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## Do related party transactions always deteriorate earnings informativeness?

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## ABSTRACT

There are two competing views in explaining the motives of related party transactions (RPTs): an efficient contracting arrangement to benefit shareholders and a mean for insiders to expropriate outside shareholders via self-dealing. This study hypothesizes that, in Taiwan, a quasi-developed economic unity with high vertical-integrated products and services, a firm's different types of revenue-related RPTs will reflect its diverse characteristics and result in a distinctive earnings informativeness. We use both the product (or processing) sales and non-operating revenues to examine how RPTs influence the amount of current and future earnings embedded in current stock returns. The empirical results show that earnings informativeness is enhanced for firms disclosing high related-party's product (or processing) sales, yet it deteriorates for firms reporting high related-party' non-operating revenues. It suggests the sub-classification of revenue-related RPTs has implication to investors. We run some diagnostic checks and document results that are robust for various specifications.

## 1. Introduction

Related party transactions (hereafter RPTs) are commonly seen among firms within a business group for Asian countries (Jian and Wong, 2010; Lo et al., 2010). Contracting theory suggests that RPTs can be part of efficient contracting with related parties and can be in the stakeholders' best interests to allocate resources and manage risk (Coase, 1937; Williamson, 1964; Gordon et al., 2007; and Ryngaert and Thomas, 2012). However, RPTs also raise concerns based on agency problem that managers will over consume perquisites and/or inappropriate wealth transfers (Holmstrom, 1979; Bertrand et al., 2002; Cheung et al., 2006; Djankov et al., 2008; Berkman et al., 2009; Lo et al., 2010; Kohlbeck and Mayhew, 2010; Jian and Wong, 2010; Kohlbeck and Mayhew, 2017). In the agency framework, RPTs alter reliability of financial statements, thereby reducing the effectiveness of contracts designed to reduce agency conflicts. Thus, there are two competing views in explaining the motives of RPTs: a benefit contracting arrangement for shareholders and a mean for insiders to expropriate outside shareholders via self-dealing. In this study, we use the earnings informativeness model that is introduced by Collins et al. (1994) (CKSS model) to examine whether current-year stock return is associated with current and future earnings for firms disclosing high revenue-related RPTs. We conjecture that the informativeness of earnings will reveal

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distinctive patterns under diverse types of RPTs.

When a firm discloses its current earnings with RPTs<sup>1</sup>, it has certain private knowledge about current and/or future earnings. RPTs in affiliated firms may be motivated by economic reasons, e.g., to obtain access to supplies or markets (vertical integration). In these cases, the earnings informativeness of RPTs would not be expected to be different from those of similar arms' length transactions conducted with non-related third parties. Even more, the contracting and/or economic reasons of RPTs in affiliated firms may enhance the forecasting capability of current earnings for the long-term contracting relationship between related parties, while at the same time, improve the earnings informativeness. On the other side, the propping-up hypothesis argues that RPTs in affiliated firms are used to prop up underperforming firms (Friedman et al., 2003). Bertrand et al. (2002) and Jian and Wong (2010) document that related sales are used to dampen the effects of negative industry shocks on firms' earnings when there are incentives to meet earnings targets. Note that prior studies have investigated determinants of the returns-earnings relation and reveal that the informativeness of current return with respect to current and future earnings is influenced by the quality of disclosure (Kothari, 2001; Lundholm and Myers, 2002; Ettredge et al., 2005; Orpurt and Zang, 2009; Choi et al., 2011). Yet, extant studies (e.g., Kohlbeck and Mayhew, 2010; Nekhilli and Cherif, 2011; Chen et al., 2011; Ryngaert and Thomas, 2012) use different RPTs measures in examining the valuation and/or earnings effect of such transactions and reveal mixed evidence. It should be noted that revenue-related RPTs have the most direct impact on earnings and the major concern is whether firms may have used these types of RPTs to inflate earnings in Taiwan<sup>2</sup>. A firm's different types of revenue-related RPTs, i.e., product (or processing) sales (Bertrand et al., 2002; Jian and Wong, 2010) and non-operating incomes (Herrmann et al., 2003; Wang and Yuan, 2012) may reflect their diverse characteristics and result in distinctive earnings informativeness. Accordingly, this study investigates how the subcategories of revenue-related RPTs influence the amount of current and future earnings that are embedded in current stock returns.

The empirical results document that earnings informativeness is enhanced for firms disclosing high related-party's product (or processing) sales in affiliated firms and supports the contracting hypothesis. Yet, earnings informativeness deteriorates for firms reporting a large magnitude of related-party's non-operating incomes. Investors are likely able to unravel the attributes of diverse types of RPTs in affiliated firms, which in turn, result in distinctive earnings informativeness. Note that the rule stipulates any fundamental RPTs need to be approved by the board of directors of listed firms and should be reported to the Taiwan Stock Exchange (TWSE). The positive association between related-party's product (or processing) sales in affiliated firms and earnings informativeness suggests that investors are likely to see the related-party's product (or processing) sales as a contracting network for the exchange and/or vertical integration of resources among affiliated firms rather than opportunistic earnings arrangement. However, investors see the irregularly non-operating incomes arrangement between related parties as a tool to facilitate tunneling because of the relatively simple arrangement of the deal (Cheung et al., 2009). The conclusions remain intact when we re-estimate the coefficients of using distinct subsamples and model specifications.

This study enriches the RPTs literature from some angles. First, although RPTs have attracted more attention in recent years, the effect on earnings informativeness, specifically the informativeness of future earnings, is largely unknown. We extended Collins et al.' (1994)<sup>3</sup> study and further examined whether sub-classifying revenue-related RPTs induce distinctive pattern of earnings informativeness. We found that the nature of RPTs are associated with its role both in efficient contracting and in opportunistic reasons in Taiwan. This provides some insight for the debate about the consequences of related party transactions from the earnings quality perspective. Second, it should be noted that the propping-up hypothesis (Friedman et al., 2003; Jian and Wong, 2010) suggests revenue-related RPTs are used to prop up underperforming firms. We propose an alternative contracting hypothesis in explaining the improved earnings informativeness of firms with high related party's product (or processing) sales in Taiwan, a quasi-developed economic unit with high vertical-integrated products and services. The finding here provide a greater understanding of potential problems and benefits of RPTs in different setting with their own institutional characteristics. Finally, Yeh et al. (2012) documented that good corporate governance is effective in constraining RPTs, which implies the opportunistic attribute of revenue-related RPTs in Taiwan. However, they focused on limited samples, i.e., seasoned equity offerings and "suspect" earnings management. We use a general sample to examine the earnings informativeness of diverse revenue-related RPTs and reveal a possible contracting explanation from the investors' viewpoint in a comprehensive setting.

The remainder of this paper is organized in the following way. Section 2 illustrates the background, describe the literature review, and develops our testable hypothesis. Section 3 outlines our research design and describes the empirical data. Section 4 presents and discusses empirical findings. Section 5 provides the robustness check on empirical findings and Section 6 contains the conclusions.

<sup>1</sup> Despite the acceptance of consolidated net income worldwide, parent-only financial statements have historically been the primary financial statements in Taiwan in our observation periods. Note that intercompany transactions between a parent firm and its subsidiaries are eliminated upon consolidation. To capture the entire characteristics of intercompany product (or processing) sales and non-operating incomes in affiliated firms, the related parties include both the subsidiaries and the associates in the affiliated groups.

<sup>2</sup> RPTs are prevalently used in Taiwanese firms. Lin et al. (2010) documented that 96% of the listed firms in Taiwan are associated with RPTs in 2006. Yeh et al. (2012) show that the average level of related-party sales with respect to total sales in Taiwan is 14.26%, which is significantly higher than that in China (6.11% from Jian & Wong 2010).

<sup>3</sup> Collins et al. (1994) pointed out that annual earnings are announced about several months after the fiscal year-end that results in the mismatch between earnings and contemporaneous annual stock returns. Consequently, a portion of year  $t$  return is in response to the previous fiscal year's (year  $t-1$ ) earnings and dividend that were reported in year  $t$ . Thus, Collins et al. (1994) suggested the use of lagged earnings (i.e., FERC) in the model to exclude the mismatch of current earnings and annual stock returns. Moreover, the explicitly and/or implicitly contracting reason for RPTs to some extent reflects a long-term network for the integration of resources among affiliated firms. We expect the use of Collins et al.'s (1994) model allow us to unravel this long-term characteristic, which in turn, deal with the earnings informativeness of RPTs.

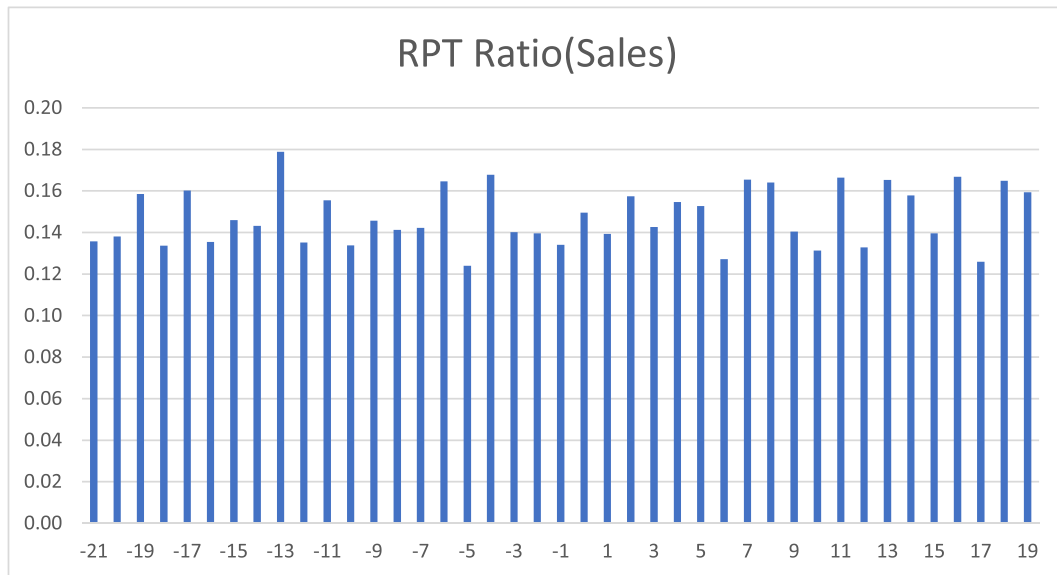


Fig. 1. The Product (or processing) sales RPTs Ratio Distribution Based on EPS Change.

## 2. Characteristics, literature review and hypotheses

### 2.1. Institutional characteristics

Many listed firms in Taiwan are members of business groups. Business groups in Taiwan have been characterized by interlocked directorates and cross-shareholding among affiliated firms and are usually held by a dominant family (Luo and Chung, 2005). A business group affiliation enables firms to access the resources required for operations (Khanna and Palepu, 2000), which in turn, acts as a network for the exchange and integration of resources among affiliated firms. The tight and long-term commercial interactions that exist in the “internal market” formed by group members imply that there are a number of methods through which shareholders can effectively monitor and exert control over management. Thus, even though a general understanding is that a high level of related party transactions tends to be associated with tunneling practices (Cheung et al., 2006; Jian and Wong, 2010; Yeh et al., 2012; Hwang et al., 2013) that go beyond the legal boundaries, some related party transactions in affiliated firms are a natural part of operating activities and not necessarily related to managerial opportunistic decisions (Gordon et al., 2007) in Taiwan. For example, Taiwan Semiconductor Manufacturing Company, Ltd. (TSMC) has established front-end and back-end integration capabilities that result in faster time-to-production and creates the best performance and area sweet spot to provide the best foundry services in the semiconductor industry. Subsidiaries in North America, Europe, Japan, China, and South Korea are dedicated to servicing TSMC customers worldwide. It is found that the disclosure of net revenue from sale of goods to TSMC North America (TSMC’s 100% subsidiary in San Jose, California, U.S.A.) is 65%, 64%, 60% of consolidated net revenue in TSMC during years 2016 ~ 2018. The audited financial reports reveal that the sales prices and payment terms of intercompany sales are not significantly different from those to third parties. Thus, it is likely TSMC North America supports the TSMC’s core foundry business with related services in North America and plays the post-manufacturing function in the value-chain of TSMC.

According to Article No. 6 issued by the Financial Accounting Standard Board of Taiwan and the rules promulgated by the regulators of Taiwan, related parties are identified as follows: (1) a party has substantive control over or impact on the other party’s operating and/or financial policies; (2) two parties are under control or affected by another party; (3) a person or his/her relatives within two tiers simultaneously serves as the chairman or CEO of two firms; (4) the endowment from a firm comprises more than 1/3 of the total funds of an institution; (5) the firm’s directors, supervisors, CEO, vice/associate CEO, and department heads are directly supervised by the headquarter; (6) the spouse of directors, supervisors, and CEO; (7) the firm’s chairman of the board, CEO, and relatives are within two tiers. Taiwan imposes disclosing regulations on the listed firms’ related party transactions. The disclosing requirements of RPTs include products (or processing) sales amount, unrealized profits and losses, the amount and percentage of goods sold, the balance and percentage of receivables, the balance and percentage of payables, the amount and percentage of property transactions (assets sales), and the amount of profits and losses generated from these transactions at the end of the reporting period. Moreover, except for fully disclosing the RPTs information in financial reports, the rule stipulates that any fundamental RPTs in affiliated firms need to be approved by the board of directors and reported to the Taiwan Stock Exchange. Doong et al. (2011) found that this mechanism results in Taiwanese firms have collectively developed products and services through an integrated cooperative network that appears to be highly effective and results in more synergy, which should translate into a higher performance for any particular firm.

