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Opportunistic strategy under cooperation: Subtle, deceitful practices in Taiwan's agri-food supply chain
合作中的機會主義策略：台灣農產品供應鏈的微妙、欺騙行為

Chia-Yi Liu[1]
Group of Management, Department of Food Science, Tunghai University

Abstract: Transaction cost theory (TCE) scholars regard opportunism as a source of transaction cost that hinders cooperation; however, collaboration, such as contract farming, is widespread in the food and agribusiness industry, even if most partnerships maintain opportunistic practices. Therefore, based on contract farming, this study elucidates how opportunistic practices diminish the transaction cost of cooperation by distinguishing subtle and deceitful practices from opportunistic behavior. This study employs the Heckman model to resolve the sample selection bias problem based on 113 contract farming transactions in Taiwan's organic agri-food supply chain. Under cooperative transactions, opportunistic behavior is affected by the decision-maker's perception of their partners' opportunism. The perception of partners' deceitful and unethical behaviors enhances the decision-maker's subtle and deceitful behavior. This study adopts the cognitive dissonance perspective to extend the transactional and relational views of cooperation using three approaches. First, this study views opportunistic behavior as a strategic response to the perception of partners' opportunism rather than an assumption of behavior. In addition, this study distinguishes subtle and deceitful practices from opportunistic behaviors. Finally,

[1] Corresponding author: Chia-Yi Liu, Group of Management, Department of Food Science, Tunghai University. Email: ciliu@thu.edu.tw.
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using the cognitive dissonance view, this study argues that opportunistic strategy, which reduces cognitive dissonance and is a type of governance mode, diminishes transaction cost.

Keywords: Cognitive dissonance, opportunism, Heckman model, contract farming.

摘要：交易成本理論（TCE）學者將機會主義視為交易成本的主要來源並阻礙合作；然而，於農業與食品產業，即使契約合作中夥伴保持機會主義做法，其仍舊為業內普遍的做法。因此，基於契約農業，本研究將機會主義行為區隔為微妙與欺騙性的做法，闡明不同機會主義做法可如何降低合作的交易成本。本研究基於台灣有機農產品供應鏈中的 113 筆契約農業交易，並採用 Heckman 模型解決樣本選擇偏差問題。實證結果發現，在合作交易下，決策者之機會主義行為，受到其對合作夥伴機會主義感知的影響。決策者對合作夥伴欺騙行為的感知，將增強其微妙和欺騙行為。本研究採用認知失調觀點提出下面三項貢獻，以擴展交易和關係合作的理解：首先，機會主義行為可視為對合作夥伴機會主義感知的戰略反應，而不是對行為的假設。此外，這項研究將微妙和欺騙性的做法與機會主義行為區分開來。最後，利用認知失調的觀點，本研究認為能夠減少認知失調之機會主義策略，可能是一種可減緩交易成本之治理模式。

關鍵詞：認知失調、機會主義、Heckman 模型、契約農業

1. Introduction

Many studies have emphasized that opportunistic behavior is a significant reason to terminate transactions (Maglaras *et al.*, 2015; Villena and Craighead, 2017). However, in practice, several firms maintain the transaction even if they perceive that their partners may adopt opportunistic behaviors. For example, organic agriculture has grown rapidly, but its production and marketing scale is not large enough to achieve the economic efficiency of a market because small farmers maintain a transaction relationship. They do so because they have no

better alternative. Therefore, to make a transaction, buyers and farmers decide for themselves whether to violate a contractual agreement. As a purchaser, when faced with committing an obvious breach of contract or implicit unethical behavior (e.g., delayed procurement, delayed payment of arrears, or exaggeration of crop defects), they adopt strategic opportunistic behaviors (e.g., supplying substandard crops, not complying with delivery times or quantities, or using vague contract terms to explain planting practices) to reduce their losses (Barrett *et al.*, 2012). Contract farming is the main marketing mode of organic agriculture despite various opportunistic strategies adopted by contract farming partners (Bolwig *et al.*, 2009). This phenomenon is more common in developing countries, such as Taiwan (Michelson *et al.*, 2012). Although many kinds of opportunistic behaviors exist in long-term trade, relevant studies are insufficient to this day. Therefore, this study aims to fill the gap. In the theoretical perspective, the transaction cost theory (TCE) emphasizes that partners tend to adopt opportunistic behaviors under high specific investment and uncertainty; this is challenging for market efficiency (Coase, 1937; Oliver, 1991; Williamson, 1985). Even under the context of low specific investment or uncertainty, the unwritten rules produce various opportunistic behaviors, especially in long-term cooperation (Wathne and Heide, 2000; Williamson, 1975). Some opportunistic behaviors are visible, whereas others are hidden, such as deceitful and subtle behaviors (Carter, 2000a; Wathne and Heide, 2000; Williamson, 1975). Because some opportunistic behaviors are difficult to notice under cooperation, social psychology is crucial to understanding how decision-makers' interpretation of partners' behavior affects their decision of opportunistic behavior (Weber and Mayer, 2014). Therefore, this study adopts the view of cognitive dissonance to examine the effects of decision-makers' perceptions of partners' deceitful/subtle practices on their deceitful/subtle opportunistic behaviors. Rather than causing transaction costs, this study argues that opportunistic behavior under cooperation is a strategic action taken by decision-makers to achieve market efficiency.

Rather than exploring the causes of opportunism on all transactions, this study focuses on the determinants of opportunism under cooperation, so it pays

more attention to the problem of sample selection bias. Thus, this study considers why transactions are terminated to clarify the determinants of opportunistic behavior under cooperative transactions. In agriculture, contract farming is a common practice of cooperation with opportunistic risks. For example, the decision of contract farming is not a random selection, but it is affected by some factors, such as contractual contents or farmers' attributes (Li and Ng, 2002; Morgan and Hunt, 1994, 1997). Therefore, our analytic results will have the problem of sample selection bias when we only consider transactions that continue to cooperate as samples. Therefore, this study adopts Heckman's (1979) two stages procedure. In the first stage, the probit model aims to identify the effects of transaction characteristics on the decision of whether partners will perform contract farming or not. Then, the inverse Mills ratio, which is derived from the result of the first stage, represents the general effect of cooperation. In the second stage, the ordinary least squares (OLS) regression shows the precise impacts of perceived partners' subtle/deceitful practices on decision-makers' subtle/deceitful practices after controlling the inverse Mills ratio. It is not only to control for the possibility of sample selection bias but also to confirm the effects of decision-makers' perceptions of partners' deceitful/subtle practices on their deceitful/subtle opportunistic behaviors using structured questionnaire surveys and interviews with farmers for their contract farming experience.

