such as electronics, chemical engineering, mechanics, food, clothing, and others. To capture the dynamic interplay of exchange relationships, we collected data at two points in time. First, we and the market research firm recruited the experienced interviewers and trained them to understand adequately the questionnaire and answer any question. Then the trained interviewers called the sample companies to solicit their cooperation, made appointments with senior purchasing managers, and asked them to characterize their relationships with one major suppliers; in this way we identified primarily well-established exchanges (Ellis, Henry, and Shockley, 2010). Our trained interviewers then visited the purchasing managers in person, presented the survey, and collected the completed questionnaire. All informants were assured that the survey was being conducted only for academic research and that their responses would be completely confidential. Of the 1,200 firms initially contacted, we obtained complete information from 463 firms, for a response rate of 38.6 percent. After the fieldwork, one of the authors randomly called 40 respondents to confirm that the interviews had been conducted.

Second, because the mutual influence between contracts and trust takes a relatively long time to play out (Mayer and Argyres, 2004), we suggest that a gap of 3 years is a good period of time to reflect on a change in governance mechanisms at the inter-organizational level. The 3-year time lag can reduce the threat of common method bias and reverse causality (Podsakoff et al., 2003), and also is an appropriate trade-off between constructing a causal inference but not

missing the effect (Rindfleisch et al., 2008; Schilke, 2014). A similar time lag has been adopted in previous studies with a similar research design (e.g., Heide, Wathne, and Rokkan, 2007; Tekleab, Takeuchi, and Taylor, 2005). We conducted the second survey by contacting the purchasing firms again and asking the respondents to update the information about their contracts and trust with the same suppliers. In this round, we received 250 usable responses, for a response rate of 54.0 percent. As a validity and quality check, we found that, on average, our respondents had worked for more than 7.5 years in their firms and had 12.14 years of industry experience. Thus, our respondents represent knowledgeable informants.

To assess the potential for non-response bias in the Time 1 survey, we compared the respondent firms with non-respondents on several key characteristics (i.e., industry type, firm ownership, number of employees, annual sales revenues) with a series of chi-square tests and analyses of variance (Armstrong and Overton, 1977). We found no significant differences. We also checked whether the responding firms for the Time 2 survey were representative of both the Time 1 sample and the sampling frame in general (Rindfleisch and Moorman, 2003). We compared the means for the key measures between responding and non-responding firms for the Time 2 survey; the tests showed no significant differences. Next, we compared the Time 2 respondents with non-responding firms in the original sample and, again, no significant differences arose. Non-response bias is therefore unlikely a major concern.

Of the buyer firms in our final sample, 62.0 percent had 100–1,000 employees and 83.6 percent had annual sales revenues of more than USD 3 million (CNY 20 million). The top industries represented in the buyer sample are mechanics (20.8%), electronics (27.6%), and consumer goods (15.6%). Among the supplier firms, 63.2 percent had 100–1,000 employees and 81.2 percent earned annual sales revenue of more than USD 3 million (CNY 20 million). The

suppliers represent mainly mechanics (18.4%), electronics (17.6%), and chemicals (16.0%) industries.

4.2 Measures

We adapted our measures from prior literature; the latent constructs and their validity assessment are presented in the Appendix. Following Zhou and Poppo (2010), we measured *trust* with four items that assess the level of predictability, opportunistic intent, and fairness of an exchange partner's behavior. For *detailed contracts*, we used four items that check the degree to which a contract specifies and details the roles and responsibilities of each party, how each party is to perform, and how disagreements will be solved (Griffith and Zhao, 2015; Zhou and Poppo, 2010). The four-item measure of *asset specificity* adopted from Cannon and Perreault (1999) indicates the extent to which exchange partners make specific investments. *Exchange history* was measured as the number of years over which a buyer and supplier had engaged in economic exchanges (Malhotra and Lumineau, 2011; Poppo et al., 2008), and we used the natural logarithm to prevent skewness.

Furthermore, we controlled for important factors at the firm, dyad, and industry levels. At the firm level, we controlled for the ages of both buyer and supplier firms. *Firm age* is the natural logarithm of a firm's years of operation. At the dyadic exchange level, we further controlled for behavioral uncertainty, market uncertainty, product customization, and information sharing. Following Zhou and Poppo (2010), we measured *behavioral uncertainty* with two items that assess how difficult it is to evaluate a partner's activities and performance and *market uncertainty* with three items that reflect environmental changes with respect to vendor support services, technology, and product supply. *Product customization* reflects the extent to which an exchange product is uniquely tailored to the needs of a particular buyer,

which indicates exchange complexity (Stump, Athaide, and Joshi, 2002). We used one item that prompts managers to indicate the degree of customization of exchange products (1 = standard products; 7 = highly customized). We measured *information sharing* between partners with three survey items, which assess how often partners inform each other of important information, such as product design decisions and supply-and-demand forecasts (Gundlach and Cannon, 2010).

At the industry level, we included four dummy variables to control for two primary industries in which the buyer and supplier operated: mechanics and electronics, with others as the baseline. Table 2 provides the basic descriptive statistics and the correlation matrix for the variables.

