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Related Party Transaction and Revenue-Expense Matching

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〈Abstract〉

This study examines the effect of firms' related－party transactions on the contemporaneous relationship between revenues and expenses. Given that related－party transactions adversely affect earnings quality and stimulate earnings management by firms, this study predicts that related－party transactions negatively affect revenue－expense matching. Using data on Korean－listed firms for the period 2012－2019, a negative association was observed between related－party transactions and revenue－expense matching. Classifying related－party transactions into operating and non－operating related－party transactions, the results show that non－operating related－party transactions adversely affect revenue－expense matching. Furthermore, the negative association between related－party transactions and revenue－expense matching was more pronounced for firms with poor financial health. Specifically, for financially weak firms, non－operating related－party transactions adversely influenced revenue－expense matching. This study provides practical implications for investors and regulators by showing that related－party transactions critically influence the fundamental quality of earnings. Thus, it could impact investors' valuation process. Moreover, the results suggest that regulators and standard setters should take related－party transactions into account to assess the regulations and accounting standards.

〈Key words〉 related－party transactions, revenue－expense matching, earnings quality, accounting earnings

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Ⅰ. Introduction

This study investigates whether a firm's related-party transactions (RPTs) influence revenue-expense matching. Investigating the factors that influence the contemporaneous relationship between revenue and expenses is important for several reasons. First, a firm's earnings are the single most important number in accounting, and revenue-expenses matching is one of the most critical factors that affect a firm's earnings (Graham et al., 2005). In general, expenses are recognized in the accounting period in which they help to generate revenues. This matching of expenses to revenues is considered a fundamental accounting standard in determining the output of the financial reporting mechanism (Dichev et al., 2013 ; Graham et al., 2005). Thus, exploring the determinants of firms' revenue-expense matching can provide valuable insights into the fundamentals of accounting earnings.

Second, any changes in revenue-expense matching will have implications for earnings quality. According to prior research, a lower contemporaneous relationship between revenue and expenses increases earnings volatility, while decreasing earnings persistence and predictability (Dechow, 1994 ; Dichev and Tang, 2008 ; Dichev et al., 2013). Thus, investigating changes in revenue-expense matching helps to understand the properties and quality of earnings, which are critical for a firm's valuation process. Third, revenue-expense matching allows market participants to accurately recognize and measure firm performance and business reality (Dichev and Tang, 2008). Business performance and success are determined by measuring how much excess revenue a firm generates in relation to the expenses it incurred to earn this revenue. Therefore, a firm's revenue-expense matching level is important to accurately evaluate its real performance. Lastly, identifying the factors that influence revenue-expense matching will provide valuable information to standard setters or regulators regarding which accounting standards, economic factors, or business activities should be considered in their assessment of current or future standards or regulations.

Several studies have suggested that revenue-expense matching is affected by economic and accounting factors (Cho and Choi, 2021 ; Dichev and Tang, 2008 ; Donelson et al., 2011 ; He and Shan, 2016 ; Hyun and Cho, 2018). Dichev and Tang (2008) provided empirical evidence that the relationship between contemporaneous revenue and expenses has deteriorated over the last 40 years, suggesting that accounting earnings have become less useful in assessing firms' long-term performance. They identified that accounting factors, such as the shift in the earnings calculation method from an income-statement-based model to a balance-sheet-based model, adversely affect revenue-expense matching. In a similar vein, Prakash and Sinha (2013) proved that

deferred revenue recognition has led to a decline in revenue-expense matching. In contrast, Denelson et al. (2011) and Hyun and Cho (2018) attribute the decline in revenue-expense matching to economic factors or events associated with special items in income statements and period costs, such as research and development (R&D) and interest expenses. Moreover, previous studies have proved that earnings quality critically affects revenue-expense matching by demonstrating that accrual and real earnings management negatively affect revenue-expense matching (Kim, 2013 ; Kim et al., 2015 ; Kim et al., 2017 ; Oh and Kim, 2019).

However, few studies have examined the influence of business activities or transactions on revenue-expense matching. Specifically, previous research has not examined the impact of RPTs on revenue-expense matching. RPTs are one of the most common forms of business transactions in the Korean market (Kang et al., 2014). Prior studies have provided empirical evidence that RPTs significantly affect a firm's earnings quality (Gordon et al., 2004 ; Hasnan et al., 2016 ; Kim and Woo, 2008, 2009 ; Ko et al., 2019 ; Kohlbeck and Mayhew, 2017 ; Ryngaert and Thomas, 2012), implying that RPTs may have a significant influence on revenue-expense matching. However, despite the potential presence of a significant association between RPTs and revenue-expense matching, no relevant evidence has been provided by earlier studies. This study fills this void by being the first to present evidence that RPTs are significantly associated with revenue-expense matching.

RPTs are defined as transactions that involve the transfer of resources, goods, services, or obligations with related entities or parties, such as major shareholders, affiliates within the same business group, and subsidiaries. RPTs have become a central theme in capital markets since the occurrence of high-profile crises such as the collapse of Enron and Parmalat. The extensive use of RPTs to mask accounting fraud was revealed to be a major attribute of the collapse of Enron and Parmalat. Thus, RPTs have drawn significant attention from researchers, investors, and regulators.

The importance of RPTs has been emphasized in the Korean capital market because RTPs are one of the most common transactions that occur in ordinary business activities in Korea. Moreover, many Korean firms belong to large business groups affiliation, wherein affiliated firms are linked together (Kang et al., 2014 ; Kim and Yi, 2006). Thus, RPTs are more prevalent in Korean markets than in other countries since both horizontal and vertical diversification across different industries is more common in Korea. Therefore, investors and regulators in Korea tend to be more concerned about whether RPTs benefit or damage shareholders and firms.