To gain a preliminary understanding of RPTs in affiliated firms and earnings reporting in Taiwanese-listed firms, we perform a

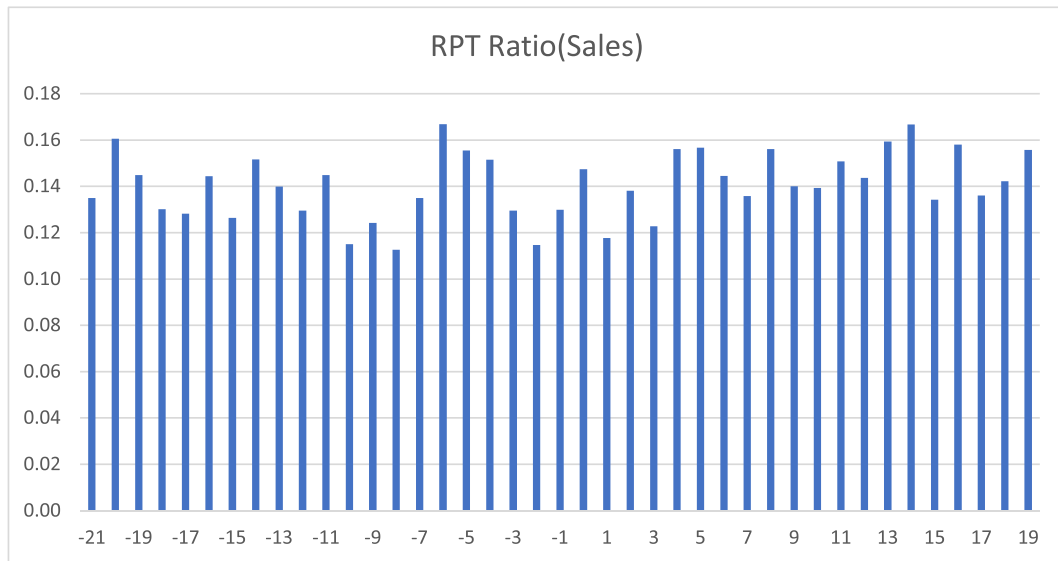


Fig. 2. The Product (or processing) sales RPTs Ratio Distribution Based on EPS Level.

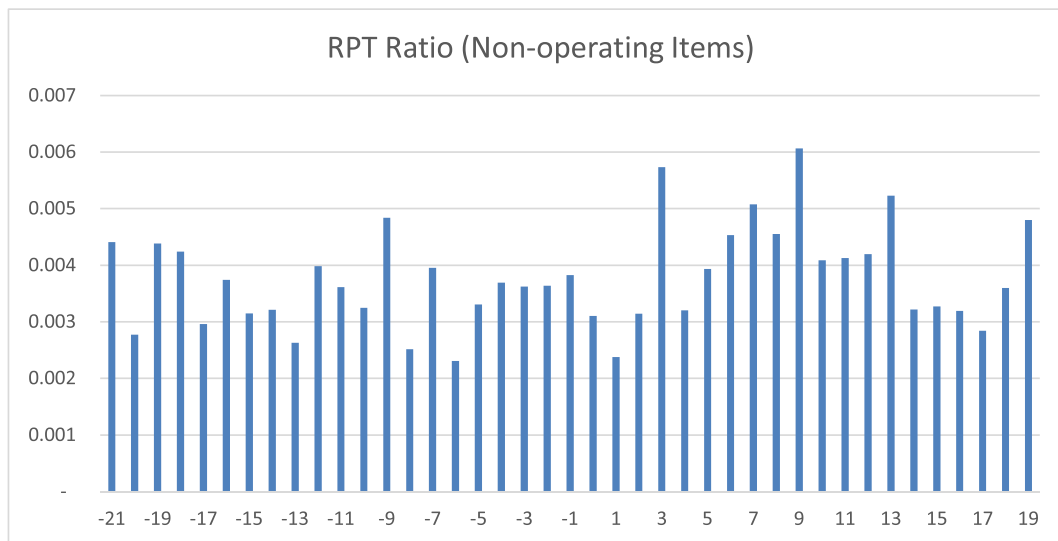


Fig. 3. The Non-operating incomes RPTs Ratio Distribution Based on EPS Change.

procedure to understand whether managers engage in related party's product (or processing) sales and/or non-operating incomes to meet or slightly beat salient earnings benchmarks. We grouped firm-years into intervals based on earnings per share (EPS) level and earnings per share change; then, we calculated the average RPTs within a 1% interval. The distributions of average related party's product (or processing) sales and non-operating incomes ratio in each interval are plotted in Figs. 1 and 2 and Figs. 3 and 4. From Figs. 1 and 2, distribution based on product (or processing) sales, RPTs ratio concentrated on firm-years in the interval to the immediate right of the zero earnings benchmark (zero earnings or previous year's earnings) within a 1% interval is moderately higher than the interval which is immediate left of the zero earnings benchmark. Yet, the average related party's product (or processing) sales in this group is unlikely higher than other intervals. As for the related party's non-operating incomes, Fig. 4 (Fig. 3) show RPTs ratio concentrated on firm-years in the interval to the immediate right of the zero earnings benchmarks is higher (lower) than the interval which is immediate left of the zero earnings benchmark. However, on average, the related party's non-operating incomes are irregularly distributed in the EPS intervals. Thus, RPTs in affiliated firms are unlikely associated with managerial opportunistic earnings reporting, specifically, the related party's product (or processing) sales in Taiwan. This preliminary result supports the findings of Yeh et al. (2012) who documented only sparse evidence of the relation between revenue-related RPTs and managerial opportunistic reporting in Taiwan.

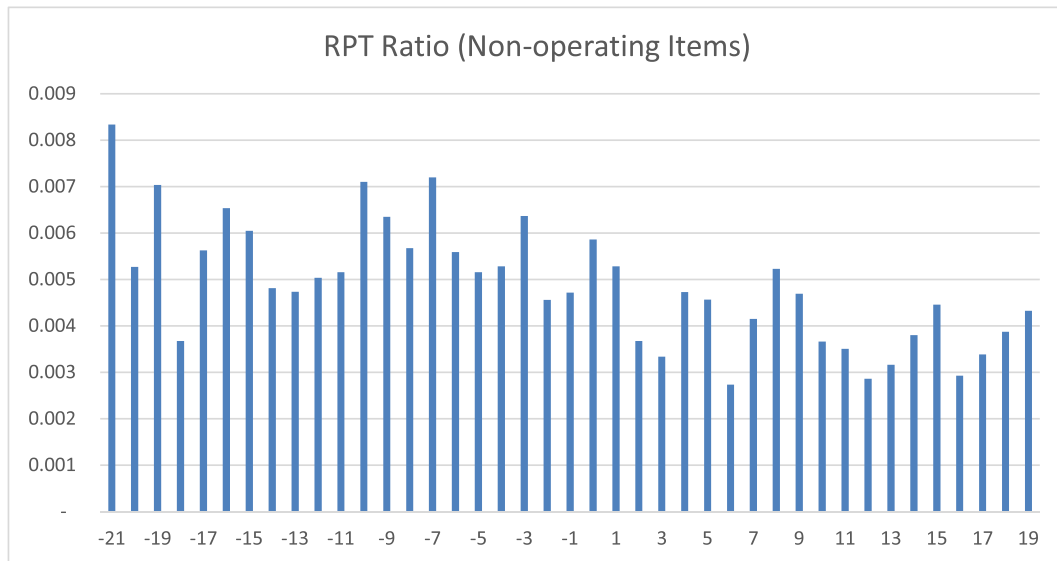


Fig. 4. The Non-operating Incomes RPTs Ratio Distribution Based on EPS Level.

## 2.2. Literature review

The returns-earnings relation has been the focus of a vast body of research in accounting (e.g., [Ball and Brown, 1968](#); [Beaver et al., 1980](#); [Kothari, 2001](#); [Jiambalvo et al., 2002](#)). However, [Collins et al. \(1994\)](#) argues that the weak relation between stock returns and contemporaneous earnings is that investors price future earnings. Several studies have investigated whether variation in a firm's disclosure practices affects the strength of the relation between current returns and future earnings. For example, [Gelb and Zarowin \(2002\)](#) and [Lundholm and Myers \(2002\)](#) document that firms with more informative disclosures have higher future earnings response coefficients (FERCs). Other studies investigated the effect of specific types of disclosures on the relation between current returns and future earnings. [Ettredge et al. \(2005\)](#) found that FERCs are higher for firms that began disclosing multiple segments under the SFAS No. 131. [Orpurt and Zang \(2009\)](#) documented that FERCs are higher when firms prepare their cash flow statement using the direct approach rather than the indirect approach. [Choi et al. \(2011\)](#) find that FERCs are higher for firms that issue management earnings forecasts and when these forecasts are more frequent and precise. From the earnings attributes viewpoint, [Tucker and Zarowin \(2006\)](#) found that the change in the current stock price of higher-smoothing firms contains more information about their future earnings. Recently, [Chen et al. \(2020\)](#) showed that earnings informativeness of income smoothing decreased after the occurrence of the crisis and moderated by high foreign institutional ownership. Overall, extant studies reveal that FERCs increase as more information about future earnings becomes available.

Limited research has considered the determinants of RPTs in developed economies. [Nekhili and Cherif \(2011\)](#) identify a number of characteristics of firms that engage in RPTs. They find that RPTs are more likely when voting rights are held by the main shareholder and when there is a larger board, greater board independence, increased leverage, and U.S. listing. Recently, [Kohlbeck and Mayhew \(2017\)](#) find that related party transactions can serve as a "red flag" that warns of potential financial misstatement. Focusing on the audit quality, [Bennouri et al. \(2015\)](#) find that firms audited by Big 4 auditors report fewer related-party transactions and this negative relationship is "weaker" in a more transparent reporting environment. [El-Helaly et al. \(2018\)](#) also find that the substitution between RPTs and real earnings management is only robust to firms audited by a non-Big 4 auditor. In Taiwan, [Tsai and Wang \(2016\)](#) show that management prefers to hire an auditing specialist when the firm has a higher level of related-party sales in order to mitigate outside investors' concern. Research on Chinese firms is particularly fruitful due to the availability of data. For example, [Hu et al. \(2009\)](#) find that the probability of RPTs increases when the chairman of the board is also the CEO or in the high concentration of ownership. [Lo et al. \(2010\)](#) show that firms with a board that has a higher percentage of independent directors, or a lower percentage of "parent" directors, or have financial experts on their audit committees, are less likely to engage in transfer pricing manipulations. [Jian and Wong \(2010\)](#) find that abnormal sales to their owners are used to prop up sales in China. These transactions are more prevalent within state-owned firms and those located in weaker economic regions. Collectively, managers may use RPTs to inappropriately make wealth transfers ([Lo et al., 2010](#); [Cheung et al., 2006](#); [Berkman et al., 2009](#); [Djankov et al., 2008](#); [Kohlbeck and Mayhew, 2010](#); [Jian and Wong, 2010](#)). However, prior studies (e.g., [Khanna and Palepu, 2000](#); [Ferris et al., 2003](#)) also document that it is difficult to explain why minority shareholders still invest in group-affiliated firms in emerging economies if affiliated groups exist solely to help the controllers to steal wealth from minority shareholders. On the other side, RPTs can be part of efficient contracting with related parties and can be in the stakeholders' best interests, allow for allocation of resources, and enable management of risk ([Gordon et al., 2007](#); [Ryngaert and Thomas, 2012](#)). Thus, it appears there exists competing viewpoints attempting to explain the determinant of RPTs.

Several empirical articles explore the valuation and performance implications of RPTs. [Kohlbeck and Mayhew \(2010\)](#) document

that firms that disclosed RPTs have lower valuations and subsequent returns compared to non-RPTs firms prior to the issuance of SOX. Nekhilli and Cherif (2011) find a negative valuation impact for RPTs carried out directly with major shareholders, directors, and managers. In the Chinese setting, Chen et al. (2011) document RPTs in connection with earnings management and initial public offerings (IPO). They find that RPTs during the pre-IPO period are positively associated with firm performance. However, the decline in operating RPTs after the IPO is associated with long-term underperformance and lower shareholder returns. Ryngaert and Thomas (2012) examine RPTs in terms of when the party became a related party (i.e., ex ante and ex post RPTs). Ex ante transactions that predate the party becoming a related party are not associated with firm performance and are positively associated with firm valuation. However, ex post transactions that occur after a firm becomes a related party are inversely associated with profitability, result in share price declines, and are associated with an increased likelihood of financial distress. The later result is consistent with the larger sample results in Kohlbeck and Mayhew (2010) who document lower valuations for firms reporting RPTs with a director, officer, and shareholders. However, few studies have focused on examining the role of RPTs under contracting or opportunistic reasons in earnings informativeness.<sup>4</sup> This study provides some insights that enriches this stream of research.

Yeh et al. (2012) examine how corporate governance affects the level of RPTs and how it moderates the motives of using RPTs in Taiwan. They show that good corporate governance is effective in constraining RPTs with the negative relation sustained across some sales-related measures of RPTs. Yet, their analysis is based on the limited “suspect” earnings management or seasoned equity offering samples. From the regulation perspective, Hwang et al. (2013) find that the enactment of the RPTs disclosure regulation in 2000 mitigates discretionary accruals of Taiwanese firms engaging in related-party transactions with Chinese entities. Specifically, the disclosure regulation is effective in reducing earnings management among firms in non-high-tech sectors. If this is the case, the work of RPTs disclosing regulation in Taiwan provides a contracting reason rather than opportunistic explanation for firms involved in RPTs arrangement. On the other side, RPTs may reflect a firm’s social capital and resource advantage, which in turn benefit its operating performance in Taiwan. This argument is supported by the study of Doong et al. (2011) who find that related-party transactions has a positive effect on a firm’s value.