----- Insert Table 2 about Here -----

To validate the measures, we conducted a confirmatory factor analysis of the latent constructs and obtained satisfactory results (comparative fit index = 0.91, incremental fit index = 0.91, root mean square error of approximation = 0.08) (Dagger and O'Brien, 2010). The composite reliabilities of all latent constructs ranged from 0.82 to 0.93, well above the 0.70 benchmark. The average variance extracted (AVE) for all constructs exceeded the 0.50 cutoff, and the AVE of each construct was higher than its shared variance with other constructs. Thus, our measures possess adequate convergent and discriminant validity (Fornell and Larcker, 1981).

4.3 Analytical method

We employed two-level hierarchical linear modeling (HLM, also referred to as multilevel modeling) with repeated measures to test the influence of contracts (trust) on trust (contracts) over time. HLM is becoming more common in many social science areas (e.g., marketing, management, education) because of its flexibility and unique advantages not present in more traditional techniques (Osborne, 2000; Raudenbush, 2002). HLM deals with hierarchical or

nested data structures. For example, students exist within a hierarchical social structure that can include family, peer group, classroom, grade level, school, school district, state, and country. Similarly, repeated-measures data (as in this study) are data that are nested or clustered within individuals (individual dyad as in this study), which are one type of data hierarchies that are less obvious but equally important and well-served by HLM (Raudenbush and Bryk, 2002). In this sense, HLM became a powerful tool for longitudinal data analysis.

The HLM approach offers two advantages: (1) it accounts for the lack of independence across observations that arise in repeated-measure designs, and (2) it accommodates individual heterogeneity that can be explained by the inclusion of explanatory variables at higher levels (Dean et al., 2016). In our data, the first level pertains to repeated measures of contracts or trust over time, and the second level is each buyer–supplier dyad. The values of $Time_{it}$ are defined as 0 (observations at Time 1) and 1 (observations at Time 2).

Before testing our hypotheses, we ran an unconditional mean model and an unconditional growth model, which helps partition the total outcome variation (Osborne 2000; Singer and Willett, 2009). These two models “allow you to establish: (1) whether there is systematic variation in your outcome that is worth exploring; and (2) where that variation resides (within or between).” (Osborne 2000, p. 92). In particular, the unconditional means model partitions and quantifies the amount of variation that exists at the within- vs. between-level and the unconditional growth model helps to explain to what extent the response is systematically associated with linear time. In our sample, an estimated 89.9 percent of the total variance in contracts and 90.1 percent of the total variance in trust resided within dyads. Approximately 37.1 percent of the within-dyad variance in contracts is associated with linear time, whereas 26.2 percent of the within-dyad variance in trust is associated with linear time.

To test the hypotheses, we used models with intercepts and slopes as outcomes, which can explain initial levels (i.e., between-dyad effect) of trust/contracts and their growth over time (i.e., within-dyad effect) (Dean et al., 2016; Jokisaari and Nurimi, 2009; Pitariu and Ployhart, 2010). Specifically, we estimate two sets of three nested models for contracts and trust, respectively. The independent variables were mean-centered to enhance interpretability. Equations 1a and 2a show the level-1 equations for contracts and trust, respectively; Equations 1b and 1c (2b and 2c) represent the level-2 equations for the intercept α_{i0} and slope α_{i1} of contracts (trust). With these equations, we can explain the initial level of contracts/trust across dyads as well as their growth over time within a particular dyad. The full model for contracts is:

$$\begin{aligned} (1a: \text{level-1}) \quad & \text{Contracts}_{it} = \alpha_{i0} + \alpha_{i1} \text{Time}_{it} + \varepsilon_{it}. \\ (1b: \text{level-2}) \quad & \alpha_{i0} = \beta_{00} + \beta_{01} \text{Trust}_i + \beta_{02} \text{Asset specificity}_i + \beta_{03} \text{Trust}_i \times \text{Asset specificity}_i + \\ & \beta_{04} \text{Exchange history}_i + \beta_{05} \text{Trust}_i \times \text{Exchange history}_i + \beta_{\text{controls}} \text{Control variables}_i + \mu_{i0} \\ (1c: \text{level-2}) \quad & \alpha_{i1} = \beta_{10} + \beta_{11} \text{Trust}_i + \beta_{12} \text{Exchange history}_i + \beta_{13} \text{Trust}_i \times \text{Exchange history}_i + \mu_{i1} \end{aligned}$$

The full model for trust is:

$$\begin{aligned} (2a: \text{level-1}) \quad & \text{Trust}_{it} = \alpha_{i0} + \alpha_{i1} \text{Time}_{it} + \varepsilon_{it}. \\ (2b: \text{level-2}) \quad & \alpha_{i0} = \beta_{00} + \beta_{01} \text{Contracts}_i + \beta_{02} \text{Asset specificity}_i + \beta_{03} \text{Contracts}_i \times \text{Asset specificity}_i \\ & + \beta_{04} \text{Exchange history}_i + \beta_{05} \text{Contracts}_i \times \text{Exchange history}_i + \beta_{\text{controls}} \text{Control variables}_i + \mu_{i0} \\ (2c: \text{level-2}) \quad & \alpha_{i1} = \beta_{10} + \beta_{11} \text{Contracts}_i + \beta_{12} \text{Exchange history}_i + \beta_{13} \text{Contracts}_i \times \text{Exchange} \\ & \text{history}_i + \mu_{i1} \end{aligned}$$

5. RESULTS

In Table 3 and 4 we report the maximum likelihood estimates and goodness-of-fit statistics for each model. In Model 2 of Table 3, trust relates positively to contracts ($b = 0.666$, $p = 0.000$); in Model 2 of Table 4, contracts relate positively to trust ($b = 0.260$, $p = 0.000$). These results support Hypothesis 1a. In terms of the effect size for between-dyad effects, a 1% increase in trust translates into a 0.694% marginal *increase* in contracts, and a 1% increase in contracts translates into a 0.277% marginal *increase* in trust.