The paper proceeds as follows: This study first develops hypotheses by reviewing related literature. The next section presents the research design, provides methodological details on self-selection, and describes the resulting two-stage model we employ in the analyses. This is followed by a presentation of results from a sample of over 100 transactions involving contract farming between farmers and retailers in the Taiwan organic industry. The discussion and conclusion sections include the implication and contribution of these findings and then identify a number of promising avenues for future research.

2. Literature review and hypotheses development

2.1 Transactional and relational perspectives on cooperative decision

A cooperative contract is an agreement for exchanging resources and information. Any exchange agreement has transactional and relational dimensions (Macneil, 1978).Regarding the transactional perspective, TCE assumes that individuals are economic entities who pursue self-interest, maximize their interests, and engage in opportunistic behaviors. Therefore, transaction costs (such as the financial and time costs of searching, contracting, negotiating, monitoring, and resolving disputes during the transaction) increase in cases of uncertain transactions or high asset specificity of trading partners (Coase, 1937; Williamson, 1985). An effective decision-maker uses appropriated governance modes (e.g., private rewards or quasi/full vertical integration; Uzea and Fulton, 2014; Weseen *et al.*, 2014) or terminates a contract with high transaction costs (Oliver, 1991). When Xhoxhi *et al.* (2020) interviewed 168 producers in Albania, they found that asymmetric margins and product quality-related activities decrease the likelihood of the farmers engaging in contract farming. Specific investment and transactional uncertainties cause power imbalances. Contract farming's specific investments include farmers' expertise, land, fixed assets, workforce, other production tools, and fertilizer/seeds (Little and Watts, 1994). When farmers invest in a specific asset, they lose their bargaining power with retailers, and the low margins diminish the possibility of cooperation (Warning and Key, 2002). Transactional uncertainty could be revealed by the contract's content, such as the ways of contract forms, purchase quality, purchasing quantity, and price (Wang, 2016). Under the high uncertainty of contracts, which retailers dominate, farmers sacrifice their right to price their products, placing them under a huge financial burden. In addition, a poorly functioning contract farming system might allow firms to snatch most of the benefits, leaving all the costs to small farmers (Fernquest, 2012). Therefore, based on the transaction cost theory, this study proposes the following hypotheses:

H1a: Specific asset investment decreases the possibility of cooperation.

H1b: Transactional uncertainty decreases the possibility of cooperation.

However, even if the contract is in progress, it becomes difficult to accurately specify the various situations encountered or to be encountered in the transaction, especially in a long-term contract. Therefore, some informal agreements or unwritten rules of action are involved in a formal contract. These gray areas, which are caused by unwritten rules, lead to various forms of opportunistic behaviors. Recent literature has extended the original notion of formal contract in TCE to relational contract (e.g., Williamson, 1979, 1985, and 1991). Following Williamson's (1975) introduction, Wathne and Heide (2000) divided opportunistic behavior into blatant and lawful practices. The relational perspective regards opportunistic behavior as a strategic response to manage partners' behavior (Macneil, 1978). Extending TCE by a complete description of social psychology, Weber and Mayer (2014) argued that the transaction cost calculation is affected by the cognitive perspective of decision-makers. For instance, an unbalanced perception of opportunistic behavior between partners and decision-makers will lead to additional strategic actions and costs. Therefore, the following section adopts the cognitive dissonance theory to elucidate the effects of decision-makers' perception about their partners' opportunism on their opportunism strategy.

2.2 Cognitive dissonance of opportunism under cooperation

Cognitive dissonance is one of the most enduring and successful theories in the history of social psychology. Festinger (1962) proposed that decision-makers who hold two or more psychologically inconsistent cognitions experience a state of psychological discomfort called cognitive dissonance. Moreover, the state of dissonance has driven-like properties, motivating people to seek to reduce it. The cognitive dissonance of opportunism comes from disappointment and guilty feelings. Cognitive dissonance is caused by the imbalance between moral expectation and partners' behavioral misconduct (Elsharnouby and Parsons, 2013). Previous studies (e.g., Ayal and Gino, 2012; Maglaras *et al.*, 2015) have shown that partners' opportunism causes psychological discomfort. When people

perceive that their partners have adopted an opportunistic behavior, they feel disappointed because their partners used commercial practices to their personal (the partners) advantage, thereby increasing the imbalance in their benefits. In addition, when people adopt opportunistic behavior (but their partners do not), they feel guilty because they experience ethical dissonance between moral standards and behavioral misconduct (Ayal and Gino, 2012). Then, people change their attitudes or behavior to decrease dissonance (Harmon-Jones and Harmon-Jones, 2008). Through an experimental study, Xu *et al.* (2019) found that after cheating, individuals with a high moral standard not only cheat less but also are more sensitive to immoral behavior. In summary, the disappointed or guilty feelings come from perceiving an imbalance between their moral expectation and their partners' unacceptable behaviors, which then diminishes cooperative performance (Guo *et al.*, 2015; Raza-Ullah and Kostis, 2020).

The moral expectations of decision-makers depend on their perception of the various forms of their partners' opportunistic behavior. Williamson (1975) introduced opportunistic behavior, and Wathne and Heide (2000) divided it into blatant and lawful practices. First, blatant practices mean that humans have weak morals (North, 1990) and actively or passively violate explicit contracts (Williamson, 1975). A similar concept is "deceitful practices," as suggested by Carter (2000a). It includes obvious behaviors that do not comply with contract specifications, for example, setting up second sources under exclusive dealing and exaggerating the seriousness of a poor crop quality problem to depress the guaranteed price of the contract.

Decision-makers face apparent breach of contract behavior of their partners (e.g., delayed payment) and tend to adopt strategically deceitful behaviors (e.g., not complying with delivery time or quantity). This reduces their loss (Barrett *et al.*, 2012) and diminishes disappointment. Thus, a strategic deceitful behavior aims to minimize the additional cost and cognitive dissonance caused by partners' opportunistic behavior, so this study proposes the following hypotheses:

H2a: The perception of partners' deceitful practices is positively related to the decision-makers' deceitful practices.