### 2.3. Hypothesis development

The role of RPTs within affiliated firms is widely discussed in the literature. Firms can benefit from an increase in contracting RPTs. Contracting theory suggests that imperfect emerging markets increase transaction costs that can be reduced through RPTs between the members of a business group (Khanna and Palepu 1997). Khanna and Palepu (2000) argue that a firm may be most profitably pursued as part of a large, diversified business group that can act as an intermediary between individual firms and imperfect markets. Williamson (1975, 1985) and Aghion et al. (2006) also document that firms in competitive industries or in uncertain environments can increase contracting RPTs to reduce both the transaction costs and operating risk, which in turn, can partially enhance firms’ performances. In contrast, the agency perspective argues that RPTs in affiliated firms can be used in the expropriation, e.g., business groups could use RPTs to “tunnel” resources from affiliated firms (Jian and Wong, 2010; Yeh et al., 2012). This “tunneling” view suggests that the engagement of RPTs in business groups provides a convenient channel through which controlling shareholders can transfer resources at the expense of minority shareholders (Chang and Hong, 2000; Cheung et al., 2006). Accordingly, RPTs can be classified as either having a contracting or an opportunistic characteristic. The former view of RPTs may consider as sound business exchanges fulfilling economic needs and/or decreasing the transaction costs, whereas the latter may imply a moral hazard and act as a way of tunneling and propping up an affiliated firms’ specific needs.

The market may price RPTs based upon the type of RPTs and the nature of the related parties. Managers’ decision-making on the related party’s product (or processing) sales in affiliated firms to manipulate financial statements (e.g., Aharony et al., 2010) leads to a greater information asymmetry, a lower earnings quality, and a general erosion of confidence in the firm. Moreover, some types of transactions in the affiliated firms may be employed more frequently to facilitate tunneling, e.g., trading assets (Cheung et al., 2009). One facet, non-operating activities and/or selling assets in the affiliated firms may be used to facilitate tunneling because of the relatively simple arrangements of the deal. Herrmann et al. (2003) provide evidence to show that Japanese companies manage earnings through non-operating incomes. Chen and Yuan (2004) also document that Chinese firms are likely to use non-operating income to inflate total earnings. Besides, the non-operating incomes and/or asset sales in affiliated firms will make the firms record a transitory item in earnings, resulting in a benefit/charge to current earnings. The impact of such RPTs recognized in the income statement should be taken as a noise impounded in the current earnings. One should be noted that relatively noisy non-operating RPTs also weaken the accounting earnings ability to predict future cash flows and hence firm value. Accordingly, we anticipate that earnings informativeness is less in the presence of intercompany RPTs in affiliated firms, both the related party’s product (or processing) sales and the related party’s non-operating incomes.

On the other side, Kohlbeck and Mayhew (2010) argue that RPTs in affiliated firms can be value-enhancing by creating strategic partnerships and facilitating contracting. Recently, based on the U.S. Census Bureau’s Related Party Trade database, Kukharsky (2016) models and provides evidence that the relative prevalence of vertical integration increases in the long-term orientation of cooperation parties. It suggests that the incidence of RPTs to some extent is closely related to industrial organization. A value-enhancing function or a production stage in the supply chain can be organized in case of vertical integration with subsidiaries or

<sup>4</sup> Wang & Yuan (2012) hypothesize that RPTs may violate the arm’s-length assumption of regular transactions and find an adverse impact of related party sales of goods and services on the usefulness of current earnings to investors. However, they exclude the possible long-term contracting characteristics of RPTs and the mismatch of current earnings and annual stock returns.



**Table 1**  
Sample Selection and Industrial Distribution.

Panel A: Sample Selecting Process			
Descriptions			N
Firms listed on TEJ during 1996–2015			25,655
Less:			
Missing financial data and other control variables			(7081)
Missing data of ex-dividend stock return			(47)
Final empirical observations			18,527
Panel B: Industrial Distribution			
Code	Industry	No. observations.	Ratio
11	Cement	198	1.07%
12	Food	447	2.41%
13	Plastics	524	2.83%
14	Textile and Fiber	1136	6.13%
15	Electric Machinery	1166	6.29%
16	Electric Appliance	183	0.99%
17	Chemical Biotech	1315	7.10%
18	Glass & Ceramic	119	0.64%
19	Paper Pulp	120	0.65%
20	Iron and Steel	813	4.39%
21	Rubber	202	1.09%
22	Automobile	112	0.60%
23	Electronics	9441	50.96%
25	Construction	1022	5.52%
26	Shipping	439	2.37%
27	Tourism	272	1.47%
29	Trade	284	1.53%
99	Others	734	3.96%
Total		18,527	100%

engaging in arm's length contracts with affiliated firms (e.g., associates). Taiwan is a quasi-developed economic unity with high vertical-integrated products and services, which results in the related party's product (or processing) sales recurring as transactions in the affiliated groups. Moreover, listed firms in Taiwan stocks market are required to prepare consolidated financial statements in accordance with Taiwan's Statement of Financial Accounting Standards No. 7, *Consolidated Financial Statements*. All intercompany transactions should be eliminated if the subsidiaries are within the consolidated entity, which in turn, have none income effect in consolidated financial statements.<sup>5</sup> It may decrease the motive of using related party's product (or processing) sales and related party's non-operating incomes in affiliated firms to manipulate financial statements in Taiwan. If the related party's product (or processing) sales and the related party's non-operating incomes in the affiliated groups (both subsidiaries and associates) can be linked to this long-term vertical-integrated contracting characteristic (Kukharsky, 2016; Del Prete and Rungi, 2017), it has certain private knowledge about the future earnings. The future earnings, which reflect the long-term contracting relation of the underlying RPTs in affiliated firms, is expected to give a better signal of stock return and enhances the earnings informativeness. We anticipate that earnings informativeness is positively associated with such types of RPTs. Nevertheless, even though the related party's transactions to some extent reflect the vertical integration of affiliated firms in contracting operations in Taiwan, there is no theoretically obvious explanation and/or a dominating empirical conclusion to describe the association between RPTs and earnings informativeness. We thus establish the hypothesis in the refutatory type as follows:

Hypothesis 1a. *Ceteris paribus*, under the contracting hypothesis, earnings informativeness is enhanced for firms engaged in higher revenue-related party's transactions in affiliated firms.

Hypothesis 1b. *Ceteris paribus*, under the opportunistic hypothesis, earnings informativeness is deteriorated for firms engaged in higher revenue-related party's transactions in affiliated firms.

Note that a firm's different types of RPTs reflect diverse characteristics and result in distinctive earnings informativeness (e.g., Kohlbeck and Mayhew, 2010; Nekhilli and Cherif, 2011; Chen et al., 2011; Ryngaert and Thomas, 2012). This study divides the revenue-related RPTs into two subcategories of RPTs, i.e., product (or processing) sales (Bertrand et al., 2002; Jian and Wong, 2010; Yeh et al., 2012) and non-operating incomes (Herrmann et al., 2003; Wang and Yuan, 2012), and examines how different types of RPTs influence the amount of current and future earnings that are embedded in current stock returns.

<sup>5</sup> Only intercompany RPTs between reporting firms and its non-subsidiaries (e.g., associates and joint ventures) are disclosed in the consolidated financial statements.

### 3. Research design

#### 3.1. Data and sample Selection

The years 1996–2015 were chosen as the observation periods because we needed the consecutive three year's earnings and stock returns data (2016–2018) to examine the earnings informativeness in the CKSS model. The year of 1996 was chosen as the starting year because the over-the-counter (OTC) listed firms' data was available in Taiwan. The empirical data was retrieved from the Taiwan Economic Journal Database (TEJ). Table 1 reports the sample selecting process in the study.

The firms used in this study are public trading companies that are listed on Taiwan Stocks Exchange or OTC. There were 25,655 firm-year observations on the TEJ database from 1996 to 2015 (excluding finance-related institutions (Code No. 28 and Code No.30 in TEJ) as they are subject to different disclosing requirements). We deleted 7081 observations for financial data and other controlling variables, 47 observations for stock return because of unavailable data. This selecting procedure yielded a final sample of 18,527 firm-year observations in empirical analysis.

#### 3.2. Variables measurement

##### 3.2.1. Dependent variable

**3.2.1.1. Stock return ( $R_t$ ).** If the recognized RPTs in affiliated firms improve (or deteriorate) earnings informativeness, stock prices will impound more (less) information about future earnings (Tucker and Zarowin, 2006). We follow Collins et al. (1994), Lundholm and Myers (2002), and Tucker and Zarowin (2006) and use the annual stock return in years  $t$  ( $R_t$ ) as the dependent variable, then examine whether the recognition of RPTs in the affiliated firms embedded in the current stock price reflect the information about both the current and future earnings.

##### 3.2.2. Pivotal explanatory variables

**3.2.2.1. Related Party's product (or Processing) sales in affiliated firms (PSRPTs).** The first pivotal explanatory variable is the ratio of intercompany related party's product (or processing) sales in affiliated firms. The related parties include subsidiaries, associates, and associates of the firm's subsidiaries in the affiliated groups. We use the amount of related party's product (or processing) sales in affiliated firms divided by the total sales of the sample firm, and denote it as PSRPTs.

**3.2.2.2. Related Party's Non-operating incomes in affiliated firms (ASRPTs).** The second pivotal explanatory variable is the ratio of intercompany related party's non-operating incomes in affiliated firms, which includes rent, advertisement, commission, and asset sales. We use total amounts of related party's non-operating incomes in affiliated firms divided by the total sales of the sample firm, and denoted it as ASRPTs.

**3.2.2.3. Control variables.** Except for the variables used in the CKSS model, we control some stock return variables that are used in the literature. As the variation of the firm's earnings increases, there may be association with closeness to the violation of debt covenants. To avoid a debt covenant violation, managers of these firms are more likely to adopt aggressive earnings in management reporting. It provides an incentive for a firm to manipulate its reported income, which in turn can affect the earnings informativeness (Whittred and Zimmer, 1986; Carlson and Bathala, 1997). We use leverage (LEV), defined as total liabilities divided by total assets, to proxy for default risk at the end of the fiscal year. We also incorporate market-to-book ratio (MB) which is calculated by the market value of the common equity to book value of the common equity at the end of the fiscal year into empirical models to proxy for growth opportunities (Collins and Kothari, 1989). The ratio of return of assets (ROA) is used to control a firm's operating performance on stock return (Subramanyam, 1996; Lee et al., 2006). Finally, we include firm size (SIZE), which is calculated by the natural logarithm of total assets, to control for the potential effects of omitted variables (Becker et al., 1998). We also control the year and industry effects in all regressions.

#### 3.3. Model specification

To test our hypotheses, we expand the earnings informativeness model suggested by Collins et al. (1994), Lundholm and Myers (2002) and Tucker and Zarowin (2006) by incorporating the intercompany related party's product (or processing) sales (PSRPT) and the intercompany related party's non-operating incomes (ASRPT) in affiliated firms and the interacting variables of these two pivotal variables. The empirical regression is presented as follows:



**Table 2**  
Descriptive Statistics of the Variables.

Panel A: Descriptive Statistics							
	Mean	SD	Min	Q1	Med	Q3	Max
$R_t$	0.169	0.673	−0.744	−0.237	0.018	0.360	3.252
$X_{t-1}$	0.008	0.182	−1.103	0.010	0.053	0.086	0.207
$X_t$	0.022	0.156	−0.838	0.006	0.049	0.089	0.356
$X_{t3}$	0.127	0.381	−1.470	−0.001	0.137	0.284	1.455
$R_{t3}$	0.509	0.997	−1.243	−0.110	0.326	0.913	4.581
$PSRPT_t$	0.144	0.209	0	0.003	0.048	0.197	0.937
$ASRPT_t$	0.004	0.012	0	0	0	0.003	0.084
$LEV_t$	0.370	0.168	0.048	0.242	0.361	0.482	0.811
$MB_t$	1.729	1.411	0.290	0.860	1.310	2.080	8.870
$ROA_t$	0.045	0.091	−0.282	0.009	0.048	0.093	0.284
$SIZE_t$	15.146	1.304	12.648	14.219	14.972	15.891	19.125
Panel B: Mean Difference of RPT Firms and Non-RPT Firms							
	Sales-based			Non-operating Income			Mean Diff.
	RPT Firms	Non-RPT Firms	Mean Diff.	RPT Firms	Non-RPT Firms	Mean Diff.	
$R_t$	0.168	0.171	−0.003	0.163	0.177	−0.014	
$X_{t-1}$	0.011	−0.010	0.021 <sup>a</sup>	0.010	0.005	0.005 <sup>c</sup>	
$X_t$	0.025	0.010	0.015 <sup>a</sup>	0.025	0.019	0.006 <sup>a</sup>	
$X_{t3}$	0.133	0.098	0.034 <sup>a</sup>	0.131	0.122	0.009	
$R_{t3}$	0.508	0.512	−0.005 <sup>a</sup>	0.489	0.536	−0.047 <sup>a</sup>	
$PSRPT_t$	0.172	0.000	0.171 <sup>a</sup>	0.158	0.123	0.035 <sup>a</sup>	
$ASRPT_t$	0.004	0.003	0.001 <sup>a</sup>	0.007	0.000	0.007 <sup>a</sup>	
$LEV_t$	0.372	0.361	0.011 <sup>a</sup>	0.374	0.364	0.010 <sup>a</sup>	
$MB_t$	1.708	1.837	−0.129 <sup>a</sup>	1.662	1.824	−0.162 <sup>a</sup>	
$ROA_t$	0.047	0.036	0.011 <sup>a</sup>	0.046	0.045	0.001	
$SIZE_t$	15.258	14.570	0.688 <sup>a</sup>	15.408	14.774	0.634 <sup>a</sup>	
Adj-GM	−0.013	0.065	0.077 <sup>b</sup>	0.015	−0.021	0.036	
Raw-GM	0.156	0.232	−0.075 <sup>a</sup>	0.183	0.149	0.034	

$R_t$ : ex-dividend annual stock return in year  $t$ .  $X_{t-1}$ : the earnings per share in year  $t-1$ , deflated by the stock price at the beginning of year  $t$ .  $X_t$ : the earnings per share in year  $t$ , deflated by the stock price at the beginning of year  $t$ .  $X_{t3}$ : the sum of earnings per share for year  $t+1$  through  $t+3$ , deflated by the stock price at the beginning of year  $t$ .  $R_{t3}$ : the sum of annual stock returns for year  $t+1$  through  $t+3$ .  $PSRPT_t$ : the ratio of related party's product (or processing) sales in year  $t$ .  $ASRPT_t$ : the ratio of related party's non-operating incomes in year  $t$ .  $LEV_t$ : a firm's leverage in year  $t$ .  $MB_t$ : market-to-book ratio in year  $t$ .  $ROA_t$ : return of assets in year  $t$ .  $SIZE_t$ : natural logarithm of book value of total assets in year  $t$ . Adj-GM: firm-years' industrial adjusted gross margin ratio in year  $t$ . Raw-GM: a firm's raw gross margin ratio in year  $t$ .