----- Insert Tables 3 & 4 about Here -----

Considering the moderating effect of asset specificity, Table 4 in Model 4 shows a positive interaction between contracts and asset specificity ($b = 0.027, p = 0.045$), so asset specificity positively moderates the between-dyad effect of contracts on trust. For the effect size, when the level of asset specificity is high (low), a 1% increase in contracts translates into a 0.326% (0.227%) marginal *increase* in trust. However, we fail to find a positive moderation role of asset specificity on the impact of trust on contracts (see Table 3). One possible reason is that, because our sample consists of greater asset specificity, the variance is not large enough to demonstrate this significant moderating effect. Overall, Hypothesis 1b is partly supported.

To illustrate the moderation effect, we followed an established procedure (Preacher et al., 2006) and calculated the simple slopes of the between-dyad effect at high and low levels (1 standard deviation above or below the mean) of asset specificity. Figure 1a shows that contracts are more positively associated with trust when asset specificity is high ($b = 0.323, p = 0.000$) than when it is low (simple slope $b = 0.240, p = 0.000$), in support of H1b.

----- Insert Figure 1 about Here -----

In Model 2 of Table 3, we find a negative interaction between time and trust ($b = -0.671, p = 0.000$), in support of the substitutive within-dyad effect of trust on contracts. Model 2 in Table 4 indicates a negative interaction between time and contracts ($b = -0.252, p = 0.000$), in support of the substitutive within-dyad effect of contracts on trust. Overall, Hypothesis 2a is supported. For the within-dyad effect size, a high level of trust results in a 3.616% *decrease* in contracts over time, and highly detailed contracts result in a 7.262% *decrease* in trust over time. We plotted the within-dyad effect in Figure 1b. Dyads with high levels of trust experience a drop in contract details (Time 1 = 6.160, Time 2 = 5.936; $b = -0.224, p = 0.017$), and in dyads with

more detailed contracts trust erodes over time (Time 1 = 6.161, Time 2 = 5.714; $b = -0.447$, $p = 0.000$). This pattern of results provides strong support for Hypothesis 2a.

For the moderating effect of exchange history, we find negative three-way interactions between trust, exchange history, and time (Model 4, Table 3: $b = -0.382$, $p = 0.011$) and between contracts, exchange history, and time (Model 4, Table 4: $b = -0.185$, $p = 0.027$). As such, these results support Hypothesis 2b. Within dyads, when exchange history is long (short), high levels of trust result in a 6.073% (1.000%) decrease in contract details, and highly detailed contracts result in an 8.254% (6.217%) decrease in trust. In Figure 1c, we plotted the within-dyad moderating effect. High levels of trust decrease detailed contracts only if exchange history is long ($b = -0.387$, $p = 0.000$) rather than short ($b = -0.062$, $p = 0.597$). Detailed contracts decrease trust more when exchange history is long ($b = -0.521$, $p = 0.000$) than when it is short ($b = -0.374$, $p = 0.000$). These results provide strong support for Hypothesis 2b.

Robustness Test

Since we conducted the survey in two separate time points, some respondent firms in Time 1 survey may not participate in the Time 2 survey and enter into the final sample, which may result in the sample selection bias and influence our results. To copy with this issue, we followed the suggestions of Wolfolds and Siegel (2019) to adopt the Heckman two-stage approach. In the first stage, we used the respondent firms in Time 1 survey as the sample where some firms enter the final sample in Time 2 survey (coded as 1) and some firms are not included in the final sample (coded as 0). We used this new constructed variable as the dependent variable and included the instrumental variable and previous control variables. Specifically, we considered the *government intervention* as the instrumental variable, which is associated with the above dependent variable but not related with the governance mechanism between buyers and

suppliers. With more government intervention, buyers and suppliers encounter more challenges from the external environment and are less likely to maintain their relationships for a longer time (Wang, Li, and Chang, 2016). However, government intervention may not directly influence the design and choice of the governance mechanism between buyers and suppliers. We constructed the probit model to predict whether the firms enter the final sample in Time 2 survey. The results indicate that government intervention is negatively associated with the presence of the respondent firms in the final sample ($b = -0.123, p = 0.030$), which is consistent with our prediction. Based on the results of the first-stage probit model, we got the selection parameter—the inverse Mills ratio—to account for the potential sample selection bias in our analysis. We included the inverse Mills ratio in the second regression stage and used the two-level HLM to re-test our hypotheses. The results are highly consistent with our main analyses.⁴

6. DISCUSSION

Our study shows that for buyer-supplier exchanges, contracts and trust interact with each other, as reflected in terms of both associations across dyads (between-dyad effect) and dynamic change within a dyad (within-dyad effect). Moreover, the between-dyad complementarity effect is strengthened with increased asset specificity, and the within-dyad substitution becomes more salient when exchange history is longer. Our study thus contributes to the B2B marketing literature in three primary ways.