There are two prevailing theories about RPTs, each having different implications for revenue-

expense matching, namely the conflict-of-interest hypothesis and the efficient transaction hypothesis. The former views RPTs as harmful transactions conducted to expropriate wealth from minority shareholders for the interests and benefits of the controlling shareholders (Du et al., 2013 ; Jiang et al., 2014 ; Kohlbeck and Mayhew, 2010, 2017). In contrast, the latter hypothesis argues that RPTs are efficient transactions that benefit shareholders by reducing transaction costs and increasing the sharing of resources, knowledge, and expertise (Chang and Hong, 2000 ; Khanna and Palepu, 2000 ; Stein, 1997 ; Zhou and Hu, 2001).

Although there are two alternative views regarding RPTs, most prior studies have provided empirical evidence that supports the conflict-of-interest hypothesis. According to the conflict-of-interest hypothesis, RPTs arise from the agency problems between managers and shareholders as well as between the controlling and minority shareholders (Du et al., 2013 ; Gordon and Henry, 2005 ; Jiang et al., 2014). The conflict-of-interest hypothesis states that the executives or controlling shareholders of a firm have incentives to manage earnings to maximize their private gains or mask the expropriation of wealth from minority shareholders (Gordon and Henry, 2005 ; Hasnan et al., 2016), resulting in reduced earnings quality. This implies that firms with a large number of RPTs have opportunistic managerial incentives, and such incentives can drive firms to delay the recognition of current expenses or accelerate the recognition of revenues. Thus, based on the conflict-of-interest hypothesis, it can be assumed that RPTs are likely to adversely affect revenue-expense matching.

RPTs can be classified as operating (e.g., sales of products/services and purchase of materials/ merchandise) or non-operating (e.g., sales and purchase of property, plant, and equipment (PPE) and investment assets) transactions (Kang et al., 2014). Previous studies have shown that the effects of RPTs could vary based on the types of RPTs (Kang et al., 2014 ; Kohlbeck and Mayhew, 2017 ; Lee et al., 2016 ; Shin et al., 2021). In general, transactions related to non-operating activities are deemed preferable for wealth transfers since they require more subjective judgment and discretion than transactions related to regular operating activities (Bertrand et al., 2002 ; Kang et al., 2014). Moreover, since non-operating RPTs are infrequent, they are less subject to scrutiny by regulators or auditors. Thus, managers are more likely to employ non-operating RPTs than operating RPTs to exercise discretion for their private benefit and to extract wealth through tunneling. This suggests that there would be a negative association between non-operating RPTs and revenue-expense matching.

Using a large sample of 12,647 firm-year observations of listed firms in Korea for the period 2012-2019, this study finds that firms with a large number of RPTs tend to have a lower

contemporaneous relationship between expenses and revenues, suggesting that RPTs adversely affect revenue-expense matching. To identify whether the non-operating RPTs negatively influence revenue-expense matching, we discriminate non-operating RPTs from total RPTs. The results show that non-operating RPTs are adversely associated with revenue-expense matching.

Furthermore, we divide the research sample into firms with strong and weak financial health by using a firm's leverage ratio and Altman's (1968) Z-score to investigate the effects of a firm's financial health on the association between RPTs and revenue-expense matching. This study finds that the effects of RPTs on revenue-expense matching are more pronounced for financially weak firms. Moreover, we find that the adverse effect of non-operating RPTs is more pronounced for financially weak firms.

This study contributes to accounting literature in several ways. First, this study is the first to provide empirical evidence that RPTs significantly affect revenue-expense matching, which is a fundamental convention of accounting earnings. Although RPTs are one of the most prevalent business transactions in Korea, prior research on revenue-expense matching has overlooked the influence of RPTs. Second, this study provides new insights into the effects of RPTs. While most studies have investigated the effects of RPTs on firm and shareholder value, this study provides empirical evidence that RPTs are the major determinants of accounting earnings' quality and properties. By highlighting the significant impact of RPTs on revenue-expense matching, this study suggests that RPTs must be considered when evaluating earning attributes and firm value. Lastly, this study has practical implications for investors and regulators in that RPTs must be carefully considered when assessing firms' long-term performance and RPT-related regulations. Specifically, this study provides evidence that investors and regulators should carefully evaluate non-operating RPTs by showing that non-operating RPTs harm the fundamental quality of earnings.

The remainder of this study is organized as follows. Section Ⅱ presents the literature review and hypothesis development. Section Ⅲ describes the research model and design, while Section Ⅳ presents the empirical results. Finally, Sections Ⅴ and Ⅵ discuss the robustness test results and conclusion, respectively.

Ⅱ. Literature Review and Hypothesis Development

1. Revenue-Expense Matching

As mentioned in the previous section, revenue-expense matching is a determinant of accounting earnings, as well as its quality and properties (Dichev and Tang, 2008 ; Donelson et al., 2011 ; Graham et al., 2005). Thus, accurate revenue-expense matching is important for information users, including investors and regulators, as it helps them understand the current performance and business reality of a firm. Considering the importance of revenue-expense matching, previous studies have investigated the factors influencing revenue-expense matching.

Prior research shows that both accounting and economic factors influence trends in revenue-expense matching (Cho and Choi, 2021 ; Dichev and Tang, 2008 ; Donelson et al., 2011 ; Hyun and Cho, 2018 ; Prakash and Sinha, 2013). Dichev and Tang (2008) suggested that the correlation between contemporaneous revenues and expenses has declined over the past 40 years. They showed that the decline in revenue-expense matching can be attributed to the change in the earnings calculation method from the income-statement-based model to the balance-sheet-based model. Following Dichev and Tang (2008), Prakash and Sinha (2013) demonstrated that accounting factors lead to a decline in revenue-expense matching by showing that recognizing deferred revenues deteriorates revenue-expense matching.

