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### Performance implications of peer monitoring among suppliers

Hu, Qinfang; Hu, Jing; Yang, Zhilin

**Published in:**

Asia Pacific Journal of Marketing and Logistics

**Published:** 27/06/2023

**Document Version:**

Post-print, also known as Accepted Author Manuscript, Peer-reviewed or Author Final version

**Publication record in CityU Scholars:**

[Go to record](#)

**Published version (DOI):**

[10.1108/APJML-02-2022-0158](https://doi.org/10.1108/APJML-02-2022-0158)

**Publication details:**

Hu, Q., Hu, J., & Yang, Z. (2023). Performance implications of peer monitoring among suppliers. *Asia Pacific Journal of Marketing and Logistics*, 35(7), 1618-1638. <https://doi.org/10.1108/APJML-02-2022-0158>

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Hu, Q., Hu, J. and Yang, Z. (2023), "Performance implications of peer monitoring among suppliers", *Asia Pacific Journal of Marketing and Logistics*, Vol. 35 No. 7, pp. 1618-1638. <https://doi.org/10.1108/APJML-02-2022-0158>.



## Performance Implications of Peer Monitoring among Suppliers

Journal:	<i>Asia Pacific Journal of Marketing and Logistics</i>
Manuscript ID	APJML-02-2022-0158.R2
Manuscript Type:	Research Paper
Keywords:	peer monitoring, perceived deterrence, generalized reciprocity, balanced reciprocity, negative reciprocity, opportunism

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## Performance Implications of Peer Monitoring among Suppliers

### Abstract

**Purpose:** What are the performance implications of peer monitoring in a multiple-supplier context? Grounded in agency and social exchange theories, this study aims to examine how, when, and why peer monitoring works as a crucial control mechanism to reduce opportunism among suppliers.

**Design/methodology/approach:** A conceptual model and research hypotheses are tested using survey data from 246 respondents in 82 supplier groups.

**Findings:** Results suggest that peer monitoring is related positively to perceived deterrence (as mediator) and negatively to opportunism, whereas the mediated relationship is moderated negatively by generalized reciprocity and positively by balanced reciprocity and negative reciprocity.

**Originality/value:** This study introduces the application of peer monitoring into business-to-business research and shows how it reduces opportunism. Its findings have implications for manufacturers on how to use peer monitoring to control opportunism among multiple suppliers.

**Keywords:** peer monitoring; perceived deterrence; generalized reciprocity; balanced reciprocity; negative reciprocity; opportunism

## 1. Introduction

As organizations become more dependent on suppliers, due to specialization processes and outsourcing initiatives in recent years, managing suppliers become more critical to the success of these organizations (Govindan, Rajendran, Sarkis, and Murugesan 2015). Traditionally, supplier networks focus mainly on the individual dyadic relationship with single suppliers, failing to take into account the entire set of supplier relationships, especially supplier interdependencies (Roseira, Brito and Henneberg 2010). Not until recent years have supplier network studies gained growing importance. Various types of supplier collaboration have been discussed in the literature and collaboration between multiple suppliers has been proven to enhance firm performance in empirical studies (Schmoltzi and Wallenburg 2011; Khan et al. 2022). However, these suppliers are also individual entities. Besides shared interests with other suppliers, they also have their self interests to pursue. No research has been found to examine the complex interactions of individual suppliers in collaboration. The act of focusing on self interests may sometimes provide an opportunity for peer monitoring which can also contribute to organization success. Monitoring often serves as a crucial control mechanism to ensure that suppliers' behaviors are aligned with interests of their cooperating manufacturers. According to Loughry & Tosi (2008), monitoring includes both formal monitoring, such as the manufacturer's supervisory monitoring, which is built into an organization's formal structures and tied to organizational effectiveness, and informal monitoring, such as peer monitoring among suppliers, which is not stipulated or directed at the principal organization's performances, but encourages behavior better aligned with the principal's interests. Monitoring is indispensable in suppressing suppliers' opportunism largely because it enables the verification of behaviors and provides

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3 important feedback and guidance to the manufacturer (Heide, Kumar, and Wathne  
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5 2014; Kashyap and Murtha 2017; Swift, Guide, and Muthulingam 2019). When used  
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7 with other strategies, monitoring may also help curtail opportunism to a greater extent  
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9 (Zeng et al. 2016; Yang et al. 2021). However, excessive reliance on supervisory  
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11 monitoring can increase the manufacturer's operating costs and produce defensive  
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13 attitudes and behaviors towards the manufacturer (Heide, Wathne, and Rokkan 2007;  
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15 Loughry and Tosi 2008; Cai and Yang 2017).

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19 In contrast, informal peer monitoring among suppliers is not intentionally aimed at the  
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21 manufacturer's performance, but once it appears, it may objectively generate less  
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23 opportunism by offering the manufacturer better information about suppliers'  
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25 behaviors and performance results and motivating suppliers to engage in behaviors  
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27 that are beneficial to themselves (Hu et al. 2016). This exists extensively among  
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29 manufacturers working with multiple suppliers clustered geographically. Since  
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31 suppliers who cluster in the same geographical area and cooperate with the same  
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33 manufacturer are connected through social networks (e.g. trade and personal  
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35 associations) and engage in frequent and close interactions (Cai, Jun, and Yang 2020),  
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37 an abundance of opportunity is created for peer monitoring (Roseira, Brito, and  
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39 Henneberg 2010; Hu et al. 2016). Therefore, some manufacturers have been taking  
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41 incentive measures to stimulate suppliers' peer monitoring. For example, Huahong,  
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43 one of the top five oolong tea exporters in Fujian province in China, implements joint  
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45 liability governance to induce suppliers' monitoring to suppress their opportunism.  
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51 There is a rich literature on the effect of peer monitoring occurring among group  
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53 borrowers (Wydick 1999; Hermes, Lensink, and Mehrteab 2006; Pasupuleti 2010;  
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55 Cason et al. 2012; Carpenter and Williams 2014; Cameron, Oak, and Shan 2021). For  
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57 instance, Cason, Gangadharan, and Maitra (2012) report results from a group-lending  
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laboratory experiment indicating that, when the cost of peer monitoring is lower than the cost of lender monitoring, peer monitoring results in higher loan frequencies and repayment rates. Carpenter and Williams (2014) use experimental field evidence from Paraguay to explore the influence of peer monitoring in microcredit programs, and find a very strong causal relationship between loan group's propensity of peer monitoring and its repayment. Similar patterns have been observed in Muslim majority countries; implementation of peer monitoring helps improve performance of micro lending contracts when used along with profit sharing (Cameron et al. 2021). There is another strand of literature on peer monitoring occurring within organizations (Weick, Sutcliffe, and Obstfeld 1999; Sitkin and George 2005; Loughry and Tosi 2008; Smith et al. 2015). For example, Loughry and Tosi (2008) identify two types of peer monitoring (i.e. direct & indirect) among employees, and verify a positive main effect of direct peer monitoring on work-unit performance. Smith et al. (2015) design an A-B single-case research model to explore the effectiveness of peer monitoring in an elementary school, and their findings indicate that students' peer monitoring is an efficient method for increasing their pro-social behaviors.

Despite important insights by many scholars into peer monitoring, there are still some common research gaps. First, peer monitoring in most recent advances is interpersonal, working among individual borrowers, employees, or students, while peer monitoring among organizations (e.g. suppliers) remains largely unexplored. Second, most existing studies focus on direct influence of peer monitoring, overemphasizing rational economic reasoning beyond human behaviors, but neglect the key mediating mechanism of peer monitoring. Third, informal social factors that may play important moderating roles in peer monitoring's influence also need to be explored. Take supplier groups as an example. They are characterized by both self-

1 interested “homo economicus” and relationship-oriented “homo sociologicus”  
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5 (Kumar, Heide, and Wathne 2011). On one hand, suppliers, as independent economic  
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8 entities, have to take into consideration consequences of their behaviors and calculate  
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10 cost and benefit while making decisions. On the other hand, embedded in complex  
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12 social relationship networks, suppliers’ behaviors are “pushed from behind” (Kumar,  
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14 Heide, and Wathne 2011) by informal social factors which are crucial for exchanging  
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16 favors for organizational purposes in China (Gu, Hung, and Tse 2008; Wang, Huo,  
17  
18 and Zhao 2020). Therefore, performance implications of peer monitoring among  
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20 suppliers deserve more in-depth exploration.  
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24 In this study, our goal is to extend the existing literature on peer monitoring in three  
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26 ways. First, we examine the possibility that peer monitoring among suppliers can  
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28 reduce their opportunism, using horizontal supplier network relationships as the unit  
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30 of analysis. Second, we explore how peer monitoring among suppliers can reduce  
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32 their opportunism. Based on agency theory, peer monitoring can serve a monitoring  
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34 function by reducing information asymmetry and rousing suppliers’ awareness of risk  
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36 aversion (Loughry and Tosi 2008; Conning 2005). As agencies are risk averse  
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38 (Bergen, Dutta, and Walker 1992), perceived deterrence will reduce suppliers’  
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40 opportunism, which is beneficial, objectively, to the manufacturer. Third, we predict  
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42 that the effectiveness of peer monitoring is contingent upon three kinds of reciprocal  
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44 relationships among suppliers, namely, generalized reciprocity (indefinite and non-  
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46 equivalent returns and altruism among all actors), balanced reciprocity (immediate  
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48 and equivalent returns and mutual benefit among all actors), and negative reciprocity  
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50 (immediate and equivalent returns and egoism among all actors), as described by  
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52 Sahlins in his social exchange theory (Sahlins 1972). In other words, whether peer  
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54 monitoring works or not depends on suppliers’ reciprocal relationships to a great  
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3 extent.  
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5 In sum, based on analysis of horizontal supplier groups, we hypothesize that  
6 stronger peer monitoring is related to less opportunism, and perceived deterrence has  
7 a key mediating effect in the process. Also, generalized reciprocity moderates the  
8 relationships negatively, whereas balanced reciprocity and negative reciprocity  
9 moderate the relationships positively. Survey data were collected from 246  
10 respondents in 82 raw tea supplier groups serving a common manufacturer in China.  
11 The research settings are chosen for two reasons. First, raw tea suppliers gathered in  
12 the same geographical area are governed in the form of groups by their downstream  
13 manufacturer and peer monitoring is often encouraged among suppliers in each group  
14 through specified incentive measures, which make study samples readily available  
15 and accessible (Hu et al. 2016). Second, Chinese cultural and historical foundations  
16 are rooted deeply in the geographical area where raw tea suppliers gather and social  
17 relationships with Chinese characteristics play an important role in these raw tea  
18 suppliers' behaviors, providing an appropriate context for understanding the effect of  
19 social relationships on inter-organizational activities.  
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40 We organized this study as follows: First, the theoretical foundations and research  
41 hypotheses are presented. Second, the research method used to test the hypotheses is  
42 described. Third, the empirical results are shown. Finally, the implications and  
43 limitations of this study are discussed and the possible topics for further research are  
44 provided.  
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## 54 **2. Theory and hypotheses**