First, this study advances current research on the contract–trust relationship by explicitly considering the dynamic nature of buyer-supplier exchanges (Majchrzak et al., 2015; Palmatier et al., 2013; Zhang et al., 2016). As relationships develop, mature, and decline over time, trust

⁴ We adapted a one-item scale from Wang et al. (2016) to measure government intervention: (1) the degree to which the changes of government regulations greatly affect our business operation? All results are available upon request.

and contracts change, as highlighted in both trust research (Vanneste et al., 2014) and the contracting literature (Mayer and Argyres, 2004; Vanneste and Puranam, 2010). Accordingly, they affect each other both at an absolute level, as exhibited by cross-sectional comparisons across dyads, and in the degree of change over time within a specific dyad (Dean et al., 2016). Our study thus complements previous research of cross-sectional, between-dyad comparisons (Cao and Lumineau, 2015) and responds to long-standing calls to examine the dynamics of buyer–supplier exchanges (Colm et al., 2020; Woolthuis et al., 2005; Zhang et al., 2016).

Second, by untangling the between-dyad effect from within-dyad effect of contracts and trust, we provide a new perspective for understanding the opposing sides of an ongoing debate. Theoretically, the between-dyad effect compares the structural associations across different dyads, whereas the within-dyad effect pertains to changes within a single dyad. Regarding their comparative strengths, our results suggest that the within-dyad effect explains a much larger proportion of variance than between-dyad effect, demonstrating the importance of examining the within-dyad effect of contracts–trust relationships (Singer and Willett, 2009). In terms of directions, we show that, in our sample, the complementarity of trust and contracts exists between dyads, yet the substitution occurs within dyads. Accordingly, our findings suggest the coexistence of substitution and complementarity effects. Prior studies often turn to contingency or decomposition approaches to reconcile such controversies (Connelly et al., 2012; Faems et al., 2008; Zhou and Poppo, 2010). By differentiating between- from within-dyad effects, we provide a novel way of understanding incompatible existing theoretical views and conflicting empirical findings (Certo et al., 2017).

Third, we explicate our key arguments by examining important moderators pertaining to the between-/within-dyad effects of contracts and trust. Between dyads, asset specificity reflects

a key structural trait of dyadic relationships (Tse and Ashkanasy, 2015). Dyadic exchanges of very low asset specificity are akin to anonymous market-based ones, whereas dyads carrying very high asset specificity are closer to hierarchies, demanding great managerial resources (Luo, 2008). Our results show that asset specificity positively moderates the impact of contracts on trust, supporting our logic that the complementarity effect exists for exchanges with high asset specificity. Regarding the within-dyad effect, time is a central factor. We reason that the learning effect likely is evident at the initial stage of an exchange, yet the routine effect may drive the contract–trust relationship into substitution at the mature stage. Our finding that exchange history strengthens the substitution between trust and contracts provides strong support for our logic. As such, we contribute to research that distinguishes between early and mature relationships (Levin, Whitener, and Cross, 2006; Verhoef, Franses, and Hoekstra, 2002). Taken together, these findings support our key arguments and also offer a more refined understanding of the contracts–trust relationship across exchange contexts.

Managerial implications

As supply chain management becomes increasingly important for firms seeking competitive advantage, our study carries important implications for channel managers. First, channel managers need to be aware that there are two distinct effects at play (i.e., between- and within-dyad effect) influencing the interplay between contracts and trust in their dyadic relationships. Since between-dyad and within-dyad effects are driven by different underlying mechanisms, when devising governance mechanisms, managers better be clear whether they are interested in the relative standing compared to others (between-dyad) or focusing on the focal relationship itself (within-dyad).

Moreover, concerning the relationship between contracts and trust, channel managers should pay special attention to important transactional and relational features. In particular, when governing exchanges with substantial relation-specific investments, contracts and trust can go well together. Channel managers thus can structure exchanges by devising detailed contracts that align incentives and demonstrate commitment, which helps build trust in a relationship. In parallel, trusting partners should take advantage of such relationship and not hesitate to draft detailed contracts, which can provide advantages over other dyads. Yet, internally, managers must remain alert to the potential substitution effect between contracts and trust over time within mature relationships. Heavy reliance on detailed contracts (trust) to regulate daily operations likely stimulates specific routines, which may gradually crowd out trust (contracts).

Limitations

This study has several limitations that also hold promise for further research. First, to illustrate the dynamic interactions between contracts and trust, we collected data at two time periods with the 3-year time lag and assumed continuous linear relationships of time with both contracts and trust. Further research should collect multiple waves of data with a range of time lags to explore the complex, varying changes that arise over time, such as nonlinear trends, development cycles, and discontinuities with sudden changes (Dalal et al., 2014). Multiple waves of data on other important indicators of the exchanges (i.e., asset specificity) may also capture the reality more precisely. In this study, we include transactional and relational features to validate the mechanisms underlying between- and within- dyad effects, respectively. While we consider asset specificity and exchange history as moderators, there are other possible contingencies worth investigation, e.g., dependence structure and interaction frequency.