While the above studies attributed the decline in revenue-expense matching to accounting factors, other studies have proved that economic factors lead to reduced revenue-expense matching. For example, Donelson et al. (2011) showed that an increase in the use of special items in the income statement, which are associated with economic factors, such as product market competition, deteriorates revenue-expense matching. In a similar vein, Hyun and Cho (2018) argued that the decline in revenue-expense matching can be largely attributed to changes in the capital structure, which reduce the explanatory power of interest expenses with respect to revenues. Moreover, Srivastava (2014) found that economic factors, such as the increase in the number of newly listed firms and period costs, including R&D, result in reduced revenue-expense matching. Therefore, according to previous research, the decline in the revenue-expense matching can be attributed to both economic and accounting factors.

Additionally, a large body of research shows that a firm's reporting behavior and earnings quality significantly affect the revenue-expense matching extent and behavior (Kim, 2013 ; Kim et al., 2015 ; Kim et al., 2017 ; Oh and Kim, 2019 ; Paek, 2011). For example, Kim (2013) found

that revenue-expense matching is lower in firms with higher accrual earnings management, which leads to reduced earnings quality. Similarly, Kim et al. (2015) showed that firms that engage in real earnings management are more likely to have poor revenue-expense matching because their earnings are determined through abnormal adjustments in revenues and expenses. Moreover, Paek (2011) proved that losses and discretionary accruals are significantly associated with poor revenue-expense matching. In summary, these studies imply that earnings quality is one of the main factors that influence revenue-expense matching.

2. Related-Party Transactions

In general, previous studies view RPTs as harmful transactions that are used to expropriate wealth from minority shareholders to maximize the benefits of the controlling shareholders. However, there are two predominant theories regarding RPTs : the conflict-of-interest hypothesis and the efficient transaction hypothesis. The conflict-of-interest hypothesis views RPTs as transactions that damage firm value and the wealth of minority shareholders (Cheung et al., 2009 ; Gordon and Henry, 2005). According to the conflict-of-interest hypothesis, RPTs arise from the agency conflicts between managers and the shareholders as well as between the controlling shareholders and minority shareholders, as suggested by Berle and Means (1932) and Jensen and Meckling (1976). The conflict-of-interest hypothesis argues that RPTs are used to expropriate minority shareholders' wealth for the private gain of managers or the controlling shareholders. For example, Johnson et al. (2000) found that controlling shareholders expropriate private benefits from minority shareholders via tunneling. Furthermore, Cheung et al. (2009) found that controlling shareholders tend to transfer resources for their private gain by adjusting the sales and purchase prices of RPTs in a way that maximizes their own benefits.

Additionally, a significant amount of research in support of the conflict-of-interest hypothesis has shown that RPTs are significantly associated with opportunistic financial reporting and earnings quality. Cheung et al. (2009) and Jian and Wong (2010) found that firms manage earnings through tunneling or by propping up through RPTs. Moreover, Rahmat et al. (2020) stated that the earnings quality of firms engaged in RPTs tends to be lower than those of firms that do not engage in RPTs. Similarly, Aharony et al. (2010), Chen et al. (2011), and Hasnan et al. (2016) showed that RPTs are significantly associated with both accruals and real earnings management. Therefore, prior studies that support the conflict-of-interest hypothesis have shown that RPTs are potentially harmful transactions that reduce both firm and shareholder value.

Moreover, these studies highlight the fact that RPTs are a critical factor that affects firms' earnings quality.

In contrast, the efficient transaction hypothesis views RPTs as efficient transactions that provide economic benefits to both firms and shareholders. Studies that support the efficient transaction hypothesis contend that RPTs allow firms to share information, knowledge, expertise, and resources, thereby reducing information asymmetry and adverse selection. Thus, RPTs improve firm performance and efficiency by reducing transaction costs (Khanna and Palepu, 2000 ; Shin and Park, 1999 ; Stein, 1997 ; Williamson, 1975).

Specifically, prior studies show that RPTs allow firms to achieve economic efficiency by mitigating external market failures. Williamson (1975) and Chang and Hong (2000) found that RPTs improve a firm's economic efficiency by establishing and enhancing the internal capital market among related parties, allowing them to share resources and reduce transaction costs. Similarly, Khanna and Palepu (2000) stated that the potential benefits of RPTs include the ability to access internal capital markets that help firms share resources. In summary, previous studies that support the efficient transaction hypothesis have argued that RPTs are efficient transactions that facilitate the economic efficiency of firms by reducing information asymmetry and transaction costs.

3. Hypothesis Development

Prior research has shown that revenue-expense matching is significantly affected by firms' financial reporting behavior and earnings quality (Kim, 2013 ; Kim and Lee, 2016 ; Kim et al., 2015 ; Kim et al., 2017 ; Oh and Kim, 2019). Opportunistic financial reporting, such as accrual and real earnings management, deteriorates revenue-expense matching since earnings are based on abnormal adjustments in revenues and expenses and business activities under earnings management. Therefore, the quality of a firm's earnings and financial reporting behavior are significantly associated with revenue-expense matching.