### 55 **2.1 Theoretical foundations**

56 A large body of research has been devoted to supply chain management and  
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collaboration is an essential part of it (Khan et al 2021). Various collaborations have been examined in the literature, including horizontal collaborations (Martin 2018), vertical collaborations (Khan et al. 2017, Verdonck 2017), and lateral collaborations (Simatupang and Sridharan 2002). At the horizontal level, emphasis has been put on cooperation rather than competition in the supply chain management literature (Khan et al 2021). Researchers have closely examined the architecture of cooperation, the motivations behind it, and its effectiveness (Martin et al 2018; Schmoltzi and Wallenburg 2011). However, no research has been found looking into the intertwined competitive relationship between the suppliers at the horizontal level in depth nor does it explain how this complex relationship affects firm performance. This competitive relationship between suppliers oftentimes provides an opportunity for peer monitoring which works to the advantage of the manufacturer and may also contribute to the organization's success.

According to agency theory, agency problems, including adverse selection and moral hazard, occur because the principal (e.g. the manufacturer) and multi-agents (e.g. the supplier groups) have asymmetric information and conflicting goals (Bergen, Dutta, and Walker 1992; Zu and Kaynak 2012). Extant literature posits that peer monitoring can be used to solve agency problems because it provides better principal information about agents' efforts or behaviors through peer reporting (Arnott and Stiglitz 1991; Barron and Gjerde 1997; Loughry and Tosi 2008). For example, evidence from the Grameen Bank of Bangladesh and similar group lending programs elsewhere shows that borrowers' peer monitoring is largely responsible for the successful performance of these financial organizations (Stiglitz 1990). Loughry and Tosi (2008) propound that peer monitoring is an informal organizational control which has a positive effect on organization's work-unit performance. However, most of these studies focus on

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3 the direct effect of agents' mutual monitoring initiated by individuals, such as  
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5 borrowers or employees on the principal's benefits, but neglect the effect of peer  
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7 monitoring occurring among organizations, let alone studying how agents' mutual  
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9 monitoring affects the principal's performance in depth. Hence, this study explores  
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11 both the influence and the influencing mechanism of peer monitoring in an agency  
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13 relationship between a focal manufacturer and multiple suppliers.  
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17 Social exchange theory is commonly applied to interpret inter-personal and inter-  
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19 organizational social interactions, and reciprocity is the core concept therein (Blau  
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21 1964; Voss et al. 2019). Gouldner (1960), one of the most important early  
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23 representative scholars, proposes that reciprocity is the basic principle governing  
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25 social exchange activities and has deep cultural characteristics, meaning that  
26  
27 reciprocity's manifestations change in different culture settings. Based on Gouldner's  
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29 point of view and long-time field survey, Sahlins (1972) suggests that there are many  
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31 types of reciprocity which have different types of influence in realistic actors'  
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33 exchange activities. Specifically, according to three dimensions of immediacy of  
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35 returns, equivalence of returns, and interest, reciprocity can be divided into three  
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37 types, i.e., generalized reciprocity, balanced reciprocity, and negative reciprocity. This  
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39 view of classification has had great influence on the development of social exchange  
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41 theory and has been widely accepted (Befu 1977). Importantly, it has been useful in  
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43 interpreting social exchange relationships in intra-organizational settings (Coyle et al.  
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45 2005; Wu et al. 2006). We believe it can also be helpful in understanding inter-  
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47 organizational social exchange activities. Therefore, this study considers using the  
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49 three types of reciprocity as the boundary conditions of the effectiveness of peer  
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51 monitoring among suppliers.  
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## 2.2 Development of hypotheses

### 2.2.1 *Peer monitoring and perceived deterrence*

Peer monitoring occurs when group members “notice and respond to their peers’ behavior or performance” (Loughry and Tosi 2008). Among multiple supplier groups serving a common manufacturer, peer monitoring appears when suppliers notice, discuss, correct, or report to the manufacturer if their peers within the group engage in activities that violate contractual agreements between manufacturers and themselves (Hu et al. 2016). Suppliers’ mutual monitoring might positively affect their perceived deterrence in several ways. First, suppliers’ information advantage and monitoring technique advantage make information acquisition much easier, enhancing their perceived celerity and certainty of being punished for the intended activities (Hu et al. 2011). According to agency theory, because suppliers coexist in an area for a long time, the degree of information transparency and information sharing among them is rather high, which obviously helps to reduce information asymmetry (Stiglitz 1990). Moreover, supplier clusters, which are economic spaces characterized by intensive-type transactions, always reflect similar professional cultural characteristics and customs (Scott 1999). Common culture improves mutual understanding of their daily activities, a factor which helps them gain monitoring technique advantage for purposes of acquiring information about peers’ opportunistic tendencies. Second, peer monitoring serves a built-in punishment function (Conning 2005), enhancing suppliers’ perceived severity of being punished for the intended activities (Wang, Gu, and Dong 2013). Because any supplier found taking opportunistic activities is discussed, censured, corrected, or even expelled by their peers, its reputation would be hurt and peer acceptance and praise would be lost (Sewell 1998), which is harmful to its future cooperation opportunities in business circles. Therefore, we believe that peer

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3 monitoring is positively related to perceived deterrence.  
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### 8 2.2.2 Moderating and mediating effects 9

10 Social exchange theory maintains that reciprocity is the essence of social interactions  
11 among exchange partners (Gouldner 1960). It plays an essential role in relationship  
12 marketing and is a key element in building sustainable relationships with customers  
13 (Rao and Perry 2002). Reciprocity also attributes to long-term beneficial relationships  
14 between supply chain partners (Yang and Gong 2021). Although in development,  
15 Sahlins (1972) considers that reciprocity in realistic social relationships has different  
16 characteristics and he divides reciprocal relationships into three kinds mentioned  
17 above based on dimensions of immediacy of returns, equivalence of returns, and  
18 interest. His view of reciprocity classification is consistent with social actors'  
19 exchange behaviors or interaction patterns (Zhang 2010), reflecting the peculiarity  
20 and complexity of social relationships. However, it has only been examined  
21 empirically in the context of inter-individuals rather than inter-organizations (Wu et al.  
22 2006; Tang et al. 2018; Marrewijk and Dessing 2019). As reciprocity functions as a  
23 guiding principle of social interactions and relationship maintenance in business-to-  
24 business markets (Li et al. 2013), we consider that generalized reciprocity, balanced  
25 reciprocity, and negative reciprocity are important moderating factors which would  
26 affect the relationship between peer monitoring and perceived deterrence.  
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49 Generalized reciprocity implies indefinite and non-equivalent returns and altruism  
50 (Sahlins 1972). That is to say, in generalized reciprocity relationships, suppliers  
51 would behave altruistically towards peers without considering returns. However, in  
52 contrast, suppliers are often offered rewards and incentives to encourage reports on  
53 opportunistic behaviors when peer monitoring is used. If getting rewards in return,  
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3 they risk being perceived as intrusive and damaging the intimate relationship with  
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5 peers (Heide, Wathne, and Rokkan 2007). Therefore, they prefer to opt for less peer  
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7 monitoring for the sake of group harmony and long-term benefits. This way, suppliers  
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9 who take opportunistic actions in a generalized reciprocity group will perceive less  
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11 deterrence of being punished. Meanwhile, the relationship between peer monitoring  
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13 and perceived deterrence should also be weaker in a high-trust context. Extant  
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15 literature shows that members in a generalized reciprocity group have a high degree  
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17 of trust in each other (Wu et al. 2006; Zhu et al. 2021). We expect that this is also true  
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19 for suppliers who are in generalized reciprocity relationships. For high trust leads to  
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21 “blind trust” (Gargiulo and Ertug 2006), which then leads to less objective peer  
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23 monitoring, resulting in trusted suppliers having less perceived deterrence of being  
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25 punished. Thus, we argue that when the supplier group is predominantly characterized  
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27 by a generalized reciprocity relationship, the positive effect of peer monitoring on  
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29 perceived deterrence will be weaker, and the related hypothesis can be stated as:

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35 **H1a.** The positive relationship between peer monitoring and perceived deterrence will  
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37 be moderated negatively by generalized reciprocity.  
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42 The basic features of balanced reciprocity are immediate and equivalent returns  
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44 among all actors. In a supplier cluster full of balanced reciprocity relationships, the  
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46 beneficiary member must repay equivalently to the obliger member in a given period.  
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48 Moreover, all suppliers chase a kind of exchange relationship characterized by give-  
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50 and-take conditions which will benefit every member therein (Sahlins 1972).  
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53 Compared with generalized reciprocity, there is less “personal color” and more  
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55 economic essence in balanced reciprocity (Hu 2017). So, unlike individuals in  
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57 balanced reciprocity relationships who prefer social exchange to economic exchange  
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3 within organizations (Wu et al. 2006; Tang et al. 2018), suppliers in these kinds of  
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5 clusters place more emphasis on their economic relationships with the manufacturer  
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7 rather than social relationships with peers. Driven by incentive measures made by the  
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9 manufacturer, suppliers would tend to strengthen peer monitoring, and have no  
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11 hesitation to report to the manufacturer once they obtain information about  
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13 opportunistic behaviors, thus increasing peers' perceived deterrence in balanced  
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15 reciprocity relationships. Also, as Sahlins (1972) finds, exchange parties' social  
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17 relationships change with their economic relationships during the process of  
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19 equivalent exchange. It can be seen, particularly in balanced reciprocity relationships,  
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21 that the default supplier's long-term cooperation with other suppliers in other  
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23 exchange fields would be damaged once his opportunistic behaviors are discovered.  
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25 Thus, reinforced peer monitoring increases suppliers' social pressure, stemming from  
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27 foreseeable adverse consequences. Hence, we propound that suppliers' balanced  
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29 reciprocity relationship can strengthen the positive relationship between peer  
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31 monitoring and perceived deterrence, and the next hypothesis can be stated as:

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37 **H1b.** The positive relationship between peer monitoring and perceived deterrence is  
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39 moderated positively by balanced reciprocity.  
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45 Reciprocity is comprised of a series of continuous interactions; whereas, negative  
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47 reciprocity and generalized reciprocity are at the two extremes (Hu et al. 2016; Zhu et  
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49 al. 2021). As generalized reciprocity negatively moderates the relationship between  
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51 peer monitoring and perceived deterrence, negative reciprocity has the opposite  
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53 moderating effect. Previous research has suggested that there are only economic  
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55 exchanges among exchange parties in a negative reciprocity relationship (Wu et al.  
56  
57 2006; Zhu et al. 2021). Similarly, suppliers in negative reciprocity relationships treat  
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each other in the capacity of “purely rational homo economicus” (Luo 2011), and their moral value is low as compared to the other two reciprocity relationships (Chang 2010). So, impelled by the manufacturer’s incentive measures, suppliers may make every endeavor in mutual monitoring to pursue maximum benefit, without showing much consideration for social relationships. Meanwhile, suppliers in a negative reciprocity relationship are selfishness-oriented and show distrust towards each other. Distrust is regarded as positive anticipation of others’ harming actions (Rousseau et al. 1998; Han et al. 2021), and will induce suppliers’ rationally mutual monitoring to protect their benefits. Along with the reinforcement of peer monitoring, suppliers will make the most of geographical advantage and technique advantage to obtain information about peers’ opportunistic behaviors, and, in the meantime, avoid taking the risks themselves. Hence, we predict that a positive relationship between peer monitoring and perceived deterrence will be strengthened in clusters endorsing negative reciprocity, and formulate the next hypothesis as:

**H1c.** The positive relationship between peer monitoring and perceived deterrence will be moderated positively by negative reciprocity.

Perceived deterrence is the extent to which suppliers perceive the certainty, celerity, and severity of being punished once the breach is discovered (Hu et al. 2011). As mentioned above, suppliers’ mutual monitoring induces their perceived deterrence. Furthermore, we predict that more perceived deterrence will lead to less opportunism within a supplier cluster for several reasons. First, drawing from general deterrence theory, as perceived punishment certainty and severity increase, opportunistic behaviors can be deterred effectively (Straub and Welke 1998; Herath and Rao 2009). More precisely, if suppliers who are the potential violators realize that the likelihood



of being punished is high and the penalties are severe for violation, they are more likely to be deterred from engaging in opportunistic behaviors and to adhere to the manufacturer's contract stipulations. Findings in punishment research have verified that stronger perception of severe punishment is more effective in suppressing undesirable behaviors (Chen, Ramamurthy, and Wen 2012). Second, suppliers' perceived deterrence will form cost expectations which are a direct function of perceived punishment outcomes (Frazier and Summers 1984). In other words, if perceived deterrence is strong enough, suppliers' overall cost expectations will be sufficiently high, which will outweigh the potential gains from opportunistic behaviors, thus resulting in reduced incentive to commit future opportunism (Wang, Gu, and Dong 2013). Finally, as behavioral theory suggests, if suppliers perceive that the punishment is imposed immediately after the undesirable behavior is observed, their potential default will be deterred effectively and intention to comply with contract stipulations will increase (Hu et al. 2011). Thus, we predict that greater peer monitoring leads to less opportunism through perceived deterrence, which has a positive mediating effect. The same three kinds of reciprocity relationships remain effective in the relationships as discussed above. More precisely, the effect of peer monitoring on opportunism through perceived deterrence is more effective in supplier clusters with higher balanced reciprocity and negative reciprocity and less effective in clusters with higher generalized reciprocity. The last three hypotheses are stated as:

**H2a.** The negative relationship between peer monitoring and opportunism, mediated through perceived deterrence, is moderated negatively by generalized reciprocity.

**H2b.** The negative relationship between peer monitoring and opportunism, mediated through perceived deterrence, is moderated positively by balanced reciprocity.

**H2c.** The negative relationship between peer monitoring and opportunism, mediated

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3 through perceived deterrence, is moderated positively by negative reciprocity.  
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8 Figure 1 presents the overall framework of the performance implications of peer  
9 monitoring.  
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12 (Insert Figure 1 about here)  
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### 15 **3. Methodology**

#### 16 *3.1 Study context and data collection*

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18 The empirical context for our study is the tea supply chain in China, involving  
19 clustered raw tea supplier groups serving a common manufacturer. Raw tea suppliers  
20 are located in township areas, characterized by large number, small scale, and close  
21 social ties. Aiming at solving the problem that the quality of tea can't reach the export  
22 market standard due to suppliers' long-term use of inferior pesticides, the  
23 manufacturer has tried to implement joint liability governance in supplier clusters  
24 since 2006. More precisely, on the basis of voluntary participation, suppliers are  
25 governed in groups, and each group is comprised of 6 to 12 suppliers. In a group, if a  
26 supplier member is found by the manufacturer to use inferior pesticides without being  
27 reported, all the raw tea from members of its group will be rejected by the  
28 manufacturer. Driven by joint liability governance, peer monitoring is common  
29 among suppliers. Obviously, the tea industry represents a suitable context for our  
30 research for several reasons. First, the focal manufacturer has stipulated specific  
31 incentive measures (i.e. joint liability governance) to encourage abundant peer  
32 monitoring within supplier groups. Second, suppliers in a group have long-term  
33 interactions, hence meeting the social exchange conditions of different reciprocity  
34 relationships. Third, the research settings, comprised of clustered supplier groups  
35 serving a common manufacturer, will be useful for us to control the influence of  
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3 exogenous factors, including industry, geographical area, and enterprise brand (Gu et  
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5 al. 2010).

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8 We collected data through a field study, involving the focal manufacturer and  
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10 supplier groups. Before the field survey, several interviews were conducted to ensure  
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12 the phrasing, content and validity of questionnaire items. More precisely, the general  
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14 manager of the focal manufacturer and eight supplier group leaders were interviewed  
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16 to help us develop the measurement scales. According to their feedback, we verified  
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18 the items' content and face validities, and made further adjustments to improve clarity  
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20 and relevance to the tea industry (Hu et al. 2016).

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23 To safeguard against same-source bias, we obtained the dependent variable  
24  
25 (opportunism) from the front-line managers (i.e. the supplier group leaders) of the  
26  
27 focal manufacturer, who had objective records of each supplier group's opportunistic  
28  
29 behaviors. The focal independent variables were obtained from the supplier groups  
30  
31 (Kumar, Heide, and Wathne 2011). Because our unit of analysis was the supplier  
32  
33 group, we identified three supplier members as qualified respondents for each group,  
34  
35 and averaged their responses to create group-level composites for further analysis  
36  
37 (Hermes, Lensink, and Mehrteab 2005; Loughry and Tosi 2008; Hu et al. 2016). We  
38  
39 drew a random sample of 122 tea supplier groups, all serving the focal manufacturer.  
40  
41 In return for their participation, all respondents were given the option of receiving a  
42  
43 report containing our research results. After three rounds of reminders, we received  
44  
45 valid responses from 82 supplier groups, which was our final sample. This response  
46  
47 rate of 67.2% compares favorably with rates obtained in prior inter-organizational  
48  
49 research contexts (Geldes et al. 2015; Kashyap and Murtha 2017).