"a", "b" and "c" denote the significance on the 1%, 5% and 10% levels respectively, based on two-tailed tests.

$$\begin{aligned}
 R_t = & \beta_0 + \beta_1 X_{t-1} + \beta_2 X_t + \beta_3 X_{t3} + \beta_4 R_{t3} + \beta_5 PSRPT_t + \beta_6 PSRPT_t * X_{t-1} + \beta_7 PSRPT_t * X_t \\
 & + \beta_8 PSRPT_t * X_{t3} + \beta_9 PSRPT_t * R_{t3} + \beta_{10} ASRPT_t + \beta_{11} ASRPT_t * X_{t-1} + \beta_{12} ASRPT_t * X_t \\
 & + \beta_{13} ASRPT_t * X_{t3} + \beta_{14} ASRPT_t * R_{t3} + \beta_{15} LEV_t + \beta_{16} MB_t + \beta_{17} ROA_t + \beta_{18} SIZE_t \\
 & + \text{Industry Effect} + \text{Year Effect} + \varepsilon_t
 \end{aligned} \quad (1)$$

where:

$R_t$	a firm's ex-dividend annual stock return in year $t$ .
$X_{t-1}$	a firm's earnings per share excluding extraordinary items in year $t-1$ , deflated by the stock price at the beginning of year $t$ .
$X_t$	a firm's earnings per share excluding extraordinary items in year $t$ , deflated by the stock price at the beginning of year $t$ .
$X_{t3}$	a firm's three years sum of earnings per share excluding extraordinary items for year $t+1$ through $t+3$ , deflated by the stock price at the beginning of year $t$ .
$R_{t3}$	a firm's three years sum of annual stock returns for year $t+1$ through $t+3$ .
$PSRPT_t$	a firm's ratio of intercompany related party's product (or processing) sales in affiliated firms in year $t$ .
$ASRPT_t$	a firm's ratio of intercompany related party's non-operating incomes in affiliated firms in year $t$ .
$LEV_t$	a firm's leverage measured as total debts divided by total assets of the sample firms at the end of year $t$ .
$MB_t$	a firm's market-to-book ratio measured as the market value of equity divided by the book value of equity at the end of year $t$ .
$ROA_t$	a firm's return of assets, which is measured as the ratio of income before extraordinary items to total assets in year $t$ .
$SIZE_t$	a firm's size measured by the natural logarithm of total assets at the end of year $t$ .
$\varepsilon_t$	the error term.

Based on the hypothesis, the coefficients of  $PSRPT_t * X_t$  ( $\beta_7$ ),  $PSRPT_t * X_{t3}$  ( $\beta_8$ ) and  $ASRPT_t * X_t$  ( $\beta_{12}$ ),  $ASRPT_t * X_{t3}$  ( $\beta_{13}$ ) are expected to be positive (negative) to reflect the increased (decreased) informativeness of current and future earnings for firms engaged in hypothesized contracting (opportunistic) related party's product (or processing) sales and related party's non-operating incomes in affiliated firms.

**Table 3**

Pearson/Spearman Correlation Matrix for Related Variables.

	R	X <sub>t-1</sub>	X <sub>t</sub>	X <sub>t3</sub>	R <sub>3</sub>	PSRPT <sub>t</sub>	ASRPT <sub>t</sub>	LEV <sub>t</sub>	MB <sub>t</sub>	ROA <sub>t</sub>	SIZE <sub>t</sub>
R	1	-.048 <sup>a</sup>	.261 <sup>a</sup>	.233 <sup>a</sup>	-.163 <sup>a</sup>	0.006	-.016 <sup>b</sup>	-.039 <sup>a</sup>	.407 <sup>a</sup>	.254 <sup>a</sup>	-.022 <sup>a</sup>
X <sub>t-1</sub>	.118 <sup>a</sup>	1	.575 <sup>a</sup>	.314 <sup>a</sup>	-.028 <sup>a</sup>	.020 <sup>a</sup>	-.075 <sup>a</sup>	-.236 <sup>a</sup>	.044 <sup>a</sup>	.429 <sup>a</sup>	.155 <sup>a</sup>
X <sub>t</sub>	.479 <sup>a</sup>	.544 <sup>a</sup>	1	.455 <sup>a</sup>	-.033 <sup>a</sup>	0.014	-.084 <sup>a</sup>	-.220 <sup>a</sup>	.150 <sup>a</sup>	.736 <sup>a</sup>	.152 <sup>a</sup>
X <sub>t3</sub>	.327 <sup>a</sup>	.387 <sup>a</sup>	.557 <sup>a</sup>	1	.314 <sup>a</sup>	.020 <sup>a</sup>	-.055 <sup>a</sup>	-.053 <sup>a</sup>	.107 <sup>a</sup>	.380 <sup>a</sup>	.093 <sup>a</sup>
R <sub>3</sub>	-.0172 <sup>a</sup>	.066 <sup>a</sup>	.054 <sup>a</sup>	.402 <sup>a</sup>	1	0.009	-.013	.044 <sup>a</sup>	-.148 <sup>a</sup>	-.022 <sup>a</sup>	-.096 <sup>a</sup>
PSRPT <sub>t</sub>	-.010	.032 <sup>a</sup>	.026 <sup>a</sup>	.028 <sup>a</sup>	0.006	1	.111 <sup>a</sup>	-.057 <sup>a</sup>	.034 <sup>a</sup>	.033 <sup>a</sup>	.128 <sup>a</sup>
ASRPT <sub>t</sub>	-.106 <sup>b</sup>	-.035 <sup>a</sup>	-.028 <sup>a</sup>	-.017 <sup>b</sup>	-.023 <sup>a</sup>	.185 <sup>a</sup>	1	-.051 <sup>a</sup>	-.029 <sup>a</sup>	-.086 <sup>a</sup>	.035 <sup>a</sup>
LEV <sub>t</sub>	-.049 <sup>a</sup>	-.086 <sup>a</sup>	-.082 <sup>a</sup>	-.008	.025 <sup>a</sup>	-.019 <sup>b</sup>	-.009	1	-.057 <sup>a</sup>	-.236 <sup>a</sup>	.160 <sup>a</sup>
MB <sub>t</sub>	.456 <sup>a</sup>	.155 <sup>a</sup>	.331 <sup>a</sup>	.158 <sup>a</sup>	-.227 <sup>a</sup>	.021 <sup>a</sup>	-.049 <sup>a</sup>	-.087 <sup>a</sup>	1	.408 <sup>a</sup>	-.036 <sup>a</sup>
ROA <sub>t</sub>	.327 <sup>a</sup>	.520 <sup>a</sup>	.825 <sup>a</sup>	.438 <sup>a</sup>	.020 <sup>a</sup>	.051 <sup>a</sup>	-.031 <sup>a</sup>	-.221 <sup>a</sup>	.569 <sup>a</sup>	1	.170 <sup>a</sup>
SIZE <sub>t</sub>	.017 <sup>b</sup>	.154 <sup>a</sup>	.151 <sup>a</sup>	.113 <sup>a</sup>	-.064 <sup>a</sup>	.177 <sup>a</sup>	.212 <sup>a</sup>	.179 <sup>a</sup>	.041 <sup>a</sup>	.138 <sup>a</sup>	1

R<sub>t</sub>: ex-dividend annual stock return in year *t*. X<sub>t-1</sub>: the earnings per share in year *t* - 1, deflated by the stock price at the beginning of year *t*. X<sub>t</sub>: the earnings per share in year *t*, deflated by the stock price at the beginning of year *t*. X<sub>t3</sub>: the sum of earnings per share for year *t* + 1 through *t* + 3, deflated by the stock price at the beginning of year *t*. R<sub>3</sub>: the sum of annual stock returns for year *t* + 1 through *t* + 3. PSRPT<sub>t</sub>: the ratio of related party's product (or processing) sales in year *t*. ASRPT<sub>t</sub>: the ratio of related party's non-operating incomes in year *t*. LEV<sub>t</sub>: a firm's leverage in year *t*. MB<sub>t</sub>: market-to-book ratio in year *t*. ROA<sub>t</sub>: return of assets in year *t*. SIZE<sub>t</sub>: natural logarithm of book value of total assets in year *t*.

"a" and "b" denote the significance on the 1% and 5% levels respectively, based on two-tailed tests.

The upper triangular of matrix presents Pearson correlation coefficients, and the lower triangular of matrix presents Spearman correlation coefficients.

**Table 4**

Results of Different Types of RPTs on Earnings Informativeness.

Model	$R_t = \beta_0 + \beta_1 X_{t-1} + \beta_2 X_t + \beta_3 X_{t3} + \beta_4 R_3 + \beta_5 PSRPT_t + \beta_6 PSRPT_t * X_{t-1} + \beta_7 PSRPT_t * X_t + \beta_8 PSRPT_t * X_{t3} + \beta_9 PSRPT_t * R_3 + \beta_{10} ASRPT_t + \beta_{11} ASRPT_t * X_{t-1} + \beta_{12} ASRPT_t * X_t + \beta_{13} ASRPT_t * X_{t3} + \beta_{14} ASRPT_t * R_3 + \beta_{15} LEV_t + \beta_{16} MB_t + \beta_{17} ROA_t + \beta_{18} SIZE_t + Industry Effect + Year Effect + \varepsilon_t$			
	Dependent Variable (R <sub>t</sub> )			
	Benchmark	PSRPT model	ASRPT model	RPT model
Variables	β (t-value)	β (t-value)	β (t-value)	β (t-value)
Constant	0.075 (0.89)	0.081 (0.92)	0.074 (0.87)	0.079 (0.89)
X <sub>t-1</sub>	-0.756 <sup>a</sup> (-9.15)	-0.785 <sup>a</sup> (-8.46)	-0.822 <sup>a</sup> (-9.22)	-0.843 <sup>a</sup> (-8.65)
X <sub>t</sub>	1.308 <sup>a</sup> (9.65)	1.331 <sup>a</sup> (9.46)	1.361 <sup>a</sup> (9.03)	1.376 <sup>a</sup> (9.03)
X <sub>t3</sub>	0.247 <sup>a</sup> (9.17)	0.221 <sup>a</sup> (6.86)	0.270 <sup>a</sup> (8.74)	0.242 <sup>a</sup> (7.02)
R <sub>3</sub>	-0.070 <sup>a</sup> (-3.94)	-0.066 <sup>a</sup> (-4.13)	-0.073 <sup>a</sup> (-3.95)	-0.069 <sup>a</sup> (-4.14)
PSRPT <sub>t</sub>	—	-0.006 (-0.25)	—	-0.016 (-0.65)
PSRPT <sub>t</sub> *X <sub>t-1</sub>	—	0.247 (0.99)	—	0.210 (0.84)
PSRPT <sub>t</sub> *X <sub>t</sub>	—	-0.143 (-0.62)	—	-0.063 (-0.28)
PSRPT <sub>t</sub> *X <sub>t3</sub>	—	0.204 <sup>b</sup> (2.12)	—	0.233 <sup>b</sup> (2.32)
PSRPT <sub>t</sub> *R <sub>3</sub>	—	-0.032 (-1.63)	—	-0.034 (-1.57)
ASRPT <sub>t</sub>	—	—	0.447 (1.34)	0.498 (1.42)
ASRPT <sub>t</sub> *X <sub>t-1</sub>	—	—	9.552 <sup>a</sup> (3.59)	9.320 <sup>a</sup> (3.52)
ASRPT <sub>t</sub> *X <sub>t</sub>	—	—	-8.327 <sup>a</sup> (-2.97)	-8.447 <sup>a</sup> (-3.25)
ASRPT <sub>t</sub> *X <sub>t3</sub>	—	—	-3.844 <sup>a</sup> (-2.87)	-4.217 <sup>a</sup> (-3.22)
ASRPT <sub>t</sub> *R <sub>3</sub>	—	—	0.579 <sup>b</sup> (2.11)	0.575 <sup>b</sup> (2.01)
LEV <sub>t</sub>	-0.020 (-0.63)	-0.021 (-0.64)	-0.016 (-0.50)	-0.017 (-0.53)
MB <sub>t</sub>	0.145 <sup>a</sup> (10.08)	0.145 <sup>a</sup> (10.07)	0.146 <sup>a</sup> (10.07)	0.146 <sup>a</sup> (10.07)
ROA <sub>t</sub>	-0.423 <sup>b</sup> (-2.11)	-0.434 <sup>b</sup> (-2.16)	-0.425 <sup>b</sup> (-2.07)	-0.440 <sup>b</sup> (-2.13)
SIZE <sub>t</sub>	-0.013 <sup>b</sup> (-2.34)	-0.014 <sup>b</sup> (-2.30)	-0.014 <sup>b</sup> (-2.34)	-0.014 <sup>b</sup> (-2.28)
Industry Effect	included	included	included	included
Year Effect	included	included	included	included
N	18,527	18,527	18,527	18,527
Adj. R <sup>2</sup>	54.94%	55.00%	55.18%	55.26%
F_value	628.37	553.15	557.33	498.37

R<sub>t</sub>: ex-dividend annual stock return in year *t*. X<sub>t-1</sub>: the earnings per share in year *t* - 1, deflated by the stock price at the beginning of year *t*. X<sub>t</sub>: the earnings per share in year *t*, deflated by the stock price at the beginning of year *t*. X<sub>t3</sub>: the sum of earnings per share for year *t* + 1 through *t* + 3, deflated by the stock price at the beginning of year *t*. R<sub>3</sub>: the sum of annual stock returns for year *t* + 1 through *t* + 3. PSRPT<sub>t</sub>: the ratio of related party's product (or processing) sales in year *t*. ASRPT<sub>t</sub>: the ratio of related party's non-operating incomes in year *t*. LEV<sub>t</sub>: a firm's leverage in year *t*. MB<sub>t</sub>: market-to-book ratio in year *t*. ROA<sub>t</sub>: return of assets in year *t*. SIZE<sub>t</sub>: natural logarithm of book value of total assets in year *t*.