In general, RPTs are viewed as potentially harmful transactions arising from agency problems, supporting the conflict-of-interest hypothesis (Cheung et al., 2009 ; Gordon and Henry, 2005 ; Hasnan et al., 2016 ; Jian and Wong, 2010 ; Johnson et al., 2000 ; Rahmat et al., 2020). The conflict-of-interest hypothesis provides two possible mechanisms through which RPTs are significantly associated with revenue-expense matching ; (1) RPTs' impact on managerial discretion in recognizing revenues and expenses and (2) RPTs' influence on managerial incentives

to manage earnings. In the first mechanism, i.e., the impact of RPTs on managerial discretion revenue-expense recognition, managers and controlling shareholders have the choice to either recognize or delay the recognition of transactions for certain purposes (Peasnell et al., 2000). RPTs allow managers to discretionarily establish the sales or purchase price of goods or services as well as the timing of the recognition of revenues and expenses (Cheung et al., 2009 ; Johnson et al., 2000). Thus, if firms engage in RPTs in an aggressive manner to manage their earnings, it will delay the recognition of current expenses, thus leading to reduced revenue-expense matching. Consistent with this view, Healy and Wahlen (1999), Hwang et al. (2013), and Aharony et al. (2010) showed that managers can manage earnings by structuring transactions, including RPTs, among firms within the same business group. Thus, based on the conflict-of-interest hypothesis, the revenue-expense matching of firms with a large number of RPTs is more likely to be poor than those with a lower number of RPTs.

The second mechanism is the influence of RPTs on managerial incentives to manage earnings. Previous research that supports the conflict-of-interest hypothesis has suggested that RPTs are harmful to shareholders. As demonstrated by the media and previous literature[1], RPTs represent the potential expropriation of the firms' resources and minority shareholders' wealth for the controlling shareholders' private benefits (Du et al., 2013 ; Jiang et al., 2014). If firms engage in RPTs to expropriate private benefits or perquisites for their managers or controlling shareholders, they have incentive to manage their earnings to justify or even conceal such opportunistic behavior. Consistent with this prediction, Gordon and Henry (2005), Rahmat et al. (2020), and Hasnan et al. (2016) showed that RPTs are significantly associated with accrual and real earnings management as well as earnings quality. They argued that controlling shareholders engage in RPTs to expropriate minority shareholders' wealth, and thus have greater incentive to conduct earnings management to mask these opportunistic behaviors.

Furthermore, RPTs require more managerial discretion than other business transactions because managers can easily structure transactions among related parties, providing managers with the incentive to manage earnings (Kim and Woo, 2008, 2009 ; Ko et al., 2019). Moreover, firms are only required to disclose the total amounts of RPTs without the detailed structures of RPTs and transaction contracts. Therefore, it would be easier for companies that conduct more RPTs to manage their earnings. Consistent with this argument, Kim and Woo (2008, 2009) and Ko et al.

1) The RPTs of GS Retail dramatically increased in 2019 from KRW 11.9 billion to KRW 21.1 billion. Furthermore, price and transaction policies were also established to increase firm performance and cash flows (https://www.newspim.com/news/view/20200217001127).

(2019) showed that firms with a large number of RPTs are more likely to engage in earnings management than their counterparts with a lower number of RPTs.

Therefore, prior literature regarding the effects of RPTs that support the conflict-of-interest hypothesis explicitly shows that firms with a large number of RPTs tend to have low-quality earnings and are more likely to engage in earnings management, implying that firms with more RPTs engage in aggressive accounting, which deteriorates revenue-expense matching. Given that opportunistic financial reporting and low-quality earnings lead to a decline in revenue-expense matching, the conflict-of-interest hypothesis indicates that RPTs have a negative association with revenue-expense matching. Thus, we developed the following hypothesis :

H1 : *There is a negative association between RPTs and revenue-expense matching.*

In general, RPTs can be disaggregated into operating and non-operating RPTs. Operating RPTs refer to ordinary business transactions with related parties associated with a firm's major operations, while non-operating RPTs represent transactions associated with sales or purchase of fixed or investment assets that are not directly related to the major operations of the firm. Previous research shows that the effects of RPTs could differ based on the types of RPTs (Bertrand et al., 2002 ; Fan et al., 2008 ; Kang et al., 2014 ; Lee et al., 2016). Generally, prior studies show that non-operating RPTs are preferable by managers or controlling shareholders to expropriate wealth from minority shareholders for their private benefits because non-operating RPTs are highly associated with managerial discretion and judgment.

Operating RPTs are frequent and recurring throughout the accounting period, whereas non-operating RPTs are typically infrequent and large in amount. Relative to operating RPTs, non-operating RPTs involve more managerial subjective discretion and judgment in determining the fair value as PPE and long-term investment assets are usually held by firms for a long period of time and not traded as a part of ordinary business transactions. On the other hand, the fair values of operating RPTs are easily determined as they are ordinary business transactions frequently occur as a part of major business operations. For these reasons, operating RPTs are usually more subject to stronger scrutiny by regulators and auditors due to the recurring nature of these transactions and their comparability with industry peers (Bertrand et al., 2002 ; Fan et al., 2008 ; Kang et al., 2014 ; Lee et al., 2016).

In this context, prior studies have proven that non-operating transactions are significantly associated with management discretion over financial reporting (Bartov, 1993 ; Hermann et al., 2003). Moreover, studies by Bertrand et al. (2002), Kang et al. (2014), and Lee et al. (2016)

argue that managers or controlling shareholders are more likely to use non-operating RPTs than operating RPTs as a method for tunneling to exercise their discretion and expropriate wealth for their private gain. Specifically, Bertrand et al. (2002) reported that firms generally use non-operating RPTs for tunneling. Using Korean listed firms, Kang et al. (2014) showed that only non-operating RPTs destroy value of non-top 5 chaebol firms, while both operating and non-operating RPTs decrease the firm values for top-5 chaebol firms with high control-ownership disparity. Moreover, Lee et al. (2016) found that the detrimental effect of RPTs on comparability is more pronounced in non-operating RPTs, suggesting that non-operating RPTs are more likely to be utilized as a means of tunneling and, therefore, involve more discretion.