### 50 51 52 53 54 55 56 57 58 *3.2 Measures*

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3 We adapted existing scales to our research settings using insights from fieldwork  
4 interviews (Wang et al. 2013). All of the multi-item measures used five-point  
5 response scales. The final items measuring each variable are provided in the appendix,  
6  
7 with their coefficient alpha, composite reliability (CA), and average variance  
8 extracted (AVE) statistics (Fornell and Larcker 1981). The correlation matrix and  
9  
10 descriptive statistics appear in Table 1.  
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16  
17 (Insert Table 1 about here)  
18

19  
20 *Peer monitoring.* Peer monitoring captures the extent of suppliers' mutual  
21 monitoring on opportunistic behaviors during the process of cooperating with the  
22 manufacturer. Specifically, we focused on monitoring in the form of noticing,  
23 discussing, correcting, or reporting if suppliers within a group engaged in activities  
24 which violated the contract. The five items are based on the ones used by Loughry  
25 and Tosi (2008).  
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33 *Perceived deterrence.* This scale describes suppliers' perception of the certainty,  
34 celerity, and severity of being punished once the opportunistic behavior is discovered.  
35 We adapted the measures for perceived deterrence of Hu et al. (2011) to the present  
36 context. Our final scale has three items.  
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42  
43 *Generalized reciprocity.* This scale captures the unconditional altruistic features of  
44 social exchange among suppliers. Given that Wu et al. (2006) have developed the  
45 scale and showed a broad array of evidence for its construct validity in the Chinese  
46 context, we followed them and used their three-item scale to measure generalized  
47 reciprocity.  
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54 *Balanced reciprocity.* Balanced reciprocity captures the equivalent relationship  
55 features among suppliers. Parallel to generalized reciprocity, we followed Wu et al.  
56 (2006) and used the three-item scale to measure balanced reciprocity.  
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3       *Negative reciprocity.* Opposite to generalized reciprocity, negative reciprocity  
4 captures the most impersonal type of economic exchange among suppliers. Likewise,  
5 we followed Wu et al. (2006) and used their three-item scale to measure negative  
6 reciprocity.  
7

8  
9  
10       *Opportunism.* Opportunism captures suppliers' behaviors that deviate from the  
11 manufacturer's specified behavior expectations in the contract. As the front-line  
12 managers of the focal manufacturer keep detailed records of the opportunistic  
13 behaviors of each supplier group since the signing of contracts, we obtained supplier  
14 groups' opportunism from their archival records. We designed the relatively distal  
15 measure, an annual average since group establishment, to minimize social desirability  
16 biases and ensure data objectivity.  
17

18  
19       *Control variables.* We included three control variables that could affect suppliers'  
20 opportunism. First, we controlled for group size, measured as the total number of  
21 suppliers in a group (Ahlin and Townsend 2007). Moreover, we controlled for  
22 member homogeneity, measured as the proportion of kinship members in a supplier  
23 group (Paxton et al. 2000; Ferrara 2003), for there were always kinships in supplier  
24 groups in our empirical context (Hu 2017), and kinships are similar and homogeneous  
25 in many aspects (Ferrara 2003). Finally, we used a six-item scale to control for  
26 knowledge sharing in a supplier group (Jiang 2013).  
27

### 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49       3.3 *Construct validity*

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51 We examined construct validity as follows: First, we ran exploratory factor analyses  
52 for perceived deterrence, generalized reciprocity, balanced reciprocity, negative  
53 reciprocity, and knowledge sharing. Factor solutions were consistent with theoretical  
54 postulates, and the results of reliability analyses showed that the measures possessed  
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3 satisfactory coefficient reliabilities. Second, to assess convergent validity of the  
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5 constructs, we conducted confirmatory factor analyses, and the results indicated  
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7 satisfactory fit ( $\chi^2 = 304.381$ , d.f. = 205,  $p < .01$ ; comparative fit index = .970;  
8  
9 incremental fit index = .970; normed fit index = .914; root mean square error of  
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11 approximation = .077). Moreover, as the Appendix shows, standardized factor  
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13 loadings of all items are large and significant ( $p < 0.01$ ), and CRs and AVEs of all  
14  
15 constructs meet Fornell and Larcker's (1981) recommended thresholds, in support of  
16  
17 convergent validity. Finally, to assess discriminant validity, we ran Chi-square  
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19 difference tests on all the constructs in pairs. The results indicated that all the chi-  
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21 square differences were highly significant ( $p < .01$ ), in support of discriminant  
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23 validity (Anderson and Gerbing 1988). Taken together, the measures possessed  
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25 satisfactory reliability and validity.  
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### 33 *3.3 Common Method Bias*

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35 Although common method bias is unlikely to be an issue in our study because we  
36  
37 collected the dependent and independent measures from different parties, we  
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39 examined the robustness of our results to ascertain the presence of any possible effect.  
40  
41 Specifically, we applied the method variance (MV) marker method and used a  
42  
43 variable theoretically unrelated to other study variables, which provided a proxy of  
44  
45 common method variance (Lindell and Whitney 2001). We chose age of the  
46  
47 respondents as the MV marker and computed the partial correlations after controlling  
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49 for MV (shown above the diagonal in Table 1). The results indicated that there was no  
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51 significant change in the major constructs. Therefore, we concluded that common  
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53 method bias was unlikely to be a serious concern.  
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#### 4 Results: Test of Hypotheses

Table 1 presents the means, standard deviations, as well as correlations among the variables. Because there are several significant correlations among the explanatory variables, we examined the variance inflation factors (VIFs) in the regression equations to check on multicollinearity. The values of the VIFs were within the acceptable range, indicating no serious concerns of multicollinearity (Neter et al. 1990).

Our contingency hypotheses (H1a, H1b, and H1c) pertain to the joint effects of peer monitoring and three kinds of reciprocal relationships. Specifically, H1a states that the positive effect of suppliers' peer monitoring on their perceived deterrence weakens with generalized reciprocity. Statistically, this is represented by a negative interaction term between peer monitoring and generalized reciprocity. As Table 2 shows, the interaction term is negative and significant ( $b = -.25, p < .05$ ), in support of H1a. H1b states that balanced reciprocity strengthens the positive effect of suppliers' peer monitoring on their perceived deterrence. Statistically, this is represented by a positive interaction term between peer monitoring and balanced reciprocity. As Table 2 shows, the interaction term is positive and significant ( $b = .27, p < .05$ ), in support of H1b. H1c states that negative reciprocity strengthens the positive effect of suppliers' peer monitoring on their perceived deterrence. Statistically, this is represented by a positive interaction term between peer monitoring and negative reciprocity. As Table 2 shows, the interaction term is positive and significant ( $b = .28, p < .05$ ), in support of H1c.

Our last three hypotheses (H2a, H2b, and H2c) predict moderated mediations. First, we examine the relationship between perceived deterrence and opportunism. As Model 3 (Table 2) shows, holding constant peer monitoring, generalized reciprocity

(or balanced reciprocity or negative reciprocity), and other covariates, the regression coefficients for perceived deterrence are negative and significant separately ( $b = -.19$ ,  $p < .01$ ;  $b = -.25$ ,  $p < .01$ ;  $b = -.22$ ,  $p < .01$ ). The three coefficients reveal that suppliers' perceived deterrence decreases their opportunism. Further, we probe whether perceived deterrence mediates the moderated relationships between peer monitoring and opportunism. Specifically, as Model 1 (Table 2) shows, the effect of the interaction between peer monitoring and generalized reciprocity ( $PM \times GR$ ) on opportunism is positive and significant ( $b = .23$ ,  $p < .01$ ). After adding perceived deterrence to the estimation (Model 3, Table 2), the coefficient of the same interaction term decreases in magnitude ( $b = .18$ ,  $p < .01$ ). This decrease suggests that the moderated relationship between peer monitoring and opportunism is mediated by perceived deterrence, statistically confirming mediated moderation (Hayes, 2013). Likewise, we examine the other two sets of coefficients in Models 1 and 3 (Table 2). Before adding perceived deterrence to the estimation (Model 1, Table 2), the coefficient of the interaction between peer monitoring and balanced reciprocity ( $PM \times BR$ ) is  $b = -0.11$  ( $p < .10$ ), and the coefficient of the interaction between peer monitoring and negative reciprocity ( $PM \times NR$ ) is  $b = -0.11$  ( $p < .10$ ), both of which are negative and directionally significant (Avery et al. 2012). After adding perceived deterrence to the estimation (Model 3, Table 2), the coefficients of the two interaction terms decrease respectively in magnitude ( $b = -.04$ ,  $p > .10$ ;  $b = -.04$ ,  $p > .10$ ), statistically confirming mediated moderations (Hayes, 2013).

(Insert Table 2 about here)

Further, we conducted bootstrapping analysis to investigate conditional indirect effects. The advantage of using bootstrapping analysis is that it doesn't rely on a distribution assumption and can provide estimates for confidence intervals (Preacher,



Rucker, and Hayes 2007). Specifically, we used SPSS macro “INDIRECT” written by Hayes (2013) to regress opportunism on the interactions of peer monitoring and generalized reciprocity ( $PM \times GR$ ), peer monitoring and balanced reciprocity ( $PM \times BR$ ), and peer monitoring and negative reciprocity ( $PM \times NR$ ) respectively, mediated through perceived deterrence, with a sample of 5000 and a 95 percent confidence interval. The conditional indirect effects are equal to the product of a path (regressing perceived deterrence on  $PM \times GR$ ,  $PM \times BR$ , and  $PM \times NR$ ) and b path (regressing opportunism on perceived deterrence). If the bootstrapped 95 percent CI’s don’t include zero, the conditional indirect effects are significant, further confirming the mediated moderations (Preacher, Rucker, and Hayes 2007). As Table 3 shows, the three bootstrap 95 percent CI’s are  $LLCI=0.0059$  and  $ULCI=0.13850$  (generalized reciprocity as moderator),  $LLCI=-0.1737$  and  $ULCI=-0.0057$  (balanced reciprocity as moderator), and  $LLCI= -0.1510$  and  $ULCI= -0.009$  (negative reciprocity as moderator). None of these intervals contains zero, confirming significant indirect effects in all three cases.