"a", "b" and "c" denote the significance on 1%, 5% and 10% levels respectively, based on two-tailed tests.

## 4. Empirical results

### 4.1. Descriptive Statistics

Table 2 presents the descriptive statistics for the related variables in this study. We winsorize the top and the bottom 1% of outliers for all continuous variables in the following analysis. From Table 2, the means (medians) of related party's product (or processing) sales (PSRPT<sub>*t*</sub>) and related party's non-operating incomes (ASRPT<sub>*t*</sub>) are 0.144 (0.048) and 0.004 (0.000) for the entire sample. On average, 14.4% of the sales was created from related parties. The mean (median) of annual stock returns ( $R_t$ ) in year  $t$  is 0.169 (0.018) for the entire sample. The means (medians) of firms' earnings per share ( $X_t$ ) and three years sum of earnings per share ( $X_{t3}$ ) in year  $t$  is 0.022 (0.049) and 0.127 (0.137). Since the standard deviation of our empirical variables was somewhat large, we adopted White's (1980) heteroskedasticity consistent covariance matrix estimator to correct estimates of the coefficient covariances in the possible presence of heteroskedasticity in all regressions.

Table 3 presents the correlations between related variables. It reveals that related party's product (or processing) sales (PSRPT<sub>*t*</sub>) is positively-associated with past, current, and future earnings. These results suggest that firms with high related party's product (or processing) sales have continuously positive outcomes on earnings performance. Nevertheless, the related party's non-operating incomes in affiliated firms (ASRPT<sub>*t*</sub>) are negatively-associated with past, current, and future earnings. The negative correlation between ASRPTs and  $X_t$  reveals high-related party's non-operating income in the poor current earnings performance case. While most of the independent variables are highly correlated with the others, the variance inflation factors (VIF) of the pivotal interactive variables, i.e., PSRPT<sub>*t*</sub>\* $X_t$ , PSRPT<sub>*t*</sub>\* $X_{t3}$ , ASRPT<sub>*t*</sub>\* $X_t$ , and ASRPT<sub>*t*</sub>\* $X_{t3}$  in Eq. (1) are less than 3.76, respectively, and do not suggest severe multicollinearity problems (Neter et al., 1989).

### 4.2. Regression results

This study firstly examined the validity of CKSS model in Taiwan. The result is denoted as a "benchmark" model and is reported in Table 4. It is found that the coefficients of  $X_t$  and  $X_{t3}$  are 1.308 ( $t = 9.65$ ) and 0.247 ( $t = 9.17$ ), positive and both statistically significant at the 1% level. The coefficients of  $X_{t-1}$  and  $R_{t3}$  are  $-0.756$  ( $t = -9.15$ ) and  $-0.070$  ( $t = -3.94$ ), negative and statistically significant at the 1% level. The results provide evidence to use the CKSS model as a benchmark model to examine the earnings informativeness of RPTs in Taiwan's stock market.

The empirical results from a separate type of RPTs model, that is product (or processing) sales (PSRPT) and non-operating incomes (ASRPT), are also reported in Table 4. In the PSRPT model, the coefficients of PSRPT<sub>*t*</sub>\* $X_t$  and PSRPT<sub>*t*</sub>\* $X_{t3}$  are  $-0.143$  ( $t = -0.62$ ) and 0.204 ( $t = 2.12$ ). The former coefficient is statistically insignificant. However, the coefficient of future earnings informativeness (FERC) is positive and statistically significant at the 5% level. It suggests that the long-term contracting characteristic of related party's product (or processing) sales enhances the informativeness of future earnings, yet reveals insignificant effect for the current earnings. This result, to some extent, supports the argument that some of the information in current earnings is already impounded in past prices, thus, the contemporaneous return-earnings association is weakened (Collins et al., 1994). Hypothesis 1a gains empirical support in the earnings informativeness of future earnings. In the ASRPT model, the coefficients of ASRPT<sub>*t*</sub>\* $X_t$  and ASRPT<sub>*t*</sub>\* $X_{t3}$  are  $-8.327$  ( $t = -2.97$ ) and  $-3.844$  ( $t = -2.87$ ), negative and statistically significant. These results document that both the current and future earnings informativeness deteriorated for firms with related party's non-operating incomes.

The result from Eq. (1) is reported in Table 4 (denoted as the RPT model). It is found that the coefficient of  $X_t$  and  $X_{t3}$  is 1.376 ( $t = 9.03$ ) and 0.242 ( $t = 7.02$ ), respectively, which is positive and statistically significant at the 1% level. This result is consistent with the findings documented by CKSS (1994) and Tucker and Zarowin (2006). Importantly, the coefficient of PSRPT<sub>*t*</sub>\* $X_{t3}$  is 0.233 ( $t = 2.32$ ), which is positive and statistically significant at the 5% level. The informativeness of future earnings increases for firms with high related party's product (or processing) sales and supports the contracting RPTs hypothesis.<sup>6</sup> However, the coefficient of PSRPT<sub>*t*</sub>\* $X_t$  is  $-0.063$  ( $t = -0.28$ ), which is negative but statistically insignificant. Meanwhile, the coefficients of ASRPT<sub>*t*</sub>\* $X_t$  and ASRPT<sub>*t*</sub>\* $X_{t3}$  are  $-8.447$  ( $t = -3.25$ ) and  $-4.217$  ( $t = -3.22$ ), both negative and statistically significant. It suggests that the informativeness of current and future earnings deteriorated for firms with a recognized related party's non-operating incomes. Thus, the result in the non-operating incomes analysis reveals distinctive pattern and supports the opportunistic hypothesis.

Note that Yeh et al. (2012) documented that good corporate governance is effective in constraining RPTs, which to some extent implies the moderating role of corporate governance in a firm's opportunistic attribute of RPTs' sales in Taiwan. To remove the

<sup>6</sup> We add the ratio of related party's product (or processing) purchases in affiliated firms and its interactive variable with  $X_{t-1}$ ,  $X_t$ ,  $X_{t3}$  and  $R_{t3}$  in the RPT model, in turn, rerun the equation. The coefficients of PSRPT<sub>*t*</sub>\* $X_t$  and PSRPT<sub>*t*</sub>\* $X_{t3}$  are  $-0.075$  ( $t=-0.34$ ) and 0.236 ( $t=2.28$ ), respectively. The coefficients of ASRPT<sub>*t*</sub>\* $X_t$  and ASRPT<sub>*t*</sub>\* $X_{t3}$  are  $-8.222$  ( $t=-3.23$ ) and  $-4.129$  ( $t=-3.12$ ), both negative and statistically significant. The empirical findings do not qualitatively change in this diagnostic check.

**Table 5**

Results of Different Types of RPTs on Earnings Informativeness – Normal vs. Abnormal Product (or processing) Sales RPTs Examinations.

$R_t = \beta_0 + \beta_1 X_{t-1} + \beta_2 X_t + \beta_3 X_{t3} + \beta_4 R_{t3} + \beta_5 NPSRPT_t + \beta_6 NPSRPT_t * X_{t-1} + \beta_7 NPSRPT_t * X_t + \beta_8 NPSRPT_t * X_{t3} + \beta_9 NPSRPT_t * R_{t3} + \beta_{10} ABPSRPT_t + \beta_{11} ABPSRPT_t * X_{t-1} + \beta_{12} ABPSRPT_t * X_t + \beta_{13} ABPSRPT_t * X_{t3} + \beta_{14} ABPSRPT_t * R_{t3} + \beta_{15} ASRPT_t + \beta_{16} ASRPT_t * X_{t-1} + \beta_{17} ASRPT_t * X_t + \beta_{18} ASRPT_t * X_{t3} + \beta_{19} ASRPT_t * R_{t3} + \beta_{20} LEV_t + \beta_{21} MB_t + \beta_{22} ROA_t + \beta_{23} SIZE_t + \text{IndustryEffect} + \text{YearEffect} + \varepsilon_t$		
Dependent Variable ( $R_t$ )		
	3-year Average Model	Jian & Wong Model
Variables	$\beta$ (t-value)	$\beta$ (t-value)
Constant	0.077 (0.88)	0.072 (0.70)
$X_{t-1}$	-0.829 <sup>a</sup> (-8.24)	-0.626 <sup>a</sup> (-5.47)
$X_t$	1.356 <sup>a</sup> (8.78)	1.267 <sup>a</sup> (6.48)
$X_{t3}$	0.237 <sup>a</sup> (6.40)	0.132 <sup>b</sup> (2.42)
$R_{t3}$	-0.069 <sup>a</sup> (-4.37)	-0.029 <sup>c</sup> (-1.68)
$NPSRPT_t$	-0.023 (-0.78)	-0.046 (-0.49)
$NPSRPT_t * X_{t-1}$	0.059 (0.23)	-1.645 <sup>b</sup> (-2.43)
$NPSRPT_t * X_t$	0.204 (0.78)	0.804 (0.71)
$NPSRPT_t * X_{t3}$	0.268 <sup>c</sup> (1.91)	1.146 <sup>a</sup> (3.21)
$NPSRPT_t * R_{t3}$	-0.032 (-1.16)	-0.336 <sup>b</sup> (-2.22)
$ABPSRPT_t$	-0.037 (-1.03)	-0.016 (-0.64)
$ABPSRPT_t * X_{t-1}$	0.169 (0.70)	0.409 <sup>c</sup> (1.66)
$ABPSRPT_t * X_t$	-0.371 (-1.00)	-0.154 (-0.73)
$ABPSRPT_t * X_{t3}$	0.166 (1.07)	0.126 (1.59)
$ABPSRPT_t * R_{t3}$	-0.049 (-1.30)	-0.009 (-0.45)
$ASRPT_t$	0.502 (1.45)	0.476 (1.33)
$ASRPT_t * X_{t-1}$	9.534 <sup>a</sup> (3.58)	9.544 <sup>a</sup> (3.45)
$ASRPT_t * X_t$	-8.909 <sup>a</sup> (-3.37)	-8.355 <sup>a</sup> (-3.19)
$ASRPT_t * X_{t3}$	-4.291 <sup>a</sup> (-3.21)	-4.214 <sup>a</sup> (-3.03)
$ASRPT_t * R_{t3}$	0.577 <sup>b</sup> (2.06)	0.509 <sup>c</sup> (1.71)
$LEV_t$	-0.020 (-0.62)	-0.023 (-0.72)
$MB_t$	0.146 <sup>a</sup> (9.86)	0.145 <sup>a</sup> (9.88)
$ROA_t$	-0.479 <sup>b</sup> (-2.27)	-0.456 <sup>b</sup> (-2.17)
$SIZE_t$	-0.014 <sup>b</sup> (-2.29)	-0.013 <sup>c</sup> (-1.88)
Industry Effect	Included	Included
Year Effect	Included	Included
N	18,428	18,507
Adj. $R^2$	55.22%	55.40%
F_value	446.55	451.69

$R_t$ : ex-dividend annual stock return in year  $t$ .  $X_{t-1}$ : the earnings per share in year  $t-1$ , deflated by the stock price at the beginning of year  $t$ .  $X_t$ : the earnings per share in year  $t$ , deflated by the stock price at the beginning of year  $t$ .  $X_{t3}$ : the sum of earnings per share for year  $t+1$  through  $t+3$ , deflated by the stock price at the beginning of year  $t$ .  $R_{t3}$ : the sum of annual stock returns for year  $t+1$  through  $t+3$ .  $NPSRPT_t$ : the ratio of related party's normal product (or processing) sales in year  $t$ .  $ABPSRPT_t$ : the ratio of related party's abnormal product (or processing) sales in year  $t$ .  $ASRPT_t$ : the ratio of related party's non-operating incomes in year  $t$ .  $LEV_t$ : a firm's leverage in year  $t$ .  $MB_t$ : market-to-book ratio in year  $t$ .  $ROA_t$ : return of assets in year  $t$ .  $SIZE_t$ : natural logarithm of book value of total assets in year  $t$ .