Collectively, extant studies explicitly show that managers or controlling shareholders engage more in non-operating RPTs than operating RPTs for tunneling and use them opportunistically as they involve more discretion with lower scrutiny or monitoring of regulators and other interested parties. Given that opportunistic use of RPTs destroys earnings quality and induces earnings management, which reduces revenue-expense matching, based on the features of non-operating RPTs, we hypothesized that there is a negative association between non-operating RPTs and revenue-expense matching as follows :

H2 : *The negative association between RPTs and revenue-expense matching is more pronounced for non-operating RPTs.*

A large body of research has proven that a firm's financial health significantly affects its earnings management and earnings quality (Beatty and Weber, 2003 ; Choi, 2008 ; Dichev and Skinner, 2002 ; Kim et al., 2017 ; Li et al., 2020 ; Jaggi and Lee, 2002 ; Zang, 2012). Previous studies have shown that firms with higher leverage ratios tend to manage their earnings to avoid debt covenant violations (Beatty and Weber, 2003 ; Choi, 2008 ; DeFond and Jiambalvo, 1994 ; Dichev and Skinner, 2002 ; Sweeney, 1994). They contend that managers undertake accounting procedures that increase earnings to avoid the violations of accounting-based debt covenants. For example, Sweeney (1994) found that managers of firms in technical default make income-increasing accounting choices to meet the debt covenant. In a similar vein, DeFond and Jiambalvo (1994) found that managers engage in income-increasing accrual-based earnings management to avoid debt covenant violations. By using Korean data, Choi (2008) also found that high leverage ratios induce firms to manage earnings, supporting the debt covenant hypothesis.

Prior studies have also proved that financially distressed firms are more likely to engage in earnings management (Li et al., 2020 ; Jaggi and Lee, 2002 ; Zang, 2012). They argued that

financial distress would result in a decline in the firm's share price, firm value, and an increase in the cost of capital. These negative economic and capital market consequences provide managers with the incentive to manage earnings to cope with them. Jaggi and Lee (2002) found that a firm's choice of income-increasing discretionary accruals is significantly associated with the severity of financial distress. Moreover, Zang (2012) also provided evidence that firms with poor financial health engage in income-increasing earnings management.

Collectively, prior literature explicitly shows that a firm's financial health significantly affects a firm's earnings quality, implying that a firm's financial status could impact the revenue-expense matching. Thus, we hypothesized that a firm's financial health would significantly impact the relationship between RPTs and revenue-expense matching. Moreover, as previously mentioned, we postulated that the effect of a firm's financial health would be more pronounced on the relationship between non-operating RPTs and revenue-expense matching.

H3a : *The negative association between RPTs and revenue-expense matching is more pronounced for firms with poor financial health.*

H3b : *For firms with poor financial health, the negative association between RPTs and revenue-expense matching is more pronounced for non-operating RPTs.*

Ⅲ. Research Design and Model

1. Research Design

This study examined the association between RPTs and revenue-expense matching. Dichev and Tang (2008) estimated revenue-expense matching by regressing the expenses in the previous, current, and proceeding year on current revenues. To examine the effects of RPTs on revenue-expense matching, following Cho and Choi (2021), we modified the model developed by Dichev and Tang (2008) by including RPTs as variables of interest. Following Dichev and Tang (2008) and Cho and Choi (2021), we estimated the following regression model :

$$\begin{aligned} REV_{it} = {} & \beta_0 + \beta_1 RPT_{it}(OP\_RPT_{it},\ NON\_OP\_RPT_{it}) + \beta_2 EXP_{it-1} \\ & + \beta_3 EXP_{it} + \beta_4 EXP_{it+1} + \beta_5 EXP_{it-1} \times RPT_{it} + \beta_6 EXP_{it} \times RPT_{it} \\ & + \beta_7 EXP_{it+1} \times RPT_{it} + \sum Controls + \sum IND + \sum YEAR + \epsilon_t \end{aligned}$$

REV captures the current revenue of the firm, while *RPT* represents the firm's total magnitude of RPTs. *OP_RPT* and *NON_OP_RPT* refers to the operating RPTs (e.g., operating sales and purchases of products/services and materials/merchandise) and non-operating RPTs (e.g., sales and purchases of property, plant, and equipment, and investment assets), respectively. EXP_{t-1}, EXP_t, and EXP_{t+1} capture the prior, current, and proceeding expenses, respectively. This study also controls for various factors that affect a firm's recognition of revenue and revenue-expense matching, such as sales volatility (*SALESVOL*), volatility of cash flows from operation (*CFOVOL*), losses (*LOSS*), firm's operating cycles (*OPCYCLE*), sales growth (*SALESGRW*), cash flows from operations (*CFO*), and external auditors (*BIG4*). The details of each variable used in this study are presented in the Appendix. This study also controls for industry- and year-fixed effects.

The coefficients of β_2, β_3, and β_4 represent the degrees of the early, current, and delayed recognition of expenses, respectively, representing revenue-expense matching. The higher positive value of β_3 indicates the better contemporaneous association between the revenues and expenses. Furthermore, according to previous research (Dichev and Tang, 2008 ; Donelson et al., 2011), the higher value of β_2 represents conservative accounting, wherein expenses are recognized early, while the higher positive value of β_4 implies aggressive accounting, which indicates delayed recognition of expenses. If RPTs deteriorate revenue-expense matching, the coefficient of the interaction term of current expenses (EXP_t) and RPTs (*RPT*) will be negative.