(Insert Table 3 about here)

## 5 Discussion

The current study takes raw tea supplier clusters serving a common manufacturer as the research object. In order to improve the quality of tea, the manufacturer has implemented joint liability governance in supplier clusters. That is, in a group, if a supplier member is found by the manufacturer to use inferior pesticides without being reported, all the raw tea from members of its group will be rejected by the manufacturer. On the one hand, driven by joint liability governance, tea suppliers want to use peer monitoring to protect their own interests. On the other hand, as

1 suppliers in each cluster are often small-scale farmers located in the same  
2  
3 geographical area, growing the same tea, and also with social ties, they are familiar  
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5 with how business is done in the area and have ways to monitor their cooperatives. In  
6  
7 this context, the study explores the possibility of using peer monitoring to curb  
8  
9 opportunistic behaviors in suppliers and tries to explain how it works and how it  
10  
11 interacts with social relationships between suppliers. Our empirical tests reveal that  
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13 peer monitoring is associated positively with perceived deterrence, but negatively  
14  
15 with opportunism. This is consistent with prior studies on role of monitoring and  
16  
17 function of peer monitoring. Objectively, suppliers' information advantage and  
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19 monitoring technique advantage make information acquisition much easier, enhancing  
20  
21 their perceived certainty and celerity of being punished for the intended activities (Hu  
22  
23 et al. 2011). Subjectively, peer monitoring serves as a built-in punishment function  
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25 (Conning 2005), enhancing suppliers' perceived severity of being punished for the  
26  
27 intended activities (Wang, Gu, and Dong 2013). Then, when perceived certainty,  
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29 severity and celerity of being punished increases, suppliers' expected costs would  
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31 outweigh the potential gains, leading to the decrease of opportunistic behaviors  
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33 (Herath and Rao 2009; Hu et al. 2011; Wang, Gu, and Dong 2013). The above  
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35 viewpoints are further confirmed by in-depth interviews with some suppliers in the  
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37 early stage of this study. Suppliers interviewed agreed that supplier members would  
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39 take the initiative to take advantage of their own information, technology, and other  
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41 advantages to monitoring each other, so as to make self-governance arise and control  
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43 opportunistic behaviors effectively in the cluster. As one supplier said, "I often go out  
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45 for a walk to notice if members of my group use banned pesticides. I'll stop any  
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47 violations as soon as I find out, and this works well." Another interviewee who is the  
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49 supplier group leader said, "Supplier members of my group have been cooperating  
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3 with the manufacturer for six years, and our performance has always been very good,  
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5 just because we always actively discuss and correct violations by ourselves, or even  
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7 report problems to the manufacturer.”  
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10 At the same time, our findings shed light on the conditional effects of different  
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12 reciprocal relationships on the performance implications of peer monitoring, applying  
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14 Sahlins' (1972) view of reciprocity classification in an inter-organizational context.

15 According to the core viewpoint, generalized reciprocity, balanced reciprocity, and  
16  
17 negative reciprocity are consistent with characteristics of a differential pattern within  
18  
19 the context and background of Chinese traditional culture (Zhang 2010). These three  
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21 forms of reciprocity exert different influences on suppliers' activities embedded in  
22  
23 complex social relationships. Specifically, in generalized reciprocity relationships, as  
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25 suppliers show stronger identification and trust, both their intention and behavior of  
26  
27 peer monitoring decrease, resulting in less perceived deterrence and more  
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29 opportunism. Hence, as demonstrated in our study, generalized reciprocity weakens  
30  
31 significantly the effectiveness of peer monitoring.  
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34 By way of contrast, negative reciprocity and balanced reciprocity affect the  
35  
36 effectiveness of peer monitoring differently. Suppliers in negative reciprocity  
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38 relationships show strong selfish tendencies and distrust among one another, resulting  
39  
40 in strong intention and action to reinforce peer monitoring, hence, encouraging  
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42 perceived deterrence and discouraging opportunism. Somewhat surprisingly, although  
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44 extant literature has demonstrated that while balanced reciprocity takes effect as  
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46 generalized reciprocity does in a Chinese intra-organizational context (Wu et al. 2006),  
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48 our inter-organizational context leads to different findings even though both studies  
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50 were done in China. Our findings show that balanced reciprocity strengthens the  
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52 effectiveness of peer monitoring, the same as negative reciprocity.  
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## 6 Conclusion

### 6.1 Implications for Theory

The current study contributes to the existing literature in several aspects. First, this study for the first time introduces the idea of peer monitoring into business-to-business research. Previous studies of peer monitoring have focused on individuals in borrowing groups (Wydick 1999; Hermes, Lensink, and Mehrteab 2006; Pasupuleti 2010, Cameron et al. 2021) or employees within organizations (Weick, Sutcliffe, and Obstfeld 1999; Sitkin and George 2005; Loughry and Tosi 2008; Kinory and Canada 2020). Most of them have employed mathematical methods to analyze direct influence of individuals' peer monitoring (Stiglitz 1990; Wydick 2002; Hermes and Lensink 2007; Cameron et al. 2021). This study, however, explores the application of a peer monitoring mechanism in the inter-organizational context and examines how peer monitoring between suppliers reduces opportunism among suppliers.

Second, this study shows the moderating effects of various reciprocal relationships in the influence of peer monitoring on suppliers' opportunistic behaviors. Interestingly, some reciprocal relationships play a different role in intra- and inter-organizational contexts. While existing literature finds that reciprocity among individuals is mainly about social exchange (Wu et al. 2006; Tang et al. 2018), this is not the case between all organizations. For example, balanced reciprocity ignores social exchange within organizations (Wu et al. 2006; Tang et al. 2018), but attaches more importance to economic exchange among suppliers and strengthens the effectiveness of their mutual monitoring. It indicates that, unlike employees appreciating intra-organizational trust and support, suppliers in balanced reciprocity relationships would place more emphasis on economic benefits rather than on social

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3 feelings and norms. This empirical research provides theoretical guidance when  
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5 building effective organizational structure and indicates that experiences of successful  
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7 peer monitoring practices among individuals may not be directly transferred to an  
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9 inter-organizational context.  
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### 14 15 *6.2 Implications for Practice*

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17 For manufacturers working with multiple suppliers that have close ties, monitoring  
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19 suppliers to effectively suppress their opportunism at low cost is always challenging  
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21 in practice. Our findings suggest that opportunism governance can not be limited to  
22  
23 manufacturers' formal supervisory monitoring. We examine the effectiveness of peer  
24  
25 monitoring in suppressing opportunism among horizontal suppliers and formulate  
26  
27 three key practical implications. First, the manufacturer could implement incentive  
28  
29 measures to encourage suppliers' peer monitoring. Suppliers with close ties interact  
30  
31 frequently and form complex social relationships with each other, which can work to  
32  
33 the manufacturer's advantage. For example, Huahong and Bama, China's tea  
34  
35 manufacturers, have been implementing a joint liability mechanism, which  
36  
37 strengthens suppliers' interdependence of interests, and, therefore, induces peer  
38  
39 monitoring. Compared with supervisory monitoring, peer monitoring not only reduces  
40  
41 defensive attitudes and behaviors towards the manufacturer, but also involves less  
42  
43 monitoring cost and yields better information sharing, resulting in an enhanced  
44  
45 governance effect for the manufacturer. That is to say, peer monitoring may have  
46  
47 value for reducing the dilemma of suppliers' opportunism when the manufacturer's  
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49 supervision is difficult or expensive, such as when a large number of small scale  
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51 suppliers makes it difficult to monitor individual performance. This practice could  
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53 work well not just in food manufacturing, but also in other industries that involve  
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3 fragmented markets with small or medium-sized enterprises. For example, the  
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5 European logistics industry, such as road transportation in Flanders alone consisting  
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7 of 4667 small carriers serving only 6 million people in 2003 which suffer from low  
8  
9 efficiency and negative public image (Crujissen, Dullaert and Joro 2006), the fashion  
10  
11 industry, such as Levi Strauss which works with numerous cotton farmers in more  
12  
13 than 100 countries, about 80 percent of which are small, family-owned (Joule 2011),  
14  
15 and the cosmetics industry, such as L'Oréal, which always looks for innovative ways  
16  
17 to collaborate with their farmers for sustainable development (Withisuphakorn et al.  
18  
19 2019). A peer monitoring mechanism may help them when sourcing supplies or  
20  
21 services that are up to their standards and may improve their organizational  
22  
23 performance.  
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28  
29 Second, guidelines that follow from our study suggest an emphasis on social  
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31 influences within supplier networks. More precisely, our findings reveal that peer  
32  
33 monitoring serves a built-in punishment function, and could successfully lead to  
34  
35 suppliers' perceived deterrence, which is the key factor in ensuring effectiveness of  
36  
37 peer monitoring. For example, once a supplier is found to have a tendency toward  
38  
39 opportunistic behavior or is engaging in opportunistic behavior, other suppliers will  
40  
41 take the initiative to impose corresponding collective sanctions on him, such as  
42  
43 alienation, dismissal, or even termination of cooperation in other fields, so that his  
44  
45 loss far exceeds the benefits gained by opportunistic behavior. As mentioned earlier,  
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47 if suppliers realize that the likelihood of being punished is high and the penalties are  
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49 severe for violation, or that punishment would be imposed immediately after the  
50  
51 undesirable behavior is observed, their potential default will be deterred effectively  
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53 and intention to comply with contract stipulations will increase. So, manufacturers  
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55 should take this into consideration when structuring their supplier networks by  
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3 clustering suppliers with pre-existing relationships together. This could be suppliers  
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5 from the same geographical area or those who partnered with each other before. This  
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7 way, manufacturers could take advantage of suppliers' social influences on each other  
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9 to increase their perceived deterrence and improve the governance effect with that  
10  
11 specific objective in mind.  
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13  
14 Finally, suppliers' social exchange relationships should be fully considered when  
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16 the manufacturer deploys incentive measures. As our findings indicate, generalized  
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18 reciprocity would weaken the effectiveness of peer monitoring, while balance  
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20 reciprocity and negative reciprocity would strengthen its effectiveness. Therefore, to  
21  
22 maximize the governance effect, the manufacturer should impose restrictions on  
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24 supplier group formation and avoid highly generalized reciprocity relationships. For  
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26 example, relatives or close friends in a supplier group would be excluded.  
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### 33 *6.3 Limitations and Further Research*