"a", "b" and "c" denote the significance on 1%, 5% and 10% levels respectively, based on two-tailed tests.

corporate governance mitigating mechanism in effecting the empirical findings, we followed [Yeh et al. \(2012\)](#) and constructed a corporate governance index in splitting the entire observations into two sub-samples: good and poor corporate governance firms. The corporate governance variables include: cash flow rights, deviation, board control, supervisory control, and independent board members.<sup>7</sup> We then divided the entire observations into two mutually exclusive sub-samples based on the median of the corporate governance index and reran the Eq. (1) in each sub-sample. The untabulated results revealed that the coefficients of  $PSRPT_t * X_t$ ,  $PSRPT_t * X_{t3}$ ,  $ASRPT_t * X_t$  and  $ASRPT_t * X_{t3}$  were 0.030 ( $t = 0.09$ ), 0.247 ( $t = 2.15$ ), -9.135 ( $t = -2.76$ ) and -3.669 ( $t = -2.20$ ) in the poor corporate governance sub-sample test. On other side, the coefficients of  $PSRPT_t * X_t$ ,  $PSRPT_t * X_{t3}$ ,  $ASRPT_t * X_t$  and  $ASRPT_t * X_{t3}$  were -0.161 ( $t = -0.46$ ), 0.242 ( $t = 1.80$ ), -8.651 ( $t = -3.08$ ) and -4.494 ( $t = -2.86$ ) in the good corporate governance sub-sample test. These results suggest that the contracting explanation of firms with high related party's product (or processing) sales did not qualitatively change in this further analysis.<sup>8</sup>

<sup>7</sup> Following [Yeh et al. \(2012\)](#), the corporate governance index is the sum of the following dummies: D(Cash flow rights) being assigned value one when the cash flow rights exceed the sample median and 0 otherwise, D(Deviation) being assigned value one when the deviation is smaller than sample median and 0 otherwise, D(Board control) being assigned the value one when the percentage of board membership controlled by controlling owner is smaller than sample median and 0 otherwise, D(Supervisory control) being assigned the value one when the percentage of supervisory board membership controlled by controlling owner is smaller than the sample median and 0 otherwise, and D(Independent directors) being assigned the value one when the number of independent directors exceeds the sample median and 0 otherwise.

<sup>8</sup> This study directly adds the comprehensive corporate governance measure ([Yeh et al. 2012](#)) as an incremental control variable into model and reruns the regressions, the results are robust to this diagnostic check.

**Table 6**

Results of Different Types of RPTs on Earnings Informativeness – Transfer Price Manipulating RPTs Examinations.

$$R_t = \beta_0 + \beta_1 X_{t-1} + \beta_2 X_t + \beta_3 X_{t3} + \beta_4 R_{t3} + \beta_5 PSRPT_t + \beta_6 PSRPT_t * X_{t-1} + \beta_7 PSRPT_t * X_t + \beta_8 PSRPT_t * X_{t3} + \beta_9 PSRPT_t * R_{t3} + \beta_{10} ASRPT_t + \beta_{11} ASRPT_t * X_{t-1} + \beta_{12} ASRPT_t * X_t + \beta_{13} ASRPT_t * X_{t3} + \beta_{14} ASRPT_t * R_{t3} + \beta_{15} LEV_t + \beta_{16} MB_t + \beta_{17} ROA_t + \beta_{18} SIZE_t + Industry Effect + Year Effect + \varepsilon_t$$

Dependent Variable ( $R_t$ )		
	High/low Gross Margin Subsample (20%)	Remaining Subsample (80%)
Variables	$\beta$ (t-value)	$\beta$ (t-value)
Constant	0.080 (0.85)	0.093 <sup>c</sup> (1.74)
$X_{t-1}$	-0.497 <sup>a</sup> (-6.28)	-0.939 <sup>a</sup> (-14.56)
$X_t$	0.294 <sup>a</sup> (3.13)	1.993 <sup>a</sup> (15.94)
$X_{t3}$	0.172 <sup>a</sup> (4.38)	0.240 <sup>a</sup> (8.00)
$R_{t3}$	-0.053 <sup>a</sup> (-4.55)	-0.072 <sup>a</sup> (-9.61)
$PSRPT_t$	-0.055 (-1.02)	-0.012 (-0.43)
$PSRPT_t * X_{t-1}$	0.077 (0.22)	0.192 (0.76)
$PSRPT_t * X_t$	-0.178 (-0.49)	-0.094 (-0.26)
$PSRPT_t * X_{t3}$	0.276 <sup>c</sup> (1.69)	0.228 <sup>b</sup> (2.08)
$PSRPT_t * R_{t3}$	-0.039 (-1.11)	-0.025 (-1.16)
$ASRPT_t$	1.204 <sup>c</sup> (1.74)	0.264 (0.63)
$ASRPT_t * X_{t-1}$	4.725 <sup>b</sup> (2.36)	11.567 <sup>a</sup> (2.84)
$ASRPT_t * X_t$	1.072 (0.40)	-11.051 <sup>a</sup> (-2.79)
$ASRPT_t * X_{t3}$	-4.653 <sup>a</sup> (-3.19)	-2.871 (-1.32)
$ASRPT_t * R_{t3}$	0.596 (1.37)	0.549 (1.53)
$LEV_t$	-0.169 <sup>a</sup> (3.20)	-0.051 (-1.61)
$MB_t$	0.106 <sup>a</sup> (11.01)	0.174 <sup>a</sup> (19.14)
$ROA_t$	0.618 <sup>a</sup> (4.23)	-1.150 <sup>a</sup> (-6.33)
$SIZE_t$	-0.012 <sup>c</sup> (-1.83)	-0.015 <sup>a</sup> (-4.47)
Industry Effect	included	included
Year Effect	included	included
N	3715	14,812
Adj_ $R^2$	48.05%	58.53%
F_value	75.69	455.50

$R_t$ : ex-dividend annual stock return in year  $t$ .  $X_{t-1}$ : the earnings per share in year  $t-1$ , deflated by the stock price at the beginning of year  $t$ .  $X_t$ : the earnings per share in year  $t$ , deflated by the stock price at the beginning of year  $t$ .  $X_{t3}$ : the sum of earnings per share for year  $t+1$  through  $t+3$ , deflated by the stock price at the beginning of year  $t$ .  $R_{t3}$ : the sum of annual stock returns for year  $t+1$  through  $t+3$ .  $PSRPT_t$ : the ratio of related party's product (or processing) sales in year  $t$ .  $ASRPT_t$ : the ratio of related party's non-operating incomes in year  $t$ .  $LEV_t$ : a firm's leverage in year  $t$ .  $MB_t$ : market-to-book ratio in year  $t$ .  $ROA_t$ : return of assets in year  $t$ .  $SIZE_t$ : natural logarithm of book value of total assets in year  $t$ . The high/low gross margin subsample is denoted as the first and the tenth decile firms that have highest/lowest gross margin ratio based on the firm-years' industrial adjusted gross margin ratio, otherwise the remaining subsample.

"a", "b" and "c" denote the significance on 1%, 5% and 10% levels respectively, based on two-tailed tests.

## 5. Robustness tests

### 5.1. Normal vs. Abnormal product (or processing) sales RPTs consideration

Jian and Wong (2010) document that listed firms in the Chinese stock market prop up earnings by using abnormal related sales for their controlling owners. Yeh et al. (2012) also supports the propping-up hypothesis based on revenue-related RPTs in Taiwan. They found the level of abnormal related sales is positively correlated with both the condition that firms plan to issue seasoned equity next period and the condition of a decrease in the reported earnings. This study thus divides the related party's product (or processing) sales into normal product (or processing) RPTs (NPSRPT) and abnormal product (or processing) RPTs (ABPSRPT) and reexamines the earnings informativeness of PSRPTs. We use two approaches to estimate the normal product (or processing) RPTs (NPSRPT) and abnormal product (or processing) RPTs (ABPSRPT). First, we adopted Jian and Wong's (2010) approach to estimate the normal level of PSRPTs and abnormal PSRPTs. Second, we used a prior three-year average product (or processing) PSRPTs to proxy the normal product (or processing) PSRPTs to avoid the estimation error that occurred in the Jian and Wong (2010) approach and recalculated the abnormal product (or processing) PSRPTs. In the three-year average product (or processing) PSRPTs case, the abnormal product (or processing) PSRPTs is calculated as a firm's actual product (or processing) PSRPTs minus the prior three-year average product (or processing) PSRPTs. The empirical results are reported in Table 5 and denoted as "Jian & Wong model" and "three-year average model".

From Table 5, the coefficients of  $NPSRPT_t * X_t$  are 0.204 ( $t = 0.78$ ) and 0.804 ( $t = 0.71$ ), respectively, both positive and statistically insignificant in the "three-year average" and "Jian & Wong" models. The coefficients of  $NPSRPT_t * X_{t3}$  are 0.268 ( $t = 1.91$ ) and 1.146 ( $t = 3.21$ ), both positive and statistically significant. Collectively, the informativeness of future earnings increases for firms with high related party's normal product (or processing) sales and supports the contracting RPTs hypothesis. It is found that the coefficients of  $ABPSRPT_t * X_t$  are -0.371 ( $t = -1.00$ ) and -0.154 ( $t = -0.73$ ) and coefficients of  $ABPSRPT_t * X_{t3}$  are 0.166 ( $t = 1.07$ ) and 0.126 ( $t = 1.59$ ) in the "three-year average" and "Jian & Wong" models. Thus, the earnings informativeness is unlikely decreased for the related

Table 7

Results of Different Types of RPTs on Earnings Informativeness – The 2008 Financial Crisis Subsample Examinations.

$$R_t = \beta_0 + \beta_1 X_{t-1} + \beta_2 X_t + \beta_3 X_{t3} + \beta_4 R_{t3} + \beta_5 PSRPT_t + \beta_6 PSRPT_t * X_{t-1} + \beta_7 PSRPT_t * X_t + \beta_8 PSRPT_t * X_{t3} + \beta_9 PSRPT_t * R_{t3} + \beta_{10} ASRPT_t + \beta_{11} ASRPT_t * X_{t-1} + \beta_{12} ASRPT_t * X_t + \beta_{13} ASRPT_t * X_{t3} + \beta_{14} ASRPT_t * R_{t3} + \beta_{15} LEV_t + \beta_{16} MB_t + \beta_{17} ROA_t + \beta_{18} SIZE_t + Industry Effect + Year Effect + \epsilon_t$$

Variables	Dependent Variable ( $R_t$ )	
	Pre-Crisis	Post-Crisis
Constant	$\beta$ (t-value) -0.067 (-0.45)	$\beta$ (t-value) 0.220 <sup>a</sup> (3.30)
$X_{t-1}$	-0.900 <sup>a</sup> (-6.19)	-0.759 <sup>a</sup> (-8.41)
$X_t$	1.537 <sup>a</sup> (7.18)	1.297 <sup>a</sup> (6.31)
$X_{t3}$	0.232 <sup>a</sup> (3.99)	0.235 <sup>a</sup> (8.15)
$R_{t3}$	-0.048 <sup>a</sup> (-3.18)	-0.092 <sup>a</sup> (-2.93)
$PSRPT_t$	-0.011 (-0.18)	-0.012 (-0.57)
$PSRPT_t * X_{t-1}$	0.077 (0.23)	0.145 (0.45)
$PSRPT_t * X_t$	0.489 <sup>b</sup> (1.98)	-0.455 (-1.54)
$PSRPT_t * X_{t3}$	0.281 <sup>b</sup> (2.10)	0.184 (1.52)
$PSRPT_t * R_{t3}$	-0.049 (-1.30)	-0.014 (-0.68)
$ASRPT_t$	0.427 (0.68)	0.364 (0.89)
$ASRPT_t * X_{t-1}$	13.521 <sup>a</sup> (3.21)	7.239 <sup>b</sup> (2.28)
$ASRPT_t * X_t$	-8.860 <sup>b</sup> (-2.13)	-9.323 <sup>a</sup> (-2.85)
$ASRPT_t * X_{t3}$	-5.098 <sup>a</sup> (-2.70)	-2.926 <sup>c</sup> (-1.72)
$ASRPT_t * R_{t3}$	0.186 (0.53)	0.829 <sup>c</sup> (1.89)
$LEV_t$	-0.034 (-0.85)	0.010 (0.30)
$MB_t$	0.219 <sup>a</sup> (12.03)	0.110 <sup>a</sup> (13.90)
$ROA_t$	-1.208 <sup>a</sup> (-4.27)	-0.093 (-0.63)
$SIZE_t$	-0.007 (-0.65)	-0.022 <sup>a</sup> (-4.12)
Industry Effect	included	included
Year Effect	included	included
N	8088	10,439
Adj_R <sup>2</sup>	45.75%	62.16%
F_value	180.49	505.41

$R_t$ : ex-dividend annual stock return in year  $t$ .  $X_{t-1}$ : the earnings per share in year  $t-1$ , deflated by the stock price at the beginning of year  $t$ .  $X_t$ : the earnings per share in year  $t$ , deflated by the stock price at the beginning of year  $t$ .  $X_{t3}$ : the sum of earnings per share for year  $t+1$  through  $t+3$ , deflated by the stock price at the beginning of year  $t$ .  $R_{t3}$ : the sum of annual stock returns for year  $t+1$  through  $t+3$ .  $PSRPT_t$ : the ratio of related party's product (or processing) sales in year  $t$ .  $ASRPT_t$ : the ratio of related party's non-operating incomes in year  $t$ .  $LEV_t$ : a firm's leverage in year  $t$ .  $MB_t$ : market-to-book ratio in year  $t$ .  $ROA_t$ : return of assets in year  $t$ .  $SIZE_t$ : the natural logarithm of book value of total assets in year  $t$ . "a", "b" and "c" denote the significance on 1%, 5% and 10% levels respectively, based on two-tailed tests.

party's abnormal product (or processing) sales and does not support the managerial opportunistic behaviors by way of intercompany related party's product (or processing) sales. The coefficients of  $ASRPT_t * X_t$  and  $ASRPT_t * X_{t3}$  are -8.909 ( $t = -3.37$ ), -4.291 ( $t = -3.21$ ) and -8.355 ( $t = -3.19$ ), -4.214 ( $t = -3.03$ ), all negative and statistically significant.<sup>9</sup> These results were consistent with the initial findings.