Second, both contracts and trust are multidimensional. In particular, there are differences between “having” a contract (e.g., contractual design) and “using” a contract (e.g., contractual usage). Contracts can fulfill different functions, such as coordination and control (Malhotra and Lumineau, 2011), protect specific transaction details and the relationship; trust might be classified as calculative or relational (Poppo et al., 2016). Future research could consider the richness of both constructs to assess the complicated interplay between distinct subdimensions of trust and contracts over time.

Third, our findings are based on buyer–supplier relationships in China, whose unique cultural features may limit the generalizability of the results to other settings (Luo et al., 2011). For example, the relatively underdeveloped legal system in China may constrain the enforceability of formal contracts (Shou, Zheng, and Zhu, 2016). Weak formal institutions also make it difficult to establish common norms, structures, and procedures that typically support trust (Bachmann and Inkpen, 2011). The complex influence of the institutional environment on both contracts and trust suggests the need for research that examines the role of institutional factors, using multi-country samples from both emerging and developed markets.

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Table 1 Key arguments of the complementarity and substitution views regarding between- and within-dyad effects

	Complementary arguments	Substitutive arguments	Overall effect
Between	<ul style="list-style-type: none"> ▪ Detailed contracts entail great efforts and constitute a specific investment, and thus signal commitment and trust (Woolthuis et al., 2005; Zhou and Poppo, 2010). ▪ Detailed contracts limit opportunities and incentives for opportunism, enabling parties to trust each other (Lumineau, 2017; Poppo and Zenger 2002; Poppo et al., 2008; Schilke and Cook, 2015). <p><u>Summary</u>: Positive signaling and opportunism deterrence, which matter more for exchanges involving greater asset specificity.</p> <ul style="list-style-type: none"> ▪ Trust provides the basis for openness and psychological safety, which serve as a foundation for negotiating and devising detailed contracts (Woolthuis et al., 2005; Zaheer et al., 1998). <p><u>Summary</u>: Safety assurance, which matters more for exchanges involving greater asset specificity.</p>	<ul style="list-style-type: none"> ▪ As formal control, detailed contracts signal distrust, therefore lower trust (Ghoshal and Moran, 1996; Jap and Ganesan, 2000). ▪ Trust relies on informal norms, which show no need for detailed contracts (Zaheer and Venkatraman, 1995). <p><u>Summary</u>: Negative signaling, which matters more for less specific exchanges.</p> <ul style="list-style-type: none"> ▪ To save costs, high levels of trust will spare exchange parties from negotiating and amending detailed contracts, and vice versa (Das and Teng, 2001; Ring and Van de Ven, 1992). <p><u>Summary</u>: Economy of governance, this cost-saving consideration matters more for less specific exchanges.</p>	Complementary, given our sample of exchanges with high asset specificity
Within	<ul style="list-style-type: none"> ▪ Detailed contracts clarify each party's roles and expectations, fostering the development of a trusting relationship through formalization and learning (Lumineau, 2017; Schilke and Cook, 2015; Vlaar et al., 2006). ▪ Trust encourages learning and adjustment over time. As mutually agreed-upon processes and experiences become formalized, it generates contractual refinement and development (Mayer and Argyres, 2004; Vanneste and Puranam, 2010). <p><u>Summary</u>: Formalization and learning, which matter more for exchanges at the initial stage.</p>	<ul style="list-style-type: none"> ▪ Reliance on detailed contracts reinforces formal routines, thereby reducing the use of trust over time (Li et al., 2010; Zollo et al., 2002). ▪ Informal routines of high levels of trust preclude the use of formal processes associated with detailed contracts (Connelly et al., 2012; Li et al., 2010; McEvily et al., 2003). <p><u>Summary</u>: Self-enforcing routines, which matter more for exchanges at the mature stage.</p>	Substitutive, given our sample of mature exchanges