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35 Some limitations of this study should be noted. First, our study was conducted within  
36  
37 the tea industry. Although **the study context bears resemblances to many smaller scale**  
38  
39 **industries**, our results may have limited generalizability. Thus, future research should  
40  
41 attempt to account for peer monitoring in other industries. Second, we only surveyed  
42  
43 supplier groups serving one focal manufacturer. Thus, caution is advised if applying  
44  
45 study results to other contexts or settings with more manufacturers. Third, as the peer  
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47 monitoring in the case we studied is used with anticipation of negative consequences,  
48  
49 we focused mainly on its deterrence effect. In practice, there could also be positive  
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51 reinforcement where rewards are given to encourage peer monitoring. Fourth, the size  
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53 of our sample was modest. Although sample size is a common problem in network-  
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55 level research, it would be desirable to replicate our findings with a larger sample.  
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3 Fifth, our survey was cross-sectional, which would limit tests of causal linkage in our  
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5 model. So, further studies should be designed to include a longitudinal dimension.  
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7  
8 Last, suppliers' activities may be affected by different social, cultural, and historical  
9  
10 factors in China. Although three kinds of reciprocity relationships properly represent  
11  
12 our tea suppliers' social relationship characteristics, there may be other theoretical  
13  
14 lenses (e.g. relational governance) and a broader set of moderators (e.g. trust) to  
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16 consider in future studies.  
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## REFERENCES

- Ahlin C., Townsend R.M.. 2007. Using repayment data to test across models of joint liability lending[J]. *The Economic Journal*, 117(517): 11-51.
- Anderson J.C., Gerbing D.W.. 1988. Structural equation modeling in practice: A review and recommended two-step approach[J]. *Psychological Bulletin*, 103(3): 411-423.
- Arnott, R., Stiglitz J. E.. 1991. Moral hazard and nonmarket institutions: Dysfunctional crowding out or peer monitoring?[J]. *American Economic Review*, 81: 179-190.
- Avery J., Steenburgh T.J., Deighton J., Caravella M.. 2012. Adding Bricks to clicks: Predicting the patterns of cross-channel elasticities over time, *Journal of Marketing*, 76(May): 96-111.
- Barron J.M., Gjerde K.P.. 1997. Peer pressure in an agency relationship. *Journal of Labor Economics*, 15(2): 234-254.
- Befu H.. 1977. Social exchange[J]. *Annual Review of Anthropology*, 6: 255-281.
- Bergen M., Dutta S., Walker Jr O.C.. 1992. Agency relationships in marketing: A review of the implications and applications of agency and related theories[J]. *Journal of Marketing*, 56(3): 1-24.
- Blau P.M.. 1964. Exchange and power in social life[M]. *New York: John Wiley & Sons, Inc.*
- Cai S., Jun M., Yang Z.. 2020. The Joint Effects of Formal Insitutions and Business Characteristics on Interfirm Guanxi Practices in China: A Fuzzy Set Analysis[J]. *Journal of Business-to-Business Marketing*, 27(2): 151-172.
- Cai S., Yang Z.. 2017. Trust, Information Integration, and Coordination Costs: An Integrative Model[J]. *Asian Journal of Business Research*, 7(1): 79-93.
- Carpenter J., Williams T.. 2014. Peer Monitoring and Microcredit: Field Experimental Evidence from Paraguay[J]. *Oxford Development Studies*, 42(1): 111-135.
- Cameron A., Oak M., Shan Y.. 2021. Peer monitoring and Islamic microfinance [J]. *Journal of Economic Behavior & Organization*, 184 (April): 337-358.
- Cason T.N., Gangadharan L., Maitra P.. 2012. Moral hazard and peer monitoring in a laboratory microfinance experiment[J]. *Journal of Economic Behavior & Organization*, 82(1): 192-209.
- Cassar, A., Crowley, L., Wydick, B.. 2007. The effect of social capital on group loan repayment: Evidence from field experiments[J]. *The Economic Journal*, 117(517): 85-106.
- Chang X.. 2010. Guanxi or li shang wanglai ? --- Reciprocity, social support networks, & social creativity in a Chinese village[M]. *Airiti Press*.
- Chen Y., Ramamurthy K., Wen K-W.. 2012.Organizations' information security policy compliance: Stick or carrot approach?[J]. *Journal of Management Information Systems*, 29(3): 157-188.

- 1  
2  
3 Conning J.. 2005. Monitoring by delegates or by peers? Joint liability loans under  
4 moral hazard, *Working Paper*.
- 5  
6 Coyle S., Jacqueline A-M., Conway N.. 2005. Exchange relationships: Examining  
7 psychological contracts and perceived organizational support[J]. *Journal of*  
8 *Applied Psychology*, 90: 774–781.
- 9  
10 Cruijssen F., Dullaert W., Joro T.. 2006. Logistic Efficiency Through Horizontal  
11 Cooperation: The Case of Flemish Road Transportation Companies. CentER  
12 Discussion Paper No. 2006-14. Available at <https://ssrn.com/abstract=895457>,  
13 last accessed on May 31, 2022.
- 14  
15 Ferrara E. L..2003. Kin groups and reciprocity: A model of credit transactions in  
16 Ghana[C]. Bureau for Research in Economic Analysis of Development.
- 17  
18 Fornell C., Larcker D.F.. 1981. Evaluating structural equation models with  
19 unobservable variables and measurement error[J]. *Journal of Marketing*  
20 *Research*, 18(1): 39-50.
- 21  
22 Frazier G.L., Summers J.O.. 1984. Interfirm influence strategies and their application  
23 within distribution channels[J]. *Journal of Marketing*, 48 (Summer): 43-55.
- 24  
25 Gargiulo M., Ertug G.. 2006. The dark side of trust[M]. *Cheltenham: Edward Elgar*.
- 26  
27 Geldes C., Felzensztein C., Turkina E., Durand A.. 2015. How does proximity affect  
28 interfirm marketing cooperation? A study of an agribusiness cluster[J]. *Journal*  
29 *of Business Research*, 68(2): 263-272.
- 30  
31 Gouldner A.W.. 1960. The norm of reciprocity: A preliminary statement[J]. *American*  
32 *Sociological Review*, 25: 161-178.
- 33  
34 Govindan K., Rajendran S., Sarkis J., Murugesan P.. 2015. Multi criteria decision  
35 making approaches for green supplier evaluation and selection: a literature  
36 review[J]. *Journal of Cleaner Production*, 98: 66-83
- 37  
38 Gu F.F., Hung K., Tse D.K.. 2008. When does guanxi matter? Issues of capitalization  
39 and its dark sides[J]. *Journal of Marketing*, 72(July): 12-28.
- 40  
41 Gu F.F., Kim N., Tse D.K., Wang D.T.. 2010. Managing distributors' changing  
42 motivations over the course of a joint sales program[J]. *Journal of Marketing*, 74  
43 (5): 32-47.
- 44  
45 Han W., Huang Y., Hughes M., and Zhang M.. 2021. The trade-off between trust  
46 and distrust in supply chain collaboration[J]. *Industrial Marketing Management*,  
47 98(7): 93-104.
- 48  
49 Hayes A.F.. 2013. Introduction to mediation, moderation, and conditional process  
50 analysis: A regression-based approach[M]. *Guilford Publications, New York, NY*.
- 51  
52 Heide J.B., Kumar A., Wathne K.H.. 2014. Concurrent sourcing, governance  
53 mechanisms, and performance outcomes in industrial value chains[J]. *Strategic*  
54 *Management Journal*, 35(August): 1164–1185.
- 55  
56 Heide J.B., Wathne K.H., Rokkan A.I.. 2007. Interfirm monitoring, social contracts,  
57 and relationships outcomes[J]. *Journal of Marketing Research*, XLIV (August):  
58 425-433.
- 59  
60 Herath T., Rao H.R.. 2009. Protection motivation and deterrence: A framework for  
security policy compliance in organizations[J]. *European Journal of Information*