Second, lawful practices are typical under relational contracting (Wathne and Heide, 2000). Formal contracts often play a relatively limited role in interfirm relationships because informal agreements often manipulate them (Macaulay, 1963). Williamson (1991) used the term "lawful opportunism" to describe violations that do not pertain to a formal contract. Addressing unethical behavior within the buyer-supplier relationship, Carter (2000b) regarded subtle practices as self-interest behaviors hidden in the transaction process and unobserved by trading partners. For example, senior managers prioritize suppliers' preferences, that is, the concession of personal factors to influence supplier selection and formulate specifications favoring specific suppliers.

When decision-makers are unsure but perceive that their partners have adopted subtle opportunistic behavior, the costs of managing subtle opportunism become huge as such subtle behaviors are difficult to be observed, monitored, and enforced (Husted and Folger, 2004). Retaliatory behavior seems like a strategic response for partners' subtle opportunism to avoid colossal time periods and costs of managing subtle practices. Compared with administrative control or power, relational norms are more effective in managing opportunistic behavior (Caniels and Gelderman, 2010). Because actors in the community build relational norms, the perception of an actor's opportunism will enhance others' adoption of tit-for-tat strategies to balance their perceived unfairness. Integrating economic forces of transaction cost and social pressures of social exchange, Trada and Goyal (2017) confirmed that perceived unfairness causes opportunistic behavior using matched data on suppliers and distributors in India. Therefore, subtle opportunistic behavior seems like a strategic response for managing partners' subtle practices by diminishing cognitive dissonance and potential losses; therefore, this study proposes the following hypotheses:

H2b: The perception of partners' subtle practices is positively related to the decision-makers' subtle practices.

The cognitive dissonance of opportunism occurs when decision-makers have an unbalanced perception of disappointed and guilty feelings. Then, psychological discomfort motivates them to change their behavior to reduce

cognitive dissonance. In the process of contract execution, formal contracts involve more informal agreements or unwritten rules of action. The perception of cognitive consonance is critical in the process of cooperation. This perception builds on the comparison of inputs and outcomes between decision-makers and their partners (Nilsson, 1996). If decision-makers recognize that their peers have adopted apparent unethical behavior, such as deceitful practices, they respond by subtle or deceitful unethical practices. In this situation, it is easy for decision-makers to rationalize their subtle (or deceitful) behavior because they believe that their damage—caused by partners—is greater than (or equal to) the damage they caused their partners. Conversely, if decision-makers perceive that their partners have adopted subtle practices, it becomes difficult to rationalize their deceitful practices.

In summary, from the perspective of social psychology, decision-makers regard opportunistic behavior as a strategy that will reduce their cognitive dissonance (such as balancing guilty and disappointed feelings) after considering their partners' opportunistic behaviors (Umphress and Bingham, 2011). The decision-makers perceive that their partners have more opportunistic severe behavior; thus, they are more comfortable in indulging in self-interest behaviors. Thus, the effect of their partners' deceitful (obvious) practices on they adopting opportunistic (including subtle and deceitful) behaviors is more significant than the effect of their partners' subtle (hidden) practices. This study proposes the following hypotheses:

H3a: Regarding decision-makers' subtle (hidden) practices, the effect of perceived partners' deceitful (obvious) practices is larger than that of perceived partners' subtle (hidden) practices.

H3b: Regarding decision-makers' deceitful (obvious) practices, the effect of perceived partners' deceitful (obvious) practices is larger than that of perceived partners' subtle (hidden) practices.

The conceptual framework is visually summarized in Figure 1.

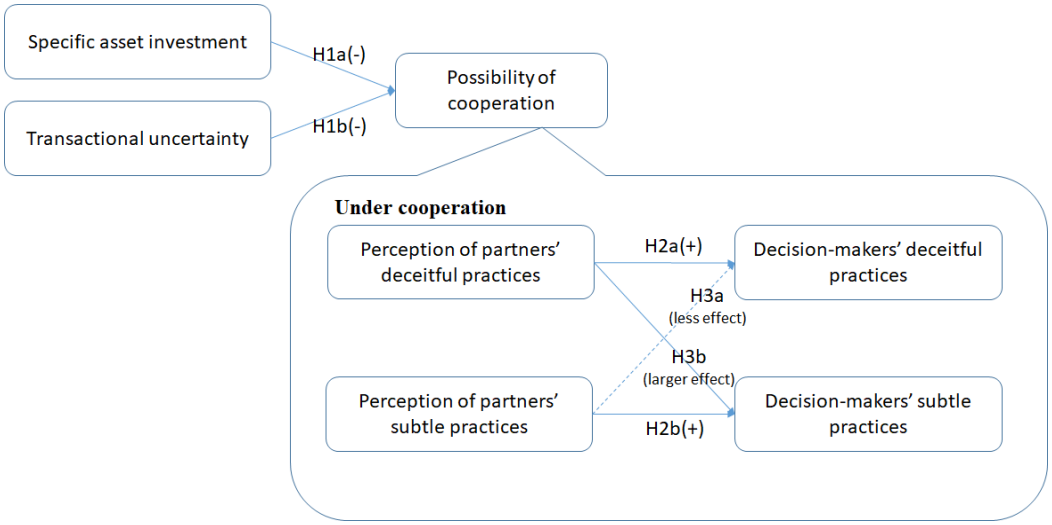

Figure 1
Conceptual overview of the hypotheses

3. Methodology

3.1 Data

Although contract farming is a common practice used to reduce agricultural production and market risks, there are high opportunistic risks embedded in it (Abebe *et al.*, 2013; Barrett *et al.*, 2002; Wang, 2016). Contract farming is a popular way of cooperation with opportunistic risks in agriculture. The total number of organic farmers in Taiwan and the data published by the "Organic Operator Integration Information System" (https://info.organic.org.tw/find/) established by the Agriculture and Food Agency (2018.12.20) include 3,509 organic farmers.

During the investigation, based on the total number of organic farmers in the northern, central, southern, and eastern regions of Taiwan, this research conducted telephone screening in the first stage using the principle of proportionality. In the telephone interviews, farmers in each region were first asked if they had any experience in contract farming; if they did, they were asked about their willingness to be visited. The second stage included a field

visit. The survey and interview lasted for more than three months, from December 25, 2018 to April 9, 2019.