## 5.2. RPTs through transfer price manipulation<sup>10</sup>

RPTs could potentially be used to prop up firms' earnings depending on the relative transfer price of the goods and services changing hands (Cheung et al., 2006; Jian and Wong, 2010). Bertrand et al. (2002) also reported that a small number of transactions in their sample may have an impact on operating profits. If the motivation behind the related party's product (or processing) sales was earnings manipulation via transfer price of goods and services, RPT firms will reveal an abnormally high or abnormally low gross margin ratio. This study thus divides the entire sample into ten groups based on the firm-years' industrial adjusted gross margin ratio<sup>11</sup> and combines the first and the tenth decile firms that have highest/lowest gross margin ratio to form the abnormal gross margin subsample. We denoted the remaining 80% of firms as the normal gross margin subsample. This study reruns the equation using these

<sup>9</sup> We use related party's asset sales in replacing the related party's non-operating incomes measure and reran Eq. (1). The coefficients of  $ASRPT_t * X_t$  and  $ASRPT_t * X_{t3}$  are -17.540 ( $t = -2.51$ ) and -10.860 ( $t = -2.52$ ), respectively, both negative and statistically significant. Alternatively, we excluded related party's asset sales in the initial related party's non-operating incomes measure and reran Eq. (1). The coefficients of  $ASRPT_t * X_t$  and  $ASRPT_t * X_{t3}$  are -13.948 ( $t = -2.94$ ) and -3.978 ( $t = -2.47$ ), again negative and statistically significant. Furthermore, this study also adds the related party's interest income as a component into non-operating incomes and recalculates the ASRPT measure. This further diagnosis does not qualitatively change the primary non-operating incomes empirical results.

<sup>10</sup> Gross profits on related-party sales data is unavailable in TEJ database, which in turn, limits this study to follow Lo et al.'s (2010) approach in measuring the manipulations of transfer prices.

<sup>11</sup> This study also bases on raw gross margin ratio and combines the first and the tenth decile firms that have highest/lowest raw gross margin ratio to form the abnormal gross margin subsample. The result is robust to this diagnostic check.



**Table 8**

Results of Different Types of RPTs on Earnings Informativeness—Alternative Measures of RPTs.

$$R_t = \beta_0 + \beta_1 X_{t-1} + \beta_2 X_t + \beta_3 X_{t3} + \beta_4 R_{t3} + \beta_5 PSRPT_t + \beta_6 PSRPT_t * X_{t-1} + \beta_7 PSRPT_t * X_t + \beta_8 PSRPT_t * X_{t3} + \beta_9 PSRPT_t * R_{t3} + \beta_{10} ASRPT_t + \beta_{11} ASRPT_t * X_{t-1} + \beta_{12} ASRPT_t * X_t + \beta_{13} ASRPT_t * X_{t3} + \beta_{14} ASRPT_t * R_{t3} + \beta_{15} LEV_t + \beta_{16} MB_t + \beta_{17} ROA_t + \beta_{18} SIZE_t + Industry Effect + Year Effect + \varepsilon_t$$

	Dependent Variable ( $R_t$ )	
	Dummy RPTs	Scaled by the Assets
	$\beta$ (t-value)	$\beta$ (t-value)
Constant	0.083 <sup>c</sup> (1.91)	0.077 (0.88)
$X_{t-1}$	-0.516 <sup>a</sup> (-5.75)	-0.788 <sup>a</sup> (-8.66)
$X_t$	1.123 <sup>a</sup> (9.72)	1.268 <sup>a</sup> (9.67)
$X_{t3}$	0.185 <sup>a</sup> (4.55)	0.241 <sup>a</sup> (8.49)
$R_{t3}$	-0.051 <sup>a</sup> (-4.49)	-0.071 <sup>a</sup> (-4.09)
$PSRPT_t$	0.006 (0.52)	-0.092 <sup>a</sup> (-2.73)
$PSRPT_t * X_{t-1}$	-0.195 <sup>c</sup> (-1.86)	-0.148 (-0.73)
$PSRPT_t * X_t$	0.185 (1.47)	0.859 <sup>a</sup> (5.29)
$PSRPT_t * X_{t3}$	0.083 <sup>c</sup> (1.77)	0.278 <sup>a</sup> (2.74)
$PSRPT_t * R_{t3}$	-0.016 (-1.32)	-0.024 (-1.16)
$ASRPT_t$	0.017 <sup>c</sup> (1.92)	-0.296 (-0.34)
$ASRPT_t * X_{t-1}$	-0.179 <sup>c</sup> (-1.66)	23.649 <sup>a</sup> (3.94)
$ASRPT_t * X_t$	0.058 (0.56)	-9.625 <sup>c</sup> (-1.90)
$ASRPT_t * X_{t3}$	-0.009 (-0.24)	-7.922 <sup>b</sup> (-2.35)
$ASRPT_t * R_{t3}$	-0.010 (-0.14)	1.506 <sup>c</sup> (1.80)
$LEV_t$	-0.023 (-0.94)	-0.015 (-0.45)
$MB_t$	0.146 <sup>a</sup> (25.72)	0.146 <sup>a</sup> (10.08)
$ROA_t$	-0.424 <sup>a</sup> (-4.13)	-0.457 <sup>b</sup> (-2.23)
$SIZE_t$	-0.015 <sup>a</sup> (-5.24)	-0.013 <sup>b</sup> (-2.28)
Industry Effect	included	included
Year Effect	included	included
N	18,527	18,527
Adj_ $R^2$	55.03%	55.23%
F_value	493.90	497.76

$R_t$ : ex-dividend annual stock return in year  $t$ .  $X_{t-1}$ : the earnings per share in year  $t-1$ , deflated by the stock price at the beginning of year  $t$ .  $X_t$ : the earnings per share in year  $t$ , deflated by the stock price at the beginning of year  $t$ .  $X_{t3}$ : the sum of earnings per share for year  $t+1$  through  $t+3$ , deflated by the stock price at the beginning of year  $t$ .  $R_{t3}$ : the sum of annual stock returns for year  $t+1$  through  $t+3$ .  $PSRPT_t$ : a dummy variable (1 if the firm had related party's product (or processing) sales, 0 otherwise).  $ASRPT_t$ : a dummy variable (1 if the firm had related party's non-operating incomes, 0 otherwise).  $LEV_t$ : a firm's leverage in year  $t$ .  $MB_t$ : market-to-book ratio in year  $t$ .  $ROA_t$ : return of assets in year  $t$ .  $SIZE_t$ : natural logarithm of book value of total assets in year  $t$ .

"a", "b" and "c" denote the significance on 1%, 5% and 10% levels respectively, based on two-tailed tests.

two mutually exclusive subsamples. The empirical results are presented in Table 6.

From Table 6, it is found that the coefficients of  $PSRPT_t * X_t$  and  $PSRPT_t * X_{t3}$  are -0.178 ( $t = -0.49$ ) and 0.276 ( $t = 1.69$ ) in the high/low gross margin subsample and -0.094 ( $t = -0.26$ ) and 0.228 ( $t = 2.08$ ) in the remaining subsample, respectively. The coefficients of  $ASRPT_t * X_t$ , which reflect the current earnings informativeness of related party's non-operating incomes, are 1.072 ( $t = 0.40$ ) and -11.051 ( $t = -2.79$ ) in the high/low gross margin and the remaining subsamples, statistically and significant in the remaining subsample. The coefficients of  $ASRPT_t * X_{t3}$  are -4.653 ( $t = -3.19$ ) and -2.871 ( $t = -1.32$ ), negative and statistically significant in the high/low gross margin subsample. These diagnostic checks again demonstrate that most of results are robust to the possible transfer pricing manipulations.

### 5.3. Global financial crisis consideration

Our observing periods include the global financial crisis that occurred in 2008. The global financial crisis represented an exogenous shock that was characterized by the drying up of liquidity (Ivashina and Scharfstein, 2010). The crisis may encourage firms using opportunistic RPTs of tunneling to enhance short-term survival, which in turn, deteriorates the earnings informativeness. This study further examines whether the global financial crisis affected the association between RPTs and earnings informativeness. To examine this issue, we divide the entire observation period into two mutually exclusive sub-periods, i.e., pre-crisis (1996–2007) versus post-crisis (2008–2015) and rerun the equation. The empirical results are presented in Table 7.

From Table 7, the coefficients of  $PSRPT_t * X_t$  are 0.489 ( $t = 1.98$ ), -0.455 ( $t = -1.54$ ) in the pre- vs. post-crisis periods. The coefficients of  $PSRPT_t * X_{t3}$  are 0.281 ( $t = 2.10$ ) and 0.184 ( $t = 1.52$ ), positive and statistically significant at the 5% level in the pre-crisis sub-period. The coefficients of  $ASRPT_t * X_t$  and  $ASRPT_t * X_{t3}$  are -8.860 ( $t = -2.13$ ), -9.323 ( $t = -2.85$ ) and -5.098 ( $t = -2.70$ ), -2.926 ( $t = -1.72$ ), all negative and statistically significant in the pre- and post-crisis sub-periods. It is fair to conclude that the initial empirical findings are unlikely affected by the consideration of the global financial crisis.

**Table 9**

Results of Different Types of RPTs on Earnings Informativeness – Controlling Shareholders' Expropriation Subsample Examinations.

$$R_t = \beta_0 + \beta_1 X_{t-1} + \beta_2 X_t + \beta_3 X_{t3} + \beta_4 R_{t3} + \beta_5 PSRPT_t + \beta_6 PSRPT_t * X_{t-1} + \beta_7 PSRPT_t * X_t + \beta_8 PSRPT_t * X_{t3} + \beta_9 PSRPT_t * R_{t3} + \beta_{10} ASRPT_t + \beta_{11} ASRPT_t * X_{t-1} + \beta_{12} ASRPT_t * X_t + \beta_{13} ASRPT_t * X_{t3} + \beta_{14} ASRPT_t * R_{t3} + \beta_{15} LEV_t + \beta_{16} MB_t + \beta_{17} ROA_t + \beta_{18} SIZE_t + Industry Effect + Year Effect + \varepsilon_t$$

Dependent Variable ( $R_t$ )		
	High Expropriating Sub-sample	Low Expropriating Sub-sample
Variables	$\beta$ (t-value)	$\beta$ (t-value)
Constant	0140 (1.18)	0.067 (0.74)
$X_{t-1}$	-0.840 <sup>a</sup> (-7.53)	-0.797 <sup>a</sup> (-7.34)
$X_t$	1.227 <sup>a</sup> (7.09)	1.565 <sup>a</sup> (8.36)
$X_{t3}$	0.195 <sup>a</sup> (5.01)	0.307 <sup>a</sup> (8.13)
$R_{t3}$	-0.073 <sup>a</sup> (-4.42)	-0.069 <sup>a</sup> (-3.64)
$PSRPT_t$	-0.023 (-0.60)	-0.011 (-0.30)
$PSRPT_t * X_{t-1}$	0.289 (1.06)	0.040 (0.12)
$PSRPT_t * X_t$	-0.032 (-0.12)	-0.019 (-0.07)
$PSRPT_t * X_{t3}$	0.215 <sup>c</sup> (1.72)	0.253 <sup>c</sup> (1.94)
$PSRPT_t * R_{t3}$	-0.018 (-0.70)	-0.037 (-1.55)
$ASRPT_t$	0.492 (1.45)	0.485 (0.80)
$ASRPT_t * X_{t-1}$	10.034 <sup>a</sup> (3.52)	8.617 <sup>a</sup> (2.76)
$ASRPT_t * X_t$	-5.444 <sup>c</sup> (-1.85)	-11.588 <sup>a</sup> (-3.47)
$ASRPT_t * X_{t3}$	-4.722 <sup>a</sup> (-2.75)	-4.069 <sup>b</sup> (-2.44)
$ASRPT_t * R_{t3}$	0.987 <sup>a</sup> (3.34)	0.336 (0.57)
$LEV_t$	-0.006 (-0.16)	-0.020 (-0.56)
$MB_t$	0.149 <sup>a</sup> (8.91)	0.144 <sup>a</sup> (9.44)
$ROA_t$	-0.298 (-1.19)	-0.657 <sup>b</sup> (-2.42)
$SIZE_t$	-0.017 <sup>b</sup> (-2.29)	-0.014 <sup>b</sup> (-2.14)
Industry Effect	included	included
Year Effect	included	included
N	9293	9234
Adj_ $R^2$	56.56%	54.38%
F_value	264.02	240.30

$R_t$ : ex-dividend annual stock return in year  $t$ .  $X_{t-1}$ : the earnings per share in year  $t-1$ , deflated by the stock price at the beginning of year  $t$ .  $X_t$ : the earnings per share in year  $t$ , deflated by the stock price at the beginning of year  $t$ .  $X_{t3}$ : the sum of earnings per share for year  $t+1$  through  $t+3$ , deflated by the stock price at the beginning of year  $t$ .  $R_{t3}$ : the sum of annual stock returns for year  $t+1$  through  $t+3$ .  $PSRPT_t$ : the ratio of related party's product (or processing) sales in year  $t$ .  $ASRPT_t$ : the ratio of related party's non-operating incomes in year  $t$ .  $LEV_t$ : a firm's leverage in year  $t$ .  $MB_t$ : market-to-book ratio in year  $t$ .  $ROA_t$ : return of assets in year  $t$ .  $SIZE_t$ : natural logarithm of book value of total assets in year  $t$ .