2. Sample Selection and Descriptive Statistics

This study utilized data on Korean-listed firms for the period 2012-2019. The financial and RPTs data were collected from the TS2000 and FnGuide databases. We excluded financial institutions since they have distinct industrial characteristics. Only firms that use the fiscal year-end of December were used to ensure sample homogeneity. Moreover, firms without RPTs are excluded from the sample to examine the effect of RPTs on revenue-expense matching explicitly. Lastly, firms without data for variables used in the study were excluded, generating a sample of 12,647 firms. The details of sample selection are shown in Table 1. Panel B of Table 1 shows the sample distribution by year, and Panel C reports the average revenue and expense of sample firms by year. Panel C shows that both revenue and expense are steadily decreasing, but there are no outliers, suggesting there is no significant exogenous shock that could distort our analyses. Panel D shows the average revenue and expense by industry. It shows that transportation and storage, and accommodation and food services have the highest average revenue and expenses,

and others show the lowest average values.

〈Table 1〉 Sample selection and distribution by year

Panel A : Sample selection procedure	
Sample selection process	Number of observations
Total listed Korean firms in 2012−2019	17,388
(−) Financial firms	(510)
(−) Firms without the fiscal year−end of December	(426)
(−) Firms without the related−party transactions	(2,913)
(−) Firms without the necessary data for the control variables	(892)
Final sample	12,647

Panel B : Sample distribution by year	
Year	Number of observations
2012	1,470
2013	1,420
2014	1,465
2015	1,515
2016	1,601
2017	1,643
2018	1,726
2019	1,807
Total Sample	12,647

Panel C : Revenue and expense by year		
Year	Average REV	Average EXP_t
2012	0.913	0.903
2013	0.900	0.898
2014	0.870	0.864
2015	0.833	0.827
2016	0.805	0.805
2017	0.818	0.814
2018	0.787	0.795
2019	0.757	0.775

〈Table 1〉 Sample selection and distribution by year (continued)

Panel D : Revenue and expense by industry		
Year	Average REV	Average EXP_t
Primary sector industry (54)	0.647	0.670
Manufacture of food and beverage (471)	0.977	0.945
Manufacture of textiles (277)	0.909	0.917
Manufacture of wood and products of wood (266)	0.756	0.765
Manufacture of chemicals and chemical products (2,255)	0.757	0.743
Manufacture of metals and products of metal (864)	0.890	0.880
Manufacture of electric components, and machinery and equipment (3,576)	0.851	0.851
Manufacture of motor vehicles and other transport equipment (828)	0.941	0.928
Manufacture of other products (128)	0.904	0.917
Electricity, gas, steam and air conditioning supply (93)	0.919	0.912
Water supply ; sewage, waste management, materials recovery (47)	0.530	0.556
Construction (327)	0.986	1.006
Wholesale and retail trade (1,108)	0.922	0.961
Transportation and storage, and accommodation and food service activities (240)	1.045	1.032
Information and communication (1,181)	0.717	0.724
Others (932)	0.593	0.598

Panel A of Table 2 presents the descriptive statistics for each variable. Each continuous variable was winsorized at the top and bottom of 1%. The mean values of *REV* and *EXP* were 0.832 and 0.832, respectively. Moreover, the mean value of a variable of interest, *RPT,* was 0.852. Furthermore, when we divided RPTs into operating RPTs (*Op_RPT*) and non-operating RPTs (*Non_Op_RPT*), their mean values were 0.446 and 0.406, respectively, indicating that firms engaged more in operating RPTs than non-operating RPTs.

To identify the difference in revenue-expense matching between firms with and without RPTs, we divided the sample into two subgroups based on the existence of RPTs. Then, we regress expenses in the previous, current, and proceeding year on current revenues. Panel B shows that the contemporaneous relationship between expenses and revenues is significantly higher for firms without RPTs (0.767) than firms with RPTs (0.719). It shows that the statistical difference of each coefficient of EXP_t is significant.

〈Table 2〉 Descriptive statistics

Panel A : RPT group (N=12,647)

Variable	Mean	Std. Dev.	Min	25th	Median	75th	Max
REV	0.832	0.527	0	0.486	0.745	1.076	4.712
RPT	0.852	20.3	−23.958	0.038	0.152	0.419	1,566.95
Op_RPT	0.446	10.056	0	0	0.035	0.217	794.14
Non−op_RPT	0.406	13.634	−23.97	0.004	0.027	0.11	1,111.17
EXP_{t-1}	0.863	0.536	−2.91	0.521	0.772	1.096	4.726
EXP_t	0.832	0.519	−2.91	0.501	0.743	1.065	4.61
EXP_{t+1}	0.799	0.507	−2.91	0.476	0.715	1.032	4.61
SIZE	19.009	1.379	14.686	18.096	18.766	19.667	26.112
SALESVOL	0.179	0.18	0.001	0.069	0.126	0.223	2.615
CFOVOL	0.069	0.054	0	0.034	0.054	0.086	0.594
LOSS	0.287	0.453	0	0	0	1	1
OPCYCLE	4.87	0.639	0.618	4.522	4.88	5.225	11.151
SALES GROWTH	1.218	13.1	0	0.907	1.02	1.135	1,447.22
ROA	0	0.155	−3.168	−0.019	0.022	0.058	2.914
CFO	0.039	0.097	−1.011	−0.004	0.041	0.088	0.879
BIG4	0.487	0.5	0	0	0	1	1

Panel B : RPT group vs Non−RPT group

Variable	Dependent variable : REV_t					
	(1) RPT group		(2) Non−RPT group		(3) Difference	
	Coeff.	t−value	Coeff.	t−value	Diff.	F−value
Intercept	−0.004	−1.67*	−0.004	−0.808		
EXP_{t-1}	0.162	32.18***	0.149	22.32***	0.041	777.13***
EXP_t	0.719	112.99***	0.767	95.13***	−0.048	9,582.4***
EXP_{t+1}	0.122	23.83***	0.088	11.70***	0.034	426.08***
N	12,647		7,389			

Table 3 presents the Pearson correlations, showing that the current revenues were highly correlated with contemporaneous expenses. Furthermore, the current revenues were negatively correlated with firms' RPTs. Specifically, the correlation table shows that operating RPTs were negatively correlated with the current revenues. Moreover, the correlation between revenues and expenses in the prior and following period was statistically significant and positive. These results show that firms tend to accelerate or delay the recognition of earnings.