This study used structured questionnaire surveys and interviews to capture the farmers' contract farming experience to understand the status of the transaction of the contract farmers' partners and their opportunistic behavior. After obtaining their consent to participate, the structured questionnaire items were filled by the interviewees; then, the response quality of the questionnaire was confirmed through interviews and observations. On average, each farmer's interview and survey time amounted to an hour. According to the telephone interview results, in the first phase, 113 organic farmers with contract farming experience were willing to be visited. The effective response rate achieved was 33% according to the 346 samples. Among them were 24.5% of interviewees (farmers) in the northern area, 26.5% farmers in the central area, 30.4% farmers in the southern area, and 18.6% farmers in the eastern area. Overall, the geographical distribution of the sample is consistent with that of Taiwanese organic farmers.

Nonresponse bias pertains to the issue of whether the sample obtained is representative of the target population. Following the methodology of Lambert and Harrington (1990), testing the difference between early and late responders, this study divided our sample into thirds based on when a respondent completed the survey. Comparing the early and late returned questionnaires regarding the cooperation decision variable, two-tailed t-tests of the mean difference between the first and third groups were not significant at $p = 0.168$. From the result, there is no support for believing that nonresponse bias was an issue in this study.

Common method bias is a source of measurement error and is a particular concern in research that uses self-reported questionnaire data. This study avoided the single-source bias by collecting data in a variety of ways, such as questionnaires, interviews, and farming contract-related documentation. In addition, a Harman's one-factor test resulted in 27 factors with the first accounting for only 16.062% of the variance, indicating that common method

variance was not a problem (Podsakoff *et al.*, 2003).

3.2 Model design

When we find the determinants of opportunistic strategy using the sample of farmers who continue to cooperate, the analytic results will have the problem of sample selection bias. Whether to cooperate depends on factors such as contractual contents (observable factors), the decision-maker's expectation, and the possibility of better alternatives (unobservable elements) rather than a random result. This study uses the Heckman two-stage model to solve the problem of sample self-selection bias. In recent years, this research method has been widely used in strategy-related (Leiblein *et al.*, 2002; Semadeni *et al.*, 2014) and contract farming studies (Bolwig *et al.*, 2009; Briones, 2015).

The Heckman analysis involves a two-step estimation procedure. In the first stage of the Heckman sample selection analysis, this study specified a probit model. The dependent variable is a dichotomous variable defined as 1 if the decision-makers have been cooperating with their partners; the dependent variable takes on a value of 0 if otherwise. This step allows us to predict the probability of a decision-maker cooperating with the partner.

In the model's design, the first stage aims to identify the effects of transaction characteristics on the decision of whether partners will perform contract farming or not. More specifically, the first stage probit model clarifies the effects of asset-specific investment and transaction uncertainty on cooperative decisions (see Eq. 1).

$$Prob\,(Dummy\ for\ cooperative\ decision) = \beta_{10} + B_{11} * (Specific\ Assets\ Investment) + \beta_{12} * (Tran.Uncertainty) + \beta_{1i} * (Control\ vars.) + \varepsilon_{11} \quad (1)$$

As shown in Eq. (1), following the argument of TCE, β_{11} and β_{12} should be significantly negative, supporting H1a and H1b. To extract the adjustment item of selection bias, the inverse Mills ratio was calculated from the probability and cumulative density functions of cooperation and noncooperation in the

probability model of the first stage, as shown in Eq. 2. Because the inverse Mills ratio was created by considering observable factors (such as specific asset investment, Tran. Uncertainty, and control variables) and unobservable elements (residual term), it will be used to adjust the problem of sample selection bias in the second stage.

$$Inverse\ Mills\ Ratio_i = \frac{\emptyset(\widehat{\beta}_1' X_{1i})}{\Phi(\widehat{\beta}_1' X_{1i})} \quad (2)$$

We then focus on transactions that have been cooperating to conduct the second stage of the Heckman analysis. In the second stage of the Heckman analysis, we re-estimated the original OLS model, controlling for sample selection bias by including the inverse Mills ratio (λ) derived in the first stage of the model.

In designing the empirical model, the second-stage aims to show the effects of decision-makers' perception of partners' subtle or deceitful opportunistic behavior on the decision-makers' subtle or deceitful opportunistic behavior under cooperation (See Eqs. 3 and 4). Under the sample of a transaction that continues to cooperate, the second stage of the Heckman model shown in Eq. 3 and 4 will generate unbiased estimated coefficients after considering the adjustment item of selection bias (called inverse Mills ratio).

$$Subtle\ practices = \alpha_{10} + \alpha_{11} * (Perception\ of\ Partners' Subtle\ practices) + \alpha_{12} * (Inverse\ Mills\ ratio) + \alpha_{13} * (Control\ vars.) + \varepsilon_{14} \quad (3)$$

$$Deceitful\ practices = \alpha_{20} + \alpha_{21} * (Percpeiotn\ of\ Partners' Deceitful\ practices) + \alpha_{22} * (Inverse\ Mills\ ratio) + \alpha_{23} * (Control\ vars.) + \varepsilon_{24} \quad (4)$$

As shown in Eq. 3 and Eq. 4, if α_{11} and α_{21} are significantly positive, it supports H2a and H2b.

Finally, this study continues to explore the relationship between different opportunistic behaviors.

$$Subtle\ practices = \alpha_{10} + \alpha_{31} * (Perception\ of\ Partners' Subtle\ practices) + \alpha_{32} * (Perception\ of\ Partner's\ Deceitful\ paractices) + \alpha_{33} * (Inverse\ Mills\ ratio) + \alpha_{34} * (Control\ vars.) + \varepsilon_{35} \quad (5)$$

$$Deceitful\ practices = \alpha_{40} + \alpha_{41} * (Perception\ of\ Parterns' Subtle\ practices) + \alpha_{42} * (Perception\ of\ Partners' Deceitful\ practices) + \alpha_{43} * (Inverse\ Mills\ ratio) + \alpha_{44} * (Control\ vars.) + \varepsilon_{45} \quad (6)$$

As presented in Eqs. (5) and (6), if $|\alpha_{23}|$is significantly larger than $|\alpha_{31}|$, it implies that the effect of the decision-maker's perception of partners' deceitful practices is greater than that of the partners' subtle practices on the decision-maker's subtle behaviors. Thus, H3a is supported. $|\alpha_{42}|$ is significantly larger than $|\alpha_{41}|$, supporting H3b.