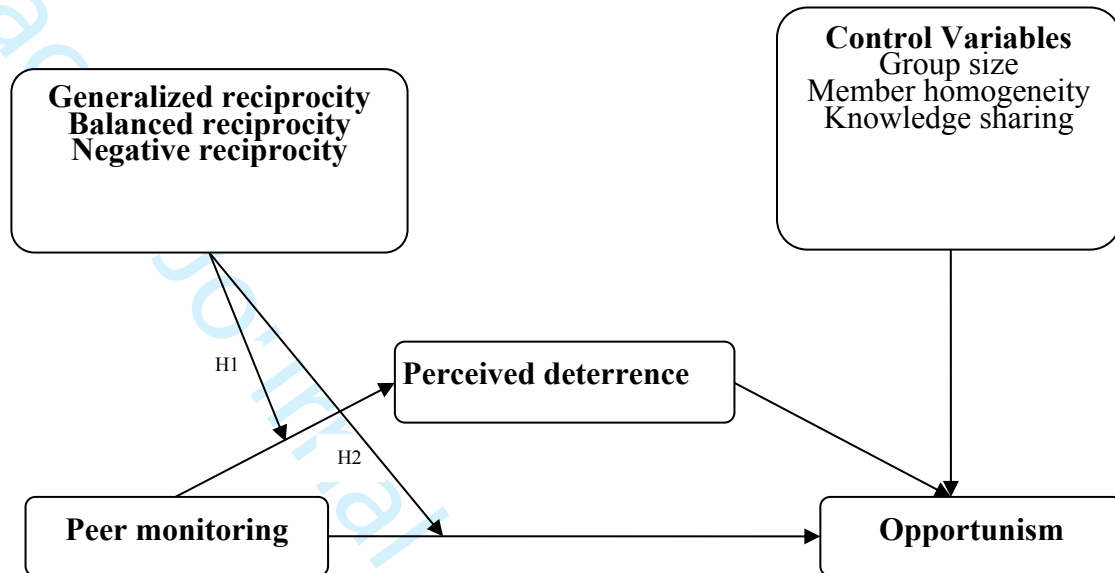
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47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60
- Systems*, 18(2): 106–125.
- Hermes N., Lensink R.. 2007. The empirics of microfinance: What do we know?[J]. *The Economic Journal*, 117(517): 1-10.
- Hermes N., Lensink R., Mehrteab H.T.. 2006. Does the group leader matter? The impact of monitoring activities and social ties of group leaders on the repayment performance of group-based lending in Eritrea[J]. *African Development Review*, 18(1): 72-97.
- Hermes N., Lensink R., Mehrteab H.T.. 2005. Peer monitoring, social ties and moral hazard in group lending programs: Evidence from Eritrea[J]. *World Development*, 33(1): 149-169.
- Hu Q., Chan S.F., Zhang G., Yang Z.. 2016. The joint-liability mechanism: Controlling opportunism through peer monitoring among Chinese supplier groups[J]. *Journal of Business & Industrial Marketing*, 31(5): 640-653.
- Hu Q.. 2017. Research on governance of opportunistic behaviors in cluster of suppliers based on joint liability: From the perspective of Salins' reciprocity theory[M]. *Beijing: Intellectual Property Press*.
- Hu Q., Xu Z., Dinev T., Ling H.. 2011. Does deterrence work in reducing information security policy abuse by employees?[J]. *Communications of the ACM*, 54(6): 54-60.
- Jiang Yi. 2013. The creative process of firm's IT value in dynamic environment: The transformation from IT competency to dynamic capability[D], *China University of Geosciences*.
- Joule E. 2011. Fashion-forward thinking: sustainability as a business model at Levi Strauss[J]. *Global Business and Organizational Excellence*, 30(2): 16-22.
- Kashyap V., Murtha B.R.. 2017. The joint effects of ex ante contractual completeness and ex post governance on compliance in franchised marketing channels[J]. *Journal of Marketing*, 81(May):130-153.
- Khan S.A.R., Yu Z., Golpira H., Sharif A., Mardani A.. 2021. A state-of-the-art review and meta-analysis on sustainable supply chain management: Future research directions[J]. *Journal of Cleaner Production*, 278(123357): 1-12.
- Khan, S.A.R., Qianli, D.. 2017. Impact of green supply chain management practices on firms' performance: an empirical study from the perspective of Pakistan[J]. *Environmental Science Pollution Research*. 24 (20), 16829-16844.
- Khan S.A.R., Yu Z., Umar M., Tanveer M.. 2022. Green capabilities and green purchasing practices: A strategy striving towards sustainable operations [J], *Business Strategy and the Environment*, 31(4): 1719-1729.
- Kinory E., Canada J.. 2020. The impact of mutual monitoring and enterprise system integration on the empowerment of managers[J]. *International Journal of Enterprise Information Systems*, 16(2): 1-21.
- Kumar A., Heide J.B., Wathne K.H.. 2011. Performance implications of mismatched governance regimes across external and internal relationships[J]. *Journal of Marketing*, 75(2): 1-17.
- Li J., Tangpong C., Hung K.-T., Johns T.R.. 2013. The role of interfirm reciprocity

- norm and agent's conscientiousness in supply contract adjustment decision[J]. *Journal of Business & Industrial Marketing*, 28(8): 660-671.
- Lindell M.K., Whitney D.J.. 2001. Accounting for common method variance in cross-sectional research designs[J]. *Journal of Applied Psychology*, 86(1): 114-121.
- Loughry M.L., Tosi H.L.. 2008. Performance implications of peer monitoring[J]. *Organization Science*, 19(6): 876-890.
- Luo J.. 2011. Social network and Chinese indigenous management[M]. *Beijing: Social Sciences Academic Press*.
- Marrewijk A.V., Dessing N.. 2019. Negotiating reciprocal relationships: Practices of engaged scholarship in project studies[J]. *International Journal of Project Management*, 37: 884-895.
- Martin N., Verdonck L., Caris A., Depaire B.. 2018. Horizontal collaboration in logistics: decision framework and typology[J]. *Operations Management Research*. 11(1): 32-50.
- Neter J., Wasserman W., Kutner M.H.. 1990. Applied linear statistical models: Regression, analysis of variance, and experimental designs[M]. *Australian Road Research Board Group, Vermont*.
- Pasupuleti V.. 2010. A study of joint liability versus individual liability in micro finance institute with respect to default rate (loan repayment). *Working Paper*.
- Paxton J., Graham D., Thraen C.. 2000. Modeling group loan repayment behavior: New insights from Burkina Faso[J]. *Economic Development and Cultural Change*, 48(3): 639-655.
- Preacher K.J., Rucker D.D., Hayes A.F.. 2007. Addressing moderated mediation hypotheses: Theory, methods, and prescriptions[J]. *Multivariate Behavioral Research*, 42(1): 185-227.
- Rao, S. and Perry, C.. 2002. Thinking about relationship marketing: where are we now?[J]. *Journal of Business & Industrial Marketing*, 17 (7): 598-614.
- Roseira C., Brito C., Henneberg S.C.. 2010. Managing interdependence in supplier networks[J]. *Industrial Marketing Management*, 39(6): 925-935.
- Rousseau D.M., Sitkin S.B., Burt R.S., Camerer C.. 1998. Not so different after all: A cross-discipline view of trust[J]. *Academy of Management Review*, 23(3): 393-404.
- Sahlins M.. 1972. Stone age economics[M]. *New York: Aldine De Gruyter*.
- Schmoltzi C., Wallenburg C.M.. 2011. Horizontal cooperations between logistics service providers: motives, structure, performance [J]. *International Journal of Physical Distribution & Logistics Management*, 41(6): 552-575.
- Scott A. J.. 1999. Regions and the world economy: The coming shape of global production, competition, and political order[M]. *Oxford: OUP*.
- Sewell G.. 1998. The discipline of teams: The control of team-based industrial work through electronic and peer surveillance[J]. *Administrative Science Quarterly*, 43: 397-428.
- Simatupang T.M., Sridharan R (2002) The collaborative supply chain[J]. *International Journal of Logistics Management*, 13(1): 15-30.

- 1  
2  
3 Sitkin S.B., George E.. 2005. Managerial trust-building through the use of  
4 legitimating formal and informal control mechanisms[J]. *International Sociology*,  
5 20: 307–338.
- 6  
7 Smith H.M., Evans-McCleon T.N., Urbanski B., Justice C.. 2015. Check-In/Check-  
8 Out Intervention With Peer Monitoring for a Student With Emotional-Behavioral  
9 Difficulties[J]. *Journal of Counseling & Development*, 93(October): 451-459.
- 10 Stiglitz J.E.. 1990. Peer monitoring and credit markets[J]. *The World Bank Economic*  
11 *Review*, 4(3): 351-366.
- 12  
13 Straub D., Welke R.. 1998. Coping with systems risk: Security planning models for  
14 management decision making[J]. *MIS Quarterly*, 22(4): 441–469.
- 15  
16 Swift C., Guide V.D.R. Jr, Muthulingam S.. 2019. Does supply chain visibility affect  
17 operating performance: Evidence from conflict minerals disclosures[J]. *Journal*  
18 *of Operations Management*, 65(5): 406-429.
- 19  
20 Tang C., Chen B., Zhao S.. 2018. The effect of inclusive leadership on employee  
21 engagement in chinese culture context[J]. *Research on Economics and*  
22 *Management*, 39(3): 110-120.
- 23  
24 Verdonck L.. 2017. Collaborative logistics from the perspective of freight transport  
25 companies. Dissertation, Hasselt University.
- 26  
27 Voss K.E., Tanner E.C., Mohan M., Lee Y.-K., Kim H.K.. 2019. Integrating  
28 reciprocity into a social exchange model of inter-firm B2B relationships[J].  
29 *Journal of Business & Industrial Marketing*, 34(8): 1668-1680.
- 30  
31 Wang D.T., Gu F.F., Dong M.C.. 2013. Observer effects of punishment in a  
32 distribution network[J]. *Journal of Marketing Research*, 50(5): 627-643.
- 33  
34 Wang Q., Huo B., Zhao X.. 2020. What makes logistics integration more effective?  
35 Governance from contractual and relational perspectives[J]. *Journal of Business*  
36 *Logistics*, 41(3): 259-281.
- 37  
38 Weick K.E., Sutcliffe K.M., Obstfeld D.. 1999. Organizing for high reliability:  
39 Processes of collective mindfulness[J]. *Research in Organizational Behavior*, 21:  
40 81–123.
- 41  
42 Withisuphakorn P., Batra I., Parameswar N., Dhir S.. 2019. Sustainable Development  
43 in Practice: Case Study of L'Oréal [J]. *Journal of Business and Retail*  
44 *Management Research*, 13: 35-47.
- 45  
46 Wu J.B., Hom P.W., Tetrick L.E., Shore L.M., Jia L., Li C., Song L.J. 2006. The  
47 norm of reciprocity: Scale development and validation in the chinese context[J].  
48 *Management and Organization Review*, 2(3): 377-402.
- 49  
50 Wydick B.. 1999. Can social cohesion be harnessed to repair market failures?  
51 Evidence from group lending in Guatemala[J]. *The Economic Journal*, 109(457):  
52 463-475.
- 53  
54 Wydick B.. 2002. Group lending under dynamic incentives as a borrower discipline  
55 device[J]. *Review of Development Economics*, 5(3): 406-420.
- 56  
57 Yang L., Huo B., Tian M., Han Z.. 2021. The impact of digitalization and inter-  
58 organizational technological activities on supplier opportunism: The moderating  
59 role of relational ties[J]. *International Journal of Operations & Production*  
60