Table 2. Descriptive statistics

	1	2	3	4	6	7	8	9	10	11	12	13	14	15	16	17
1. Contracts at Time 2	1.000															
2. Trust at Time 2	0.295	1.000														
3. Contracts at Time 1	0.137	0.181	1.000													
4. Trust at Time 1	0.051	0.151	0.496	1.000												
6. Exchange history ^a	0.135	0.219	0.133	0.152	1.000											
7. Asset specificity	0.079	0.027	0.238	-0.016	0.155	1.000										
8. Market uncertainty	0.077	0.144	0.304	0.134	0.128	0.395	1.000									
9. Behavioral uncertainty	0.055	-0.003	-0.244	-0.488	-0.204	0.139	-0.279	1.000								
10. Product customization	0.135	-0.019	-0.138	-0.276	-0.055	0.298	-0.100	0.382	1.000							
11. Information sharing	0.083	0.229	0.396	0.587	0.236	-0.005	0.050	-0.387	-0.237	1.000						
12. Buyer age ^a	0.086	0.043	0.031	0.018	0.199	0.090	0.054	-0.032	0.083	0.077	1.000					
13. Supplier age ^a	-0.050	0.123	-0.031	0.016	0.399	0.025	-0.191	0.034	0.070	0.121	0.142	1.000				
14. Buyer mechanics	0.045	-0.020	0.092	0.110	-0.005	0.006	0.084	-0.032	-0.144	0.143	-0.073	-0.025	1.000			
15. Supplier mechanics	0.004	0.027	0.110	0.047	0.178	0.071	0.067	-0.037	0.081	0.058	0.004	0.042	0.087	1.000		
16. Buyer electronics	-0.005	0.143	-0.024	-0.021	-0.064	0.068	0.009	0.072	0.086	-0.044	-0.021	-0.021	-0.316	0.007	1.000	
17. Supplier electronics	-0.002	0.026	-0.077	-0.113	-0.034	0.079	-0.043	0.146	0.082	-0.079	-0.058	-0.048	-0.056	-0.219	0.514	1.000
Mean	5.929	5.716	5.639	5.860	1.452	2.506	4.039	3.492	3.948	5.043	2.340	2.191	0.208	0.184	0.276	0.176
SD	0.650	0.601	1.159	0.808	0.565	1.125	1.225	1.433	2.344	1.133	0.495	0.632	0.407	0.388	0.448	0.382

Notes: N = 250. The values of correlation coefficients greater than 0.124 are statistically significant at $p < 0.05$.

^a Natural log.

Table 3. Effects of trust on contracts over time

Independent Variables	M1		M2		M3		M4	
Between-dyad effect	b	se(p)	b	se(p)	b	se(p)	b	se(p)
Intercept	5.305	0.345 (0.000)	5.327	0.334 (0.000)	5.330	0.334 (0.000)	5.310	0.333 (0.000)
Buyer age	0.027	0.083 (0.749)	0.028	0.080 (0.731)	0.027	0.080 (0.738)	0.027	0.080 (0.733)
Supplier age	-0.117	0.070 (0.096)	-0.122	0.068 (0.074)	-0.121	0.068 (0.075)	-0.122	0.068 (0.073)
Buyer mechanics	-0.050	0.105 (0.634)	-0.055	0.101 (0.586)	-0.052	0.102 (0.608)	-0.051	0.101 (0.614)
Supplier mechanics	-0.012	0.107 (0.914)	-0.001	0.103 (0.996)	0.005	0.104 (0.963)	0.003	0.104 (0.976)
Buyer electronics	0.049	0.126 (0.700)	0.051	0.122 (0.676)	0.050	0.122 (0.685)	0.050	0.122 (0.682)
Supplier electronics	0.000	0.109 (0.997)	-0.004	0.106 (0.969)	-0.004	0.106 (0.973)	-0.003	0.105 (0.978)
Market uncertainty	0.091	0.039 (0.020)	0.087	0.037 (0.021)	0.087	0.037 (0.022)	0.087	0.037 (0.021)
Behavior uncertainty	0.057	0.035 (0.105)	0.058	0.034 (0.090)	0.059	0.034 (0.084)	0.059	0.034 (0.083)
Product customization	0.020	0.019 (0.310)	0.022	0.019 (0.236)	0.023	0.019 (0.227)	0.023	0.019 (0.231)
Information sharing	0.099	0.044 (0.026)	0.094	0.042 (0.028)	0.092	0.043 (0.032)	0.092	0.043 (0.032)
Exchange history	0.140	0.082 (0.092)	0.150	0.080 (0.061)	0.157	0.081 (0.054)	0.145	0.112 (0.196)
Asset specificity	0.057	0.042 (0.178)	0.050	0.041 (0.224)	0.048	0.041 (0.235)	0.048	0.041 (0.239)
Trust	H_{1a}:	0.242 (0.000)	0.666	0.081 (0.000)	0.701	0.111 (0.000)	0.703	0.112 (0.000)
Trust × Exchange history							0.229	0.134 (0.090)
Trust × Asset specificity	H_{1b}:				0.012	0.026 (0.647)	0.013	0.026 (0.610)
Within-dyad effect								
Time	0.290	0.072 (0.000)	0.290	0.065 (0.000)	0.290	0.065 (0.000)	0.317	0.066 (0.000)
Time × Trust	H_{2a}:		-0.671	0.081 (0.000)	-0.671	0.081 (0.000)	-0.668	0.081 (0.000)
Time × Exchange history							0.020	0.116 (0.866)
Time × Trust × Exchange history	H_{2b}:						-0.382	0.150 (0.011)
Deviance (-2 log-likelihood)	1236.746		1176.665		1176.454		1170.240	
Degrees of freedom	22		23		24		27	

Notes: N = 250. All tests are two-tailed. B = unstandardized coefficients; se = standard errors, with exact *p*-values in parentheses.