〈Table 3〉 Pearson Correlations (N=12,647)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) *REV*	1	−0.019 (0.033)	−0.029 (0.001)	−0.007 (0.445)	0.88 (0.000)	0.956 (0.000)	0.864 (0.000)	0.039 (0.000)	0.25 (0.000)	0.105 (0.000)	−0.172 (0.000)	−0.33 (0.000)	−0.012 (0.172)	0.194 (0.000)	0.211 (0.000)	0.099 (0.000)
(2) *Total RPT*		1	0.802 (0.000)	0.898 (0.000)	0.009 (0.308)	−0.021 (0.019)	−0.038 (0.000)	0.01 (0.258)	0.04 (0.000)	−0.003 (0.759)	0.001 (0.871)	−0.007 (0.453)	−0.001 (0.889)	0.005 (0.552)	0.005 (0.543)	0.007 (0.439)
(3) *Op_RPT*			1	0.456 (0.000)	0.001 (0.877)	−0.029 (0.001)	−0.046 (0.000)	0.009 (0.328)	0.032 (0.001)	−0.01 (0.243)	−0.003 (0.754)	−0.002 (0.779)	−0.001 (0.879)	−0.001 (0.931)	0.006 (0.535)	0.005 (0.586)
(4) *Non_Op_RPT*				1	0.012 (0.161)	−0.009 (0.289)	−0.023 (0.009)	0.009 (0.335)	0.036 (0.000)	0.004 (0.686)	0.004 (0.634)	−0.008 (0.362)	−0.001 (0.924)	0.008 (0.342)	0.004 (0.655)	0.007 (0.453)
(5) EXP_{t-1}					1	0.877 (0.000)	0.793 (0.000)	−0.025 (0.005)	0.347 (0.000)	0.192 (0.000)	−0.07 (0.000)	−0.317 (0.000)	−0.018 (0.042)	0.052 (0.000)	0.075 (0.000)	0.066 (0.000)
(6) EXP_t						1	0.867 (0.000)	−0.023 (0.010)	0.263 (0.000)	0.142 (0.000)	−0.06 (0.000)	−0.295 (0.000)	−0.015 (0.093)	−0.102 (0.000)	0.075 (0.000)	0.073 (0.000)
(7) EXP_{t+1}							1	−0.012 (0.176)	0.213 (0.000)	0.104 (0.000)	−0.048 (0.000)	−0.257 (0.000)	−0.014 (0.111)	0.028 (0.002)	0.049 (0.000)	0.071 (0.000)
(8) *SIZE*								1	−0.179 (0.000)	−0.277 (0.000)	−0.195 (0.000)	−0.152 (0.000)	−0.006 (0.473)	0.209 (0.000)	0.178 (0.000)	0.408 (0.000)
(9) *SALESVOL*									1	0.468 (0.000)	0.051 (0.000)	−0.152 (0.000)	0.001 (0.947)	−0.03 (0.001)	−0.062 (0.000)	−0.059 (0.000)
(10) *CFOVOL*										1	0.107 (0.000)	0.024 (0.006)	−0.006 (0.485)	−0.12 (0.000)	−0.138 (0.000)	−0.099 (0.000)
(11) *LOSS*											1	0.157 (0.000)	0.015 (0.095)	−0.381 (0.000)	−0.306 (0.000)	−0.096 (0.000)
(12) *OPCYCLE*												1	0.059 (0.000)	−0.132 (0.000)	−0.176 (0.000)	−0.119 (0.000)
(13) *SALES GROWTH*													1	0.009 (0.326)	−0.014 (0.117)	−0.007 (0.416)
(14) *ROA*														1	0.466 (0.000)	0.093 (0.000)
(15) *CFO*															1	0.114 (0.000)
(16) *BIG4*																1

Ⅳ. Empirical Results

1. Main Results

Table 4 reports the empirical results for Hypotheses H1 and H2. The first column of Table 4 presents the effects of the total magnitude of RPTs on revenue−expense matching (H1). The coefficient of the interaction term of total RPTs and current expenses ($EXP_t \times RPT$) (−0.064) was negative and significant at the 1% level (t−value=−16.79), indicating that RPTs decrease the contemporaneous relationship between revenues and expenses. This result supports our argument that RPTs damage revenue−expense matching because a firm's RPTs reduce earnings quality and increase earnings management.

Columns (2) and (3) present the results for the second hypothesis. When non−operating RPTs (*Non_op_RPT*) are discriminated from the total RPTs, the result in column (2) shows that the interaction term of the non−operating RPTs and current expenses ($EXP_t \times Non\_op\_RPT$) were negatively associated with the revenues. The coefficient of the interaction term of the current expenses and non−operating RPTs (−0.114) was significantly negative at the 1% level (t−value =−21.20), implying that non−operating RPTs reduced revenue−expense matching. This result also supports our argument that non−operating RPTs adversely affect revenue−expense matching. Firms prefer to use non−operating RPTs for tunneling and earnings management, reducing earnings quality, and revenue−expense matching because they involve more discretion and judgment with less subject to scrutiny.