"a", "b" and "c" denote the significance on 1%, 5% and 10% levels respectively, based on two-tailed tests.

#### 5.4. Alternative measures of RPTs

This study uses the continuous variable to measure both the related party's product (or processing) sales and related party's non-operating incomes and examines the earnings informativeness for firms with these two types of RPTs. The decision to use RPTs might instead be made in two steps: decide to use RPTs, then, determine the extent of usage. We thus follow the study of [Hwang et al. \(2013\)](#) and use dummy variables to measure these two type of RPTs and rerun the regression. The dummy variable of  $PSRPT_t$  is denoted as 1 for firms that had related party's product (or processing) sales, otherwise 0. Identically, the dummy variable of  $ASRPT_t$  is denoted as 1 for firms that had related party's non-operating incomes, otherwise 0. The results from this additional testing are presented as "Dummy RPTs" model on [Table 8](#). From [Table 8](#), we can see that the coefficients of  $PSRPT_t * X_t$  and  $PSRPT_t * X_{t3}$  are 0.185 ( $t = 1.47$ ) and 0.083 ( $t = 1.77$ ). The coefficient of future earnings informativeness is positive and statistically significant at the 10% level. The results are robust with respect to the dummy variable of RPTs examination. However, the coefficients of  $ASRPT_t * X_t$  and  $ASRPT_t * X_{t3}$  are 0.058 ( $t = 0.56$ ) and -0.009 ( $t = -0.24$ ), both statistically insignificant. It is likely firms' magnitude of related party's non-operating incomes matters for investors rather than firms had conducted related party's non-operating incomes.

We also use total assets to scale the RPTs and reexamine the regression. The results are reported as "Scaled by the Assets" model on [Table 8](#). It is found that the coefficients of  $PSRPT_t * X_t$  and  $PSRPT_t * X_{t3}$  are 0.859 ( $t = 5.29$ ) and 0.278 ( $t = 2.74$ ), both positive and statistically significant at the 1% level. The coefficients of  $ASRPT_t * X_t$  and  $ASRPT_t * X_{t3}$  are -9.625 ( $t = -1.90$ ) and -7.922 ( $t = -2.35$ ), both negative and statistically significant. The results of this analysis again document that the empirical evidence reported in the study remains unchanged.

#### 5.5. Consideration of controlling Shareholders' expropriation

Prior studies document the potential for both tunneling and propping up activities by the controlling shareholder and reveal the incidence of RPTs by the controlling shareholders expropriating wealth from minority shareholders (e.g., [Johnson et al., 2000](#); [Liu and Lu, 2007](#); [Cheung et al., 2006](#); [Jian and Wong, 2010](#); [Yeh et al., 2012](#)). Taiwan is characterized as an economy where there is ownership concentration. The listed firms are with an identifiable controlling owner who tends to be the founder or founding family. This study

**Table 10**

Results of Different Types of RPTs on Earnings Informativeness – The Suspect Subsample Examinations.

$$R_t = \beta_0 + \beta_1 X_{t-1} + \beta_2 X_t + \beta_3 X_{t3} + \beta_4 R_{t3} + \beta_5 PSRPT_t + \beta_6 PSRPT_t * X_{t-1} + \beta_7 PSRPT_t * X_t + \beta_8 PSRPT_t * X_{t3} + \beta_9 PSRPT_t * R_{t3} + \beta_{10} ASRPT_t + \beta_{11} ASRPT_t * X_{t-1} + \beta_{12} ASRPT_t * X_t + \beta_{13} ASRPT_t * X_{t3} + \beta_{14} ASRPT_t * R_{t3} + \beta_{15} LEV_t + \beta_{16} MB_t + \beta_{17} ROA_t + \beta_{18} SIZE_t + Industry\ Effect + Year\ Effect + \epsilon_t$$

Dependent Variable (R <sub>t</sub> )		
	Non-suspect Subsample	Suspect Subsample
Variables	$\beta$ (t-value)	$\beta$ (t-value)
Constant	0.113 (1.41)	-0.077 (-0.58)
X <sub>t-1</sub>	-0.907 <sup>a</sup> (-10.63)	-0.586 <sup>a</sup> (-4.74)
X <sub>t</sub>	1.454 <sup>a</sup> (9.77)	1.208 <sup>a</sup> (6.01)
X <sub>t3</sub>	0.253 <sup>a</sup> (6.97)	0.183 <sup>a</sup> (3.44)
R <sub>t3</sub>	-0.072 <sup>a</sup> (-4.12)	-0.051 <sup>a</sup> (-2.91)
PSRPT <sub>t</sub>	-0.002 (-0.08)	-0.035 (-1.04)
PSRPT <sub>t</sub> *X <sub>t-1</sub>	0.122 (0.50)	0.205 (0.50)
PSRPT <sub>t</sub> *X <sub>t</sub>	0.060 (0.21)	-0.275 (-0.71)
PSRPT <sub>t</sub> *X <sub>t3</sub>	0.212 <sup>c</sup> (1.87)	0.262 <sup>c</sup> (1.85)
PSRPT <sub>t</sub> *R <sub>t3</sub>	-0.039 <sup>c</sup> (-1.73)	-0.022 (-0.60)
ASRPT <sub>t</sub>	0.504 (1.40)	-0.183 (-0.23)
ASRPT <sub>t</sub> *X <sub>t-1</sub>	7.325 <sup>a</sup> (2.71)	11.185 <sup>a</sup> (3.20)
ASRPT <sub>t</sub> *X <sub>t</sub>	-7.529 <sup>a</sup> (-3.23)	-9.633 <sup>a</sup> (-3.00)
ASRPT <sub>t</sub> *X <sub>t3</sub>	-2.819 <sup>c</sup> (-1.77)	-8.100 (-1.62)
ASRPT <sub>t</sub> *R <sub>t3</sub>	0.522 <sup>b</sup> (2.00)	1.420 <sup>b</sup> (2.00)
LEV <sub>t</sub>	-0.052 <sup>c</sup> (-1.74)	0.045 (0.90)
MB <sub>t</sub>	0.166 <sup>a</sup> (10.95)	0.124 <sup>a</sup> (7.38)
ROA <sub>t</sub>	-0.740 <sup>a</sup> (-3.49)	-0.017 (-0.07)
SIZE <sub>t</sub>	-0.015 <sup>b</sup> (-2.53)	-0.011 (-1.36)
Industry Effect	included	included
Year Effect	included	included
N	14,651	3876
Adj_R <sup>2</sup>	56.10%	54.29%
F_value	408.04	101.04

R<sub>t</sub>: ex-dividend annual stock return in year *t*. X<sub>t-1</sub>: the earnings per share in year *t* - 1, deflated by the stock price at the beginning of year *t*. X<sub>t</sub>: the earnings per share in year *t*, deflated by the stock price at the beginning of year *t*. X<sub>t3</sub>: the sum of earnings per share for year *t* + 1 through *t* + 3, deflated by the stock price at the beginning of year *t*. R<sub>t3</sub>: the sum of annual stock returns for year *t* + 1 through *t* + 3. PSRPT<sub>t</sub>: the ratio of related party's product (or processing) sales in year *t*. ASRPT<sub>t</sub>: the ratio of related party's non-operating incomes in year *t*. LEV<sub>t</sub>: a firm's leverage in year *t*. MB<sub>t</sub>: market-to-book ratio in year *t*. ROA<sub>t</sub>: return of assets in year *t*. SIZE<sub>t</sub>: natural logarithm of book value of total assets in year *t*. The suspect subsample is denoted as the potential earnings management sample as firms that meet these two earnings benchmarks (zero earnings and previous year's earnings) within a 0.5% interval or the firms that issue seasoned equity, otherwise non-suspect subsample.

"a", "b" and "c" denote the significance on 1%, 5% and 10% levels respectively, based on two-tailed tests.

further examines whether this institutional characteristic plays a role in the earnings informativeness of RPTs. We divide the entire observations into two exclusive subsamples, high expropriating versus low expropriating group, based on the divergence of control rights and cash-flow rights (denoted as control-cashflow deviation ratio). We form the high expropriating group that included a firm if its control-cashflow deviation ratio is higher than the median of control-cashflow deviation ratio, otherwise the firm is classified into the low expropriating group. The additional results are reported in Table 9.

From Table 9, we find that the coefficients of PSRPT<sub>t</sub>\*X<sub>t</sub> are -0.032 (*t* = -0.12) and -0.019 (*t* = -0.07), both statistically insignificant in the high and low expropriating groups. Meanwhile, the coefficients of PSRPT<sub>t</sub>\*X<sub>t3</sub> are 0.215 (*t* = 1.72) and 0.253 (*t* = 1.94), positive and statistically significant in the high and low expropriating subsamples. These results again support the contracting RPTs hypothesis that the informativeness of future earnings increases for firms with high related party's product (or processing) sales. The coefficients of ASRPT<sub>t</sub>\*X<sub>t</sub> and ASRPT<sub>t</sub>\*X<sub>t3</sub> are -5.444 (*t* = -1.85), -11.588 (*t* = -3.47) and -4.722 (*t* = -2.75), -4.069 (*t* = -2.44) in the high and low expropriating subsamples. The additional diagnoses do not qualitatively change the primary results.

### 5.6. Potential earnings management examinations

Yeh et al. (2012) illustrated two factors that motivate firms to use related sales for the purpose of propping up earnings, i.e., to avoid reporting losses (Leuz et al., 2003; Bhattacharya et al., 2003; Jian and Wong, 2010) and to issue seasoned equity (Bai et al., 2005). This suggests that the related party's product (or processing) sales may be opportune rather than contracting in these two cases, then deteriorates the earnings informativeness of firms with high related party's product (or processing) sales. We divide the entire observations into two subsamples, "suspect" earnings management group versus the remaining group, and rerun Eq. (1). To identify the "avoid reporting losses or earnings decrease" subsample, we group firm-years into intervals based on EPS (earnings per share) of the year and concentrated on firm-years in the interval to the immediate right of zero. We denote the potential earnings management sample as firms that meet these two earnings benchmarks (zero earnings and previous year's earnings) within a 0.5% interval. Following Yeh et al. (2012), we combine the "avoid reporting losses or earnings decrease" and the "issue seasoned equity" subsamples

and denote it as the “suspect” earnings management group. The further results are reported in Table 10.

From Table 10, we find that the coefficients of  $PSRPT_t * X_t$  and  $PSRPT_t * X_{t3}$  are 0.060 ( $t = 0.21$ ),  $-0.275$  ( $t = -0.71$ ) and 0.212 ( $t = 1.87$ ), 0.262 ( $t = 1.85$ ), respectively, in both the “suspect” and the “remaining non-opportunistic” subsamples. The coefficients of  $PSRPT_t * X_{t3}$  again are statistically significant in the analysis. The coefficients of  $ASRPT_t * X_t$  and  $ASRPT_t * X_{t3}$  are  $-7.529$  ( $t = -3.23$ ),  $-9.633$  ( $t = -3.00$ ) and  $-2.819$  ( $t = -1.77$ ),  $-8.100$  ( $t = -1.62$ ), respectively. In sum, the empirical findings were unlikely affected by the potential earnings management test.

In summary, this study presents evidence consistent with our initial findings. The additional examinations include: the normal/abnormal related party's product (or processing) sales test, the transfer pricing manipulation examination, the consideration of the global financial crisis, alternative measures of RPTs, consider the possible shareholders' expropriation, and the potential earnings management test. The major findings are robust in these tests.

## 6. Conclusion

We consider both the contracting theory and agency theory in explanation the earnings informativeness of related party transactions in Taiwan. Agency theory suggests RPTs can result from opportunistic behavior; however, RPTs can also result or be managed via a contracting reason. This study proposes that different subcategories of RPTs are associated with competing reasons and will result in distinctive earnings informativeness. We therefore investigate how the subcategories of RPTs influence the amount of current and future earnings that are embedded in current stock returns. The empirical results revealed that the informativeness of future earnings increases for firms with high related party's product (or processing) sales, yet, decreases for firms with a large magnitude of related party's non-operating incomes. We document evidence that the nature of the RPTs are associated with its role in contests characterized by efficient contracting or opportunistic reasons. Our investigation suggests that depending on the type of RPTs, RPTs may both enhance the earnings informativeness via contracting and deteriorate the earnings informativeness result when there is opportunistic behavior.

The findings in this study are subject to a number of limitations and should be interpreted with caution. First, our analysis is based on the stylized CKSS model which is extended by Tucker and Zarowin (2006); thus, the usual caution with joint model fitting and RPTs effect should be employed in interpreting the results. Secondly, we focused only on the related party's product (or processing) sales and related party's non-operating incomes; applying this study to other types of RPTs should be approached carefully.

## CRedit authorship contribution statement

**Ching-Lung Chen:** Conceptualization, Methodology, Validation. **Chung-Yu Chen:** Software. **Pei-Yu Weng:** Software, Methodology.

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