Table 4. Effects of contracts on trust over time

Independent Variables	M1		M2		M3		M4	
	b	se(p)	b	se(p)	b	se(p)	b	se(p)
Between-dyad effect								
Intercept	5.075	0.238 (0.000)	5.086	0.232 (0.000)	5.123	0.230 (0.000)	5.124	0.228 (0.000)
Buyer age	-0.025	0.056 (0.659)	-0.025	0.055 (0.647)	-0.032	0.054 (0.551)	-0.031	0.054 (0.560)
Supplier age	0.024	0.048 (0.621)	0.024	0.046 (0.597)	0.005	0.046 (0.909)	0.003	0.046 (0.953)
Buyer mechanics	-0.039	0.071 (0.588)	-0.037	0.069 (0.590)	-0.032	0.068 (0.641)	-0.041	0.068 (0.547)
Supplier mechanics	0.061	0.072 (0.398)	0.062	0.071 (0.382)	0.071	0.070 (0.309)	0.078	0.069 (0.260)
Buyer electronics	-0.189	0.074 (0.011)	-0.191	0.072 (0.008)	-0.179	0.071 (0.013)	-0.170	0.071 (0.017)
Supplier electronics	0.110	0.085 (0.199)	0.110	0.083 (0.188)	0.106	0.082 (0.199)	0.102	0.082 (0.214)
Market uncertainty	0.033	0.027 (0.216)	0.035	0.026 (0.176)	0.030	0.026 (0.245)	0.030	0.025 (0.234)
Behavior uncertainty	-0.035	0.023 (0.122)	-0.032	0.022 (0.152)	-0.029	0.022 (0.185)	-0.022	0.022 (0.315)
Product customization	-0.002	0.013 (0.885)	-0.002	0.013 (0.899)	-0.001	0.013 (0.924)	-0.002	0.013 (0.843)
Information sharing	0.184	0.028 (0.000)	0.182	0.027 (0.000)	0.182	0.027 (0.000)	0.180	0.027 (0.000)
Exchange history	0.097	0.056 (0.083)	0.101	0.054 (0.065)	0.125	0.055 (0.025)	0.089	0.073 (0.225)
Asset specificity	-0.044	0.029 (0.129)	-0.045	0.028 (0.110)	-0.049	0.028 (0.080)	-0.048	0.028 (0.087)
Contracts	H_{1a}: 0.132	0.026 (0.000)	0.260	0.036 (0.000)	0.366	0.058 (0.000)	0.373	0.058 (0.000)
Contracts × Exchange history							0.176	0.057 (0.002)
Contracts × Asset specificity	H_{1b}:				0.031	0.013 (0.021)	0.027	0.013 (0.045)
Within-dyad effect								
Time	-0.144	0.057 (0.012)	-0.144	0.056 (0.010)	-0.144	0.055 (0.010)	-0.128	0.055 (0.022)
Time × Contracts	H_{2a}:		-0.252	0.048 (0.000)	-0.252	0.047 (0.000)	-0.275	0.048 (0.000)
Time × Exchange history							0.083	0.098 (0.401)
Time × Contracts × Exchange history	H_{2b}:						-0.185	0.084 (0.028)
Deviance (-2 log-likelihood)	926.501		899.473		895.133		885.022	
Degrees of freedom	22		23		24		27	

Notes: N = 250. All tests are two-tailed. B = unstandardized coefficients; se = standard errors, with exact *p*-values in parentheses.

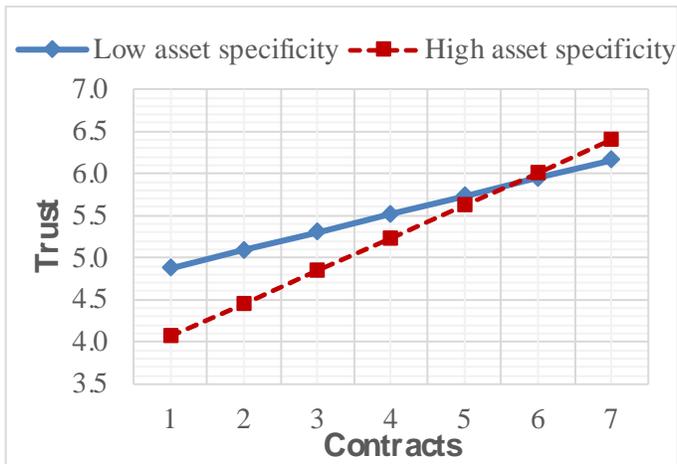


Figure 1a. Moderation by asset specificity (H1b)