- 1  
2  
3                    *Management*, 41(7): 1085-1118.
- 4                    Yang, M., Gong, X.M.. 2021. Optimal decisions and Pareto improvement for green  
5                    supply chain considering reciprocity and cost-sharing contract [J].  
6                    *Environmental Science and Pollution Research*, 28: 29859–29874.
- 7                    Zhang J.. 2010. Charisma, publicity, and China society: Rethinking of chaxu geju[J].  
8                    *Society*, 30(5): 1-24.
- 9  
10  
11                    Zhu N., Liu Y., Zhang J., Raza J., Cai Y.. 2021. How do generalized reciprocity and  
12                    negative reciprocity influence employees' task performance differently? The  
13                    mediating role of social exchange and the moderating role of emotional labor[J].  
14                    *Journal of Social Psychology*, 161(6):1-18.
- 15  
16                    Zeng F., Chen Y., Dong M.C., Chi Y.. 2016. The use of accommodation in buyer-  
17                    seller relationships: encouraging or controlling opportunism in business markets  
18                    middle-grounds[J]. *Journal of Business-to-Business Marketing*, 23 (1): 47–62.
- 19  
20                    Zu X. Kaynak H.. 2012. An agency theory perspective on supply chain quality  
21                    management [J]. *International Journal of Operations & Production Management*,  
22                    32(4): 423-446.
- 23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
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**FIGURE 1**  
**Research Model**



**TABLE 1**  
**Summary of Descriptive Statistics**

Construct	M (SD)	1	2	3	4	5	6	7	8	9
1. Peer monitoring	3.36 .96		.44**	-.47	.67**	.78**	-.51**	.16	-.50**	-.49**
2. Perceived deterrence	3.04 1.07	.46**		-.41**	.39**	.37**	-.43**	.02	-.38**	-.46**
3. Generalized reciprocity	3.55 .85	-.45**	-.40**		-.22*	-.33**	.14	.09	.85**	.90**
4. Balanced reciprocity	3.48 .97	.68**	.41**	-.21		.87**	-.27*	.10	-.27*	-.23*
5. Negative reciprocity	3.56 1.03	.79**	.39**	-.32**	.88**		-.31**	.17	-.38**	-.37**
6. Opportunism	1.76 .63	-.54**	-.46	.11	-.29**	-.33**		-.25*	.23*	.15
7. Group size	7.56 1.40	.22*	.08	.11	.14	.20	-.34**		-.03	-.04
8. Member homogeneity	2.93 1.31	-.47**	-.35**	.85**	-.25*	-.36**	.18	.02		.92**
9. Knowledge sharing	3.52 .84	-.45*	-.44**	.90**	-.22	-.36**	.11	-.01	.92**	
10. Age (MV)	46.73 7.80	.20	.16	.07	.13	.14	-.32**	.36**	.11	.10

Notes: \*\*  $p < .01$ , \*  $p < .05$

Below diagonal: Zero-order correlations

Above diagonal: Adjusted correlations for common method bias (Lindell and Whitney 2001),  
with age as the MV marker.



**TABLE 2**  
**Unstandardized Regression Coefficient Estimate**

Predictor	Model 1 Opportunism	Model 2 Perceived deterrence	Model 3 Opportunism
<i>(a) Generalized reciprocity as moderator</i>			
Peer monitoring (PM)	-1.13**	1.27**	-0.89**
Generalized reciprocity (GR)	-0.77**	0.86 <sup>†</sup>	-0.61*
Perceived deterrence			-0.19**
PM × GR	0.23**	-0.25*	0.18**
Group size <sup>c</sup>	-0.12**	0.00	-0.12**
Member homogeneity <sup>c</sup>	0.22*	0.31	0.28**
Knowledge sharing <sup>c</sup>	-0.34 <sup>†</sup>	-0.88*	-0.50*
Adjusted R <sup>2</sup>	0.43	0.30	0.49
F-statistic	10.99**	6.70**	12.11**
<i>(b) Balanced reciprocity as moderator</i>			
Peer monitoring (PM)	-0.04	-0.74 <sup>†</sup>	-0.23
Balanced reciprocity (BR)	0.44*	-0.60	0.30
Perceived deterrence			-0.25**
PM × BR	-0.11 <sup>†</sup>	0.27*	-0.04
Group size <sup>c</sup>	-0.10*	-0.02	-0.10**
Member homogeneity <sup>c</sup>	0.21 <sup>†</sup>	0.29	0.28**
Knowledge sharing <sup>c</sup>	-0.39*	-0.84**	-0.60**
Adjusted R <sup>2</sup>	0.36	0.34	0.47
F-statistic	8.60**	7.90**	11.23**
<i>(c) Negative reciprocity as moderator</i>			
Peer monitoring (PM)	-0.06	-0.77	-0.23
Negative reciprocity (NR)	0.44*	-0.73*	0.28
Perceived deterrence			-0.22**
PM × NR	-0.11 <sup>†</sup>	0.28*	-0.04
Group size <sup>c</sup>	-0.10*	-0.04	-0.11**
Member homogeneity <sup>c</sup>	0.21 <sup>†</sup>	0.24	0.27*
Knowledge sharing <sup>c</sup>	-0.37*	-0.76*	-0.54**
Adjusted R <sup>2</sup>	0.37	0.32	0.46
F-statistic	9.00**	7.27**	10.97**

Notes: \*\*p < 0.01; \*p < 0.05; <sup>†</sup>p < 0.10; <sup>c</sup> covariate

**TABLE 3**  
**Bootstrap Analysis Results of Mediated Moderations**

	PM × GR→Perceived deterrence (a path)	Perceived deterrence→Opportunism (b path)	Indirect effect (ab paths)	Direct effect (c' path)
$\beta$ (CI)	-0.25*	-0.19**	0.05 (0.0059, 0.1385)	0.18**
	PM × BR→Perceived deterrence (a path)	Perceived deterrence→Opportunism (b path)	Indirect effect (ab paths)	Direct effect (c' path)
$\beta$ (CI)	0.27*	-0.25**	-0.07 (-0.1737, -0.0057)	-0.04
	PM × NR→Perceived deterrence (a path)	Perceived deterrence→Opportunism (b path)	Indirect effect (ab paths)	Direct effect (c' path)
$\beta$ (CI)	0.28*	-0.22**	-0.06 (-0.1510, -0.0090)	-0.04

Notes: (1) CI=Confidence intervals; (2) \*\* p <0.01, \* p<0.05.

## APPENDIX Measures

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**Peer monitoring** (Loughry & Tosi 2008): Reliability = .96, CR = .97, AVE =.85 (1= never, 2 = very infrequently, 3 = sometimes, 4 = very often, 5 = always)

1. How often do members in our group visit each other to observe pesticide spraying practices? (.93<sup>a</sup>)
2. If a member in our group violated contractual terms on pesticide uses, how likely that member would be confronted by others for the violation? (.95)
3. If a member violated contractual terms on pesticide uses, how likely would members in our group tell each other about the violation? (.93)
4. If a member violated contractual terms on pesticide uses, how likely would members in our group report the violation to the manufacturer or their delegate? (.87)
5. How often do members in our group discuss pesticide uses among each other? (.94)

**Perceived deterrence** (Hu et al. 2011): Reliability = .98, CR = .98, AVE =.95 (1 = strongly disagree to 5 = strongly agree)

6. If a member in our group violated contractual terms on pesticide uses, that member's perceived certainty of being punished against the acts is great. (.96)
7. If a member in our group violated contractual terms on pesticide uses, that member's perceived celerity of being punished against the acts is great. (.98)
8. If a member in our group violated contractual terms on pesticide uses, that member's perceived severity of being punished against the acts is great. (.98)

**Generalized reciprocity** (Wu et al. 2006; Hu 2017): Reliability = .97, CR =.97, AVE =.92 (1 = strongly disagree to 5 = strongly agree)

9. Members in our group would help one another, even if the member being helped can't reward at present. (.94)
10. Members in our group would do something for one another without any strings attached. (.96)
11. Members in our group take care of one another in ways that exceed the concerned member's reward. (.98)

**Balanced reciprocity** (Wu et al. 2006; Hu 2017): Reliability = .98, CR = .98, AVE =.95 (1 = strongly disagree to 5 = strongly agree)

12. Members in our group take care of one another as much as the concerned member' reward. (.97)
13. It seems important to members in our group that one's efforts are equivalent to what he receives from the group. (.97)
14. If a member's performance exceeds our group's need, that member will deserve an extra reward from the group, otherwise, that member will be punished. (.98)

**Negative reciprocity** (Wu et al. 2006; Hu 2017): Reliability = .98, CR = .97, AVE =.93 (1 = strongly disagree to 5 = strongly agree)

15. Members in our group are up to something that could hurt others' interests. (.98)

16. Members in our group would never help one another out unless it was in their own interests. (.96)

17. Members in our group only care about their own benefits and never care about others'. (.95)

**Opportunism** (Wydick 1999; Hermes et al. 2005)

18. Since our group first established, how many times per year, on average, would member(s) have pesticide violations?

**Group size** (Ahlin and Townsend 2007)

19. Please indicate the total number of suppliers in our group.

**Member homogeneity** (Cassar et al. 2007; Ferrara 2003; Paxton et al. 2000)

20. Please indicate the proportion of kinship members in our group.

**Knowledge sharing** (Jiang 2013): Reliability = .97, CR =.97, AVE =.85 (1 = strongly disagree to 5 = strongly agree)

21. Members in our group share industry knowledge with one another. (.93)

22. Members in our group share market knowledge with one another. (.88)

23. Members in our group share experiences with one another. (.92)

24. Members in our group are effective in dealing with conflicts. (.95)

25. Members in our group could find and solve operational issues. (.94)

26. Members in our group are flexible to cope with market demand changes. (.92)

**Overall model fit:**  $\chi^2 = 304.381, p < .01; CFI = .970; IFI = .970; NFI = .914; RMSEA = .077$

Notes: <sup>a</sup> standardized factor loadings (per item) in parentheses, CR = composite reliability, AVE =

average variance extracted, CFI = comparative fit index, IFI = incremental fit index, NFI = normed fit

index, RMSEA = root mean square error of approximation.