3.3 Measure

To avoid common method biases, the data source of the semi-structured questionnaire includes two parts—the content of the contract and interviews with farmers. The data about the transactional frequency, cooperation period, specific asset investment, and transaction uncertainty were collected from the content of farming contracts. The interviews with farmers aimed to identify their own subtle and deceitful opportunistic behaviors and those of their partners. Next, the measurements of variables will be explained in succession according to the two stages of the Heckman model.

3.3.1 Dependent and explanatory variables in the first stage of the Heckman model

Cooperation decision is a dummy variable that measures whether a decision-maker agrees to keep cooperating. In the context of contract farming transactions presented in this study, when the cooperation in the observed transaction continues, this variable is denoted as 1. If the transaction was

canceled, then the variable is denoted as 0.

Specific asset investment is the investment that farmers (the respondents) use in the contract. Little and Watts (1994) believed that in contract farming, the main investments include (1) farmers' expertise on contract farming, (2) land for production, (3) fixed assets, such as greenhouses and sheds, (4) workforce for planting/harvesting, (5) agricultural and other production tools, as well as (6) production inputs, such as fertilizer and seeds. According to the content of the contract of respondents, specific asset investment was measured by the number of items (among the above six main investments) in which the farmers undertook specific investments.

Transaction uncertainty was measured by the level of uncertainty in contracts for farmers. This study uses the primary four sources of risk for contract farming in Taiwan's agriculture proposed by Wang (2016) to measure the uncertainty in contract farming transactions, such as contract form, purchase quality, purchasing quantity, and price. In the measurement steps, the values of uncertainty in contract form, purchase quality, quantity, and price were set separately and then summed up to measure transaction uncertainty. First, the forms of contract farming are divided into verbal commitments and formal document contracts (Barrett *et al.*, 2012). The formal written contract specifies the responsibilities of both parties, planting regulations, and penalties (Poppo and Zenger, 2002). There is a less contractual warranty in the verbal commitment; hence, the uncertainty of the transaction for farmers is high (Wolff *et al.*, 2001). Therefore, in this study, the uncertainty of formal document contract is set to 1, and the verbal commitment is set to 2. Second, the measurement of uncertainty in the purchase quality is set according to the contents of the following three ways. When retailers only purchase products that meet the predetermined quality, uncertainty is set to 3; when retailers only purchase products with the most basic quality requirements in predetermined quantity, the uncertainty is set to 2; when retailers buy all products with the most basic quality requirements, it implies the uncertainty is the lowest (it is set to 1). Third, based on the ways of purchasing quantity and price by "guaranteed fixed purchase volume (price)" and based on

"changes in market demand," the measurements of quantity (price) uncertainty are set to 1 and 2, respectively, based on the transaction uncertainty for farmers. Finally, the transaction uncertainty was measured by summing up all uncertainty values related to contract form, quality, quantity, and price.

3.3.2 Dependent and explanatory variables in the second stage of the Heckman model

Subtle practices are used to clarify the frequency of subtle practices that are done by decision-makers (farmers) and their partners (retailers) in contract farming transactions but are hidden and not easily observed by trading partners. This study uses the four common subtle practices in transactions presented in Carter's (2000b) study—(1) prioritizing partners preferred by senior managers, (2) allowing personal factors to influence partner selection, (3) using vague contract terms to obtain self-advantages, and (4) formulating specifications that are beneficial to a particular partner—as a standard for setting the frequency of subsequent subtle practices of decision-makers and partners.

Subtle practices (of decision-makers) are the number of the four common subtle practices in the contract farming transaction that the decision-makers (farmers) have performed.

Perception of partners' subtle practices is the subtle practices of trading partners (i.e., retailers) the decision-makers (farmers) believe that their partners have adopted in a contract farming transaction.

Deceitful practices are the frequency of explicit deceitful practices of decision-makers (farmers) and their partners (retailers) in contract farming transactions. This study uses the three common deceitful practices in transactions presented by Carter (2000b)—(1) using a second source under exclusive dealing, (2) exaggerating the seriousness of the poor crop quality problem when bargaining, and (3) deliberately misleading partners when bargaining and negotiating—as a standard for setting the frequency of subsequent deceitful practices of decision-makers and partners.

Deceitful practices (of decision-makers) are the three most common

deceitful practices in the contract farming transaction that decision-makers (farmers) have performed.

Perception of partners' deceitful practices are the deceitful practices the decision-makers (farmers) believe that their trading partners (i.e., retailers) have adopted in a contract farming transaction.

This study assessed the reliability and validity of its measures using the stringent criteria of Fornell and Larcker (1981). The composite reliabilities (CRs) were > 0.7, demonstrating strong reliability (Hair *et al.*, 1998), whereas the average variance extracted (AVE) exceeded 0.5, revealing an acceptable convergent validity. Most variable estimates were within recommended ranges (subtle practices: CR = 0.917, AVE = 0.786; Perception of partners' subtle practices: CR = 0.788, AVE = 0.555; Deceitful practices: CR = 0.929, AVE = 0.816; Perception of partners' deceitful practices: CR = 0.854, AVE = 0.663).

3.3.3 Control variable

The different growing seasons of different crops significantly affect the frequency and form of contract farming transactions (Nawi, 2010). Furthermore, many studies indicate that the duration of cooperation can significantly affect the degree of trust among cooperating members (de Pablo González *et al.*, 2014). In their study about contract farming, Fu *et al.* (2013) demonstrated that the quality of a relationship built through cooperation significantly affects the stability of contract farming by analyzing approximately 462 transactions. To avoid other potential explanations, this study designs some control variables to regulate variables such as transactional frequency (i.e., the number of transactions per year), transactional period (i.e., the number of years of cooperation), farmer scale (cultivated land area of farmers), and origin (dummy variable to determine whether the origin is in Tainan, the main area for farming in Taiwan).