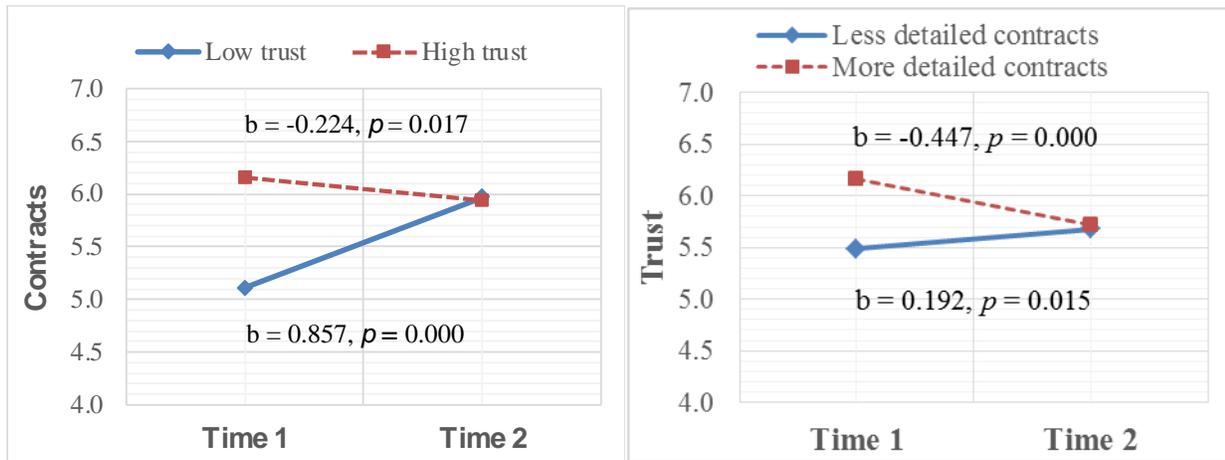


Figure 1b. Within-dyad effects over time (H2a)

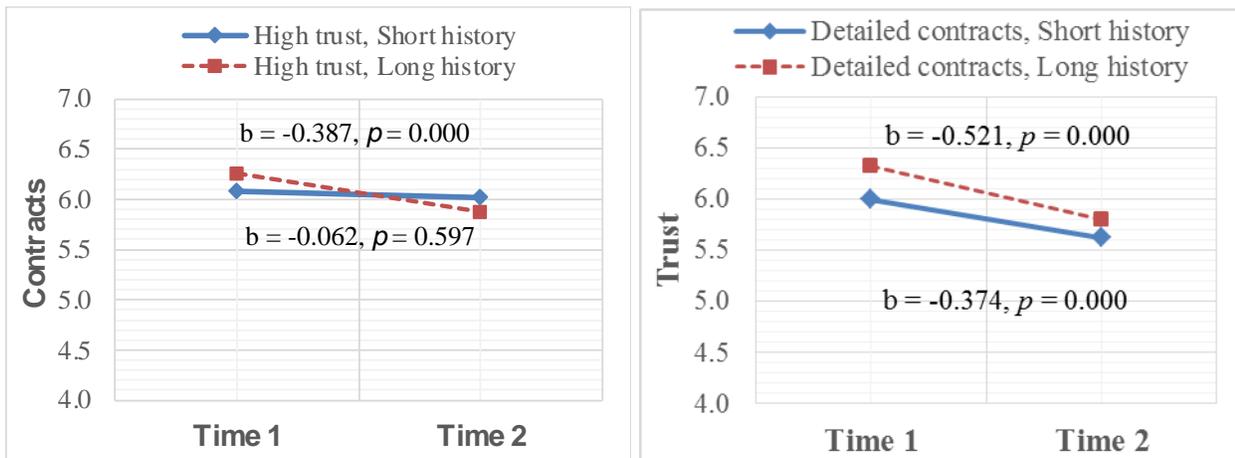


Figure 1c. Moderation by exchange history (H2b)

Appendix: Validity assessment

Measurement items	Factor Loading	
Trust: Time 1 CR = 0.89, AVE = 0.68; Time 2 CR = 0.82, AVE = 0.54	Time 1	Time 2
Please evaluate the following statements (1 = strongly disagree, 7 = strongly agree)		
1. This supplier is trustworthy.	0.89	0.78
2. This supplier has always been evenhanded in its negotiations with us.	0.92	0.91
3. This supplier never uses opportunities that arise to profit at our expense.	0.87	0.68
4. Based on past experience, we can with complete confidence rely on the supplier to keep promises made to us.	0.57	0.53
Detailed contracts: Time 1 CR= 0.93, AVE = 0.76; Time 2 CR = 0.84, AVE = 0.58	Time 1	Time 2
In dealing with this supplier, to what degree do the written contracts specify (1 = very low, 7 = very high)		
1. The role of each party	0.74	0.88
2. The responsibility of each party	0.93	0.90
3. How each party is to perform	0.93	0.61
4. How disagreement will be solved	0.88	0.59
Asset specificity: Time 1 CR = 0.87, AVE = 0.63	Time 1	
Please indicate the extent of specific investments made by the exchange partners in the following respects (1 = none, 7 = a great deal)		
1. Product features	0.61	
2. Personnel	0.73	
3. Marketing activities	0.90	
4. Major equipment and tools	0.90	
Behavioral uncertainty: Time 1 CR = 0.93, AVE = 0.87	Time 1	
Please evaluate the following statements (1 = strongly disagree, 7 = strongly agree)		
1. It is difficult to measure the collective performance of this supplier.	0.93	
2. It is difficult to evaluate if this supplier has followed our recommended operating procedures.	0.93	
Market uncertainty: Time 1 CR = 0.93, AVE = 0.82	Time 1	
Regarding the supply market, the following factors are changing (1 = very infrequently, 7 = very frequently)		
1. Vendor support service.	0.95	
2. Technology used by suppliers.	0.91	
3. Product supply.	0.80	
Information sharing: Time 1 CR = 0.93, AVE = 0.82	Time 1	
Please evaluate the following statements (1 = strongly disagree, 7 = strongly agree)		
1. We inform each other of important events and changes.	0.85	
2. We always share information on supply and demand forecasts.	0.95	
3. In this relationship, exchange parties share information frequently.	0.92	

Notes: CR = composite reliability, AVE = average variance extracted.