4. Results

Tables 1 and 2 present the descriptive statistics and correlation matrices of all variables in the study, respectively. Overall, the values of the dependent

variables in the correlation matrix are appropriate (that is, <0.3), except that the correlation between specific asset investment and partners' deceitful/subtle practices are significantly larger than 0.3. However, because these variables are from different sources (the former was collected from the content of the contracts and the latter through interviews), they interpret the different causes of the independent variable.

Table 3 shows the regression results of the Heckman two-stage models. For all samples analyzed, Model 1 is the base model. Model 2 shows the transaction characteristics, i.e., the effects of specific asset investment and transaction uncertainty on the cooperation decision. Based on whether farmers perform cooperation with retailers under a contract, Models 3–6 illustrate the relationship between the perception of partners' (deceitful or subtle) practices and decision-makers' subtle and deceitful practices, respectively. These models demonstrate the relationship between farmers' perception of their partners' subtle or deceitful practices and their own subtle or deceitful practices.

4.1 Appropriateness of the empirical models

This study adopts the Heckman two-stage model to control and correct the problem of sample selection bias. Based on Eq. 2, the inverse Mills ratio is calculated using the effects of observable factors (such as specific asset investment, Tran. Uncertainty, and control variables) and unobservable elements (such as the residual term) on the first stage's cooperation decision. Therefore, the inverse Mills ratio represents the general effect of cooperation. In the Heckman model's second stage, OLS regression showed the precise results of the dependent variables' effect on subtle/deceitful practices after controlling the general effect of cooperation, that is, the inverse Mills ratio. The results of Models 3–6 (in second stage of the Heckman model) show that the adjustment of problems (inverse Mills ratio) has a significant impact on decision-makers' subtle or deceitful practices (Table III: Model 3: $\beta = 1.0156$, $P < 0.001$; Model 4: $\beta = 1.1335$, $P < 0.001$; Model 5: $\beta = 0.6080$ $P < 0.001$; Model 6: $\beta = 0.6290$, $P < 0.001$). Therefore, in this study's OLS regression, the factors affecting

cooperation decisions were successfully controlled when discussing the decision-makers' opportunistic behavior, resulting in unbiased estimates of the coefficients between the dependent and explanatory variables presented in Models 3–6.

Finally, to detect multicollinearity, each regression equation indicates a variance inflation factor (VIF). The empirical results in Models 3–6 show that the maximum value of the VIF in all regression equations of the study is smaller than 10, which is consistent with the empirical judgment value proposed by Neter *et al.* (1985). Therefore, the estimates of the empirical result are free of multicollinearity concerns.

4.2 First-stage potential partner opportunism estimates

The empirical results are presented in Table 3. Model 2 shows that specific asset investment and transaction uncertainty significantly affect cooperation decisions. When the specific asset investment or transaction uncertainty is high, farmers tend to not cooperate with the retailers (Model 2: $\beta = -0.1894$, $P < 0.05$; $\beta = -0.4461$, $P < 0.01$), supporting H1a and H1b.

4.3 Second-stage opportunistic strategy estimates

Table 3 presents an empirical analysis of the bilateral opportunistic strategy. Model 3 shows that the perception of partners' deceitful practices has a significant positive impact on decision-makers' (farmers') choices regarding deceitful practices (Model 3: $\beta = 0.5054$, $P < 0.01$); this supports H2a. Moreover, Model 4 shows that the perception of partners' subtle practices has a significant positive impact on decision-makers' (farmers') choices regarding subtle practices (Model 4: $\beta = 0.3680$, $P < 0.05$), which supports H2b.

Concerning the neutralization effect of bilateral opportunistic behavior, Model 5 shows that the effect of partners' deceitful practices is significantly larger than that of partners' subtle practices on decision-makers'(farmers') choices regarding subtle practices (Model 5: $\beta = 0.3725$, $P < 0.5$), supporting H3a. Model 6 indicates that the effect of partners' deceitful practices is

Table 1

Basic statistics of the dependent and explanatory variables

	Variable	Measurement	All Samples		
			Obs	Mean	St dev
(1)	Dummy for cooperation decision	Denoted as 1 when the observed transaction continues cooperation, 0 otherwise	113	0.7787	0.4169
(2)	Transactional period	Number of years of cooperation	113	3.8495	2.9038
(3)	Transactional frequency	Number of transactions per year	113	46.1858	41.5678
(4)	Farmer scale	Hectares of farmers' farmland	113	1.3672	0.6504
(5)	Origin	A dummy variable that is 1 when the origin is in Taiwan (the main farming area in Taiwan), and 0 otherwise	113	0.2920	0.4567
(6)	Specific asset investment	Number of items (e.g., expertise, land, fixed assets, workforce, tools, and input) specifically invested by farmers in the observed transaction	113	2.0619	1.5311
(7)	Transaction uncertainty	Sum of all uncertainty values related to the contract form, quality, quantity, and price in the observed transaction	113	5.8018	1.1681
(8)	Subtle practices	Number of subtle behaviors performed by the decision-makers (farmers) in the contract farming transaction, measured using the four subtle practices in the supply chain in the study of Carter (2000b)	113	0.7876	1.1836
(9)	Perception of partners' subtle practices	Decision-makers' (farmers') beliefs about the number of subtle behaviors adopted by their partners	113	1.4867	1.2894
(10)	Deceitful practices	The number of deceitful behaviors performed by the decision-makers (farmers) in the contract farming transaction, measured using the three deceitful practices in the supply chain from the study of Carter (2000b)	113	0.3805	0.9288
(11)	Perception of partners' deceitful practices	Decision-makers' (farmers') beliefs about the number of deceitful behaviors adopted by their partners	113	0.5929	0.9967

Note: $^{+}p < 0.1$; $*p < 0.05$; $**p < 0.01$; $***p < 0.001$

Table 2

Correlation matrix

	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1)	Dummy for cooperation decision	1										
(2)	Transactional period	0.3226**	1									
(3)	Transactional frequency	0.2723**	0.1225	1								
(4)	Farmer scale	−0.1340	0.1855*	−0.0981	1							
(5)	Origin	−0.1734^{+}	−0.1416	0.0493	−0.0412	1						
(6)	Specific asset investment	−0.1602^{+}	0.0242	−0.0922	0.0711	−0.2176*	1					
(7)	Transaction uncertainty	−0.3732***	−0.1234	−0.1741^{+}	0.0233	0.1028	0.0029	1				
(8)	Subtle practices	−0.4941***	−0.0509	−0.1467	0.0471	−0.0329	0.4409***	0.3981***	1			
(9)	Deceitful practices	−0.4954***	−0.0911	−0.1408	−0.0043	−0.1380	0.4792***	0.2742**	0.8700***	1		
(10)	Perception of partners' subtle practices	−0.5453***	−0.1674^{+}	−0.1111	−0.0261	0.0597	0.2966**	0.3421**	0.6592***	0.6490***	1	
(11)	Perception of partners' deceitful practices	−0.5409***	−0.0861	−0.0492	−0.0703	−0.0503	0.4320***	0.2337*	0.7586***	0.8438***	0.7043***	1

Note: $^{+}p < 0.1$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Table 3

Results of the Heckman two-stage model

Dependent var	Probit regression (Dummy: cooperation decision)		OLS regression (Y = opportunistic behavior of decision-maker) Under cooperation Deceitful practices	Subtle practices	Subtle practices	Deceitful practices
Independent var	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	0.8201+	4.2101***	--	--	--	--
	(0.4224)	(1.0984)				
Transactional	0.0148**	0.0126*	0.0780+	0.1677*	0.1621*	0.0841+
Frequency	(0.0052)	(0.0057)	(0.0448)	(0.0643)	(0.0712)	(0.0428)
Farmer scale	−0.2653	−0.2734	−0.0605	−0.1288	−0.0852	−0.0628
	(0.2276)	(0.2543)	(0.0408)	(0.0801)	(0.0765)	(0.0400)
Origin	−0.6633*	−0.7929*	−0.3535**	−0.2949	−0.3058	−0.3809**
	(0.3023)	(0.3429)	(0.1313)	(0.2402)	(0.2359)	(0.1286)
Specific asset		−0.1894+	−0.0731	−0.0628	−0.1238	−0.0795
investment		(0.0994)	(0.0648)	(0.1210)	(0.1082)	(0.0624)
Trans. Uncertainty		−0.4461**	−0.1407*	−0.1351	−0.1549	−0.1632**
		(0,1356)	(0.0535)	(0.0967)	(0.0950)	(0.0612)
Transactional period			0.0732+	0.1875*	0.1596*	0.0764+
			(0.0391)	(0.0893)	(0.0775)	(0.0394)
Perception of partners' subtle practices			--	0.3680*	0.1927	0.0887
				(0.1690)	(0.1162)	(0.0742)
Perception of partners' deceitful practices			0.5054**	--	0.3725+	0.4522**
			(0.1473)		(0.1937)	(0.1302)
Inverse Mills ratio			0.6080***	1.0156***	1.1335***	0.6290***
			(0.1595)	(0.2367)	(0.2537)	(0.1597)
Num of obs	113	113	88	88	88	88
VIF	--	--	2.67	2.66	2.61	2.61
Wald Chi2/F	17.04**	32.25***	2.13*	3.79**	3.43**	2.08*
Adj-R squared	0.1427	0.2700	0.5239	0.4262	0.4786	0.5341

Note: 1. () is S.E.: Standard error. 2. $^{+}p < 0.1$; $*p < 0.05$; $**p < 0.01$; $***p < 0.001$

2. The coefficients of OLS are standardized.

significantly larger than that of partners' subtle practices on decision-makers' (farmers') choices regarding deceitful practices (Model 6: $\beta = 0.4522$, $P < 0.01$), supporting H3b.

5. Discussion

This study adopts the cognitive dissonance perspective to extend the transactional and relational views of cooperation (e.g., Coase, 1937; Williamson, 1979, 1991) and derives three findings. First, in contrast to the transactional view, this study views opportunistic behavior as a strategic response to the perception of partners' opportunism rather than an assumption of behavior. The empirical results reveal that when individuals perceive a partner adopting an unethical behavior, they will respond to opportunistic behavior. It is a venerable moral precept to provide social approbation for revenge (Eisenberger *et al.*, 2004). The return of good and evil for good and evil makes partners reward and punish each other, respectively; hence, the expectation for reciprocity or revenge changes their behaviors during the cooperation period (Abbink *et al.*, 2000; Eisenberger *et al.*, 2004; Tangpong *et al.*, 2016). Verbeke and Kano (2013) regarded reciprocity as a managerial mechanism, and Abbink *et al.* (2000) argued that retribution is more compelling than reciprocity. Thus, revenge actions impact opportunistic behavior much more than reciprocal actions. Therefore, this study argues that opportunistic behavior is a strategic way for decision-makers to manage their partners' opportunistic behavior.

In addition, extending the relational view, this study distinguishes subtle and deceitful practices from opportunistic behavior. The findings indicate that the effect of partners' deceitful practices is more significant than that of their subtle practices on decision-makers' opportunistic (including subtle and deceitful) behavior. It shows that decision-makers tend to adopt an opportunistic strategy that can be rationalized. Finally, using the cognitive dissonance view, this study argues that the opportunistic strategy, a type of governance mode that reduces cognitive dissonance, diminishes transaction costs. This contrasts with previous studies (e.g., Maglaras *et al.*, 2015; Villena and Craighead, 2017), which often

believe that opportunistic behavior can undermine mutual relationships. In 2020, cognitive neuroscientists from the University of Chicago, Yoder and Decety (2020), argued that people tend to uphold fairness for others in cooperation when their individual needs are met. Thus, although they can observe opportunistic behaviors, this relationship can still be maintained under the high perception of fairness in transactions (Festinger, 1962; Tangpong *et al.*, 2016). Through empirical analysis, this study argues that decision-makers can maintain mutual relations when considering an opportunistic strategy and their partners' cognitive dissonance.

This study's findings also yield some practical implications, especially for retailers and farmers within the contract farming paradigm. For retailers, opportunistic behavior can result in high transaction costs in the long term as risks are involved in the food supply chain that cannot be controlled easily and can potentially harm the end product. If retailers adopt obvious or implicit unethical behaviors against farmers, the farmers may adopt a tit-for-tat strategy in response. For example, based on the contract farming methods of broccoli farmers in Ecuador, comparing a positive signal in the form of an on-time payment, farmers exposed to payment delays can become hostile or perfunctory (Romero Granja and Wollni, 2019). Notably, good contract farming relies on a contract scheme with symmetric information rather than economic indicators. Ruml and Qaim (2021) showed that most palm oil farmers in Ghana neither read or fully understood their contracts before signing, increasing the risk of loss (Key and Runsten, 1999). It also enhances perceived opportunism when a farmer feels vulnerable and unprotected by the company from the subtle behavior of retailers (Dedehouanou *et al.*, 2013; Glover, 1987). When making decisions about production investments, these farmers may lower their effort and input use through rational choices. For retailers, the low, negative, or perfunctory input from cooperative farmers can lead to high monitoring costs to ensure consistent transactor compliance with specified terms or quality of goods. Therefore, farmers' opportunistic response can strengthen retailers' time and supervision costs to manage the quality of the supply chain. As such, retailers should be kind

to their partners in the supply chain to build a good relationship of mutual assistance (Mao *et al.*, 2022).

This study regards opportunistic behavior as farmers' strategic response to retailers' opportunistic behavior to maintain cooperation. Based on our empirical result, under cooperation, opportunistic behavior is positive based on the perception of partners' opportunistic behavior; however, for farmers, the choice of subtle or deceitful opportunism is a critical strategic issue. Based on 300 buyer and supplier surveys, Jap and Anderson (2003) argued that goal congruence is a more powerful safeguard under ex-post opportunism than interpersonal trust. Luo *et al.* (2015) showed the role of fairness perception in curtailing opportunism based on the analysis of 225 dyads in the Chinese home appliance industry. When partners perceive fairness in distribution, procedure, or interaction under a cooperative process, it can enhance overall commitment (Johnson *et al.*, 2002) while reducing opportunism (Luo, 2007). Considering these studies, any opportunistic decision to maintain cooperation should consider the common interests among collaborators (goal congruence in prior studies) and partners' perceived fairness. Therefore, according to our empirical results, for farmers, the best response to partners' unethical practices should consider the effect of cognitive dissonance. In other words, the farmers' choice of an opportunistic strategy (subtle or deceitful practice), which may cause potential damage to partners, should be less than (or equal to) the damage caused by their partners. If farmers make opportunistic decisions considering the perceived fairness and common goals among cooperative partners, the decision reduces loss (Barrett *et al.*, 2012) and feelings of disappointment. In addition, this opportunistic decision may also diminish the possibility of cooperation termination caused by partners' perceived unfairness.

6. Conclusion

This study reveals the positive effect of opportunistic strategy on market efficiency under cooperation. Extending the argument that opportunistic behavior causes high transaction costs, impedes market efficiency, and

terminates the transaction in the future, this study highlights that opportunistic strategies that reduce cognitive dissonance will keep the additional cost and potential loss of cooperation low.

Rather than the experiment method, this study uses a real situation (contract farming transactions in Taiwan's organic agriculture) to identify farmers' perceptions of their partners' opportunistic behaviors. Based on 113 contract farming transactions in Taiwan's organic agriculture, the data of this study were collected from the content of contracts and interviews with farmers. In addition, to clarify the determinants of opportunistic strategy under cooperation, this study uses the Heckman two-stage model to resolve the sample selection bias problem using cooperation transactions as a sample. The empirical findings show that decision-makers' perception of their partners' obvious unethical behavior increases their hidden and obvious unethical behavior; the perception of partners' hidden unethical behavior increases decision-makers' hidden behavior but does not affect their obvious unethical behavior.

Finally, the limitation of this study opens opportunities for future research. The potential for social desirability bias is a limitation of survey research on sensitive topics such as unethical behavior (Randall and Fernandes, 1991). Based on our central argument that opportunistic behavior results from the interaction of stakeholders, this study interviews each respondent for more than one hour to clarify the content of the farming contract, their perception of their partners' opportunistic behavior, and their own unethical behavior. Future studies can conduct bilateral or multilateral matching surveys to diminish the potential of social desirability bias in the survey. In addition, this will not only reveal the relationships among multi-stakeholders' perception of their partners' opportunism and decisions but also enhance the quality of investigation through each other's confirmation.

Appendix: Questionnaire items

	Variable	Questionnaire Items
(1)	Dummy for cooperation decision	Under your contract farming experience, has the impressive cooperation continued until now?
(2)	Transactional period	For how many years has the cooperation existed?
(3)	Transactional frequency	How many times were transactions conducted per year for this specific cooperation?
(4)	Farmer scale	How many farmland hectares does the farmer own?
(5)	Origin	Is the farmland in Taiwan?
(6)	Specific asset investment	How many of the below items do the farmer specifically invest in this contract? (1) Expertise in contract farming; (2) land for production; (3) fixed assets, such as greenhouses and sheds; (4) workforce for planting/harvesting; (5) agricultural and other production tools;(6) production inputs, such as fertilizer and seeds.
(7)	Transaction uncertainty	Based on the content of the specific contract, 1. Which form of contract farming is used (verbal commitments or formal document contracts)? 2. Which method of quality identification is used? (1) When retailers only purchase products that meet the predetermined qualification; (2) when retailers only purchase products with the most basic quality requirements in a predetermined quantity; (3) when retailers buy all products with the most basic quality requirements. 3. Which method of pricing and purchasing quantity is used? (1) Guaranteed fixed purchase volume (price); (2) price changes with market demand.
(8)	Subtle practices	How many of the below practices have you adopted in the specific cooperation? (1) Prioritizing partners preferred by senior managers; (2) allowing personal factors to influence partner selection; (3) using vague contract terms to obtain self-advantages; (4) formulating specifications that are beneficial to a particular partner.
(9)	Perception of partners' subtle practices	How many of the below practices do you think your partner adopted in the specific cooperation? (1) Prioritizing partners preferred by senior managers; (2) allowing personal factors to influence partner selection; (3) using vague contract terms to obtain self-advantages; (4) formulating specifications that are beneficial to a particular partner.
(10)	Deceitful practices	How many of the below practices have you adopted in the specific cooperation? (1) Using a second source under exclusive dealing; (2) exaggerating the seriousness of the poor crop quality problem when bargaining; (3) deliberately misleading partners when bargaining and negotiating.
(11)	Perception of partners' deceitful practices	How many of the below practices do you think your partner has adopted in the specific cooperation? (1) Using a second source under exclusive dealing; (2) exaggerating the seriousness of the poor crop quality problem when bargaining; (3) deliberately misleading partners when bargaining and negotiating.

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