Interestingly, the result in column (3) shows that the coefficient of interaction between operating RPTs and current expenses ($EXP_t \times Op\_RPT$) is positive (0.034) and significant (t−value=4.60). Shin et al. (2021) found that income smoothing via RPTs improves the informativeness of earnings, suggesting that reported income that is significantly related to RPTs are more sustainable because RPTs serve as the basis of stable source of revenues. Piror studies on the market reaction to income smoothing indicate that income smoothing improves earnings persistence and future earnings predictability, resulting in favorable market reactions.

For example, prior research has demonstrated that smooth earnings are significantly associated with higher credit ratings (Yang et al., 2007 ; Park et al., 2011), higher analyst forecast accuracy (Beidleman, 1973), and lower cost of capital (Francis et al., 2004). Particularly, Tucker and Zarowin (2006) state that income smoothing enhances the informativeness of past and present earnings about future earnings and cash flow.

〈Table 4〉 The association between RPTs and revenue-expense matching

Variable	Dependent variable : REV_t					
	(1) Total RPT		(2) Non-operating RPT		(3) Operating RPT	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	−0.007	−0.29	−0.009	−0.37	−0.004	−0.14
RPT_t	−0.012	−7.05***	−0.006	−2.68***	−0.014	−4.90***
EXP_{t-1}	0.039	15.19***	0.041	16.76***	0.052	20.13***
EXP_t	0.941	301.27***	0.936	322.62***	0.911	297.20***
EXP_{t+1}	0.016	7.32***	0.021	10.43***	0.032	14.95***
$EXP_{t-1} \times RPT_t$	0.019	6.99***	0.027	6.83***	−0.017	−3.09***
$EXP_t \times RPT_t$	−0.064	−16.79***	−0.114	−21.20***	0.034	4.60***
$EXP_{t+1} \times RPT_t$	0.046	13.25***	0.070	13.61***	−0.004	−0.62
$SIZE_t$	0.001	2.86***	0.001	2.70***	0.001	1.75*
$SALESVOL_t$	0.000	0.09	−0.001	−0.41	0.001	0.25
$CFOVOL_t$	−0.058	−5.91***	−0.052	−5.40***	−0.056	−5.70***
$LOSS_t$	0.000	0.41	0.000	0.29	0.000	0.05
$OPCYCLE_t$	−0.003	−3.48***	−0.003	−3.63***	−0.003	−3.13***
$SALESGROWTH_t$	0.016	10.71***	0.016	10.74***	0.017	10.93***
ROA_t	1.053	213.03***	1.049	212.84***	1.058	212.22***
CFO_t	0.018	3.32***	0.021	3.86***	0.020	3.50***
$BIG4_t$	−0.001	−0.64	−0.001	−0.86	−0.001	−0.98
Year FE	Yes		Yes		Yes	
Industry FE	Yes		Yes		Yes	
F-value	19,470***		19,700***		18,980***	
Adj.-R^2	99.22%		99.23%		99.20%	
N	12,647		12,647		12,647	

Note : (1) Robust t-statistics in parentheses. *** Statistical significance at the 1% level (p-value < 0.01). ** Statistical significance at the 5% level (p-value < 0.05). * Statistical significance at the 10% level (p-value < 0.1). (2) All continuous variables are winsorized at the top and bottom 1%.

In this context, Shin et al. (2021) examined the effect of RPTs on income smoothing and found that only operating RPTs are significantly associated with income smoothing, implying that firms are more likely to use operating RPTs to smooth income. Firms usually engage in operating RPTs as part of long-term business strategies (Kang et al., 2014 ; Lee et al., 2016). Moreover, operating RPTs occur throughout the accounting period in a frequent and recurring manner. Thus, Shin et

al. (2021) argue that firms prefer operating RPTs over non-operating RPTs as a means to smooth income due to their recurring and long-term nature. Furthermore, as aforementioned, they documented that income smoothing based on RPTs improves the informativeness of reported earnings, suggesting smooth earnings with RPTs provide a reliable signal about the firm's true income.

Based on the results of prior studies, therefore, there are possibilities that operating RPTs could have a positive association with revenue-expense matching.

Panels A and B of Tables 5 and 6 present the results for hypotheses H3a and H3b. To examine the hypotheses, we divided the sample into two subgroups based on the leverage ratio and Altman's (1968) Z-score industry median. In Column (1) of Panel A (Table 5), the coefficient of the interaction term between total RPT and current expenses ($EXP_t \times RPT$) (−0.065) was negative and significant (t-value = −11.44) for firms with high leverage ratios. Consistent with the results in Panel A of Table 5, the coefficient of $EXP_t \times RPT$ (−0.014) in Column (1) of Panel B (Table 5) was also significant (t-value = −3.64) and negative. However, each coefficient was statistically different (F-statistics = −245.66, p-value < 0.001), which indicates that the negative effects of RPTs on revenue-expense matching were stronger for firms with high leverage ratios. This result supports Hypothesis H3a by showing that the negative association between RPTs and revenue-expense matching was more pronounced for firms with a high leverage ratio.

Columns (2) and (3) of Panels A and B (Table 5) indicate the effect of each different RPT type on the revenue-expense matching for firms with high and low leverage ratios, respectively. The results in Column (2) of Panel A show that, for firms with a high leverage ratio, the coefficient of $EXP_t \times Non\_Op\_RPT$ (−0.127) was significantly negative. Consistent with Panel A, Panel B shows the qualitatively consistent results. However, the coefficient of each $EXP_t \times Non\_Op\_RPT$ in Panel A and B was statistically different (F-statistics = 483.39, p-value < 0.001), showing the adverse effect of non-operating RPTs on revenue-expense matching is stronger for firms with a high leverage ratio. These results are consistent with our predictions that for firms with poor financial health, the impact of RPT on revenue-expense matching is stronger in non-operating RPTs.

〈Table 5〉 The effect of a firm's leverage on the association between RPTs and revenue-expense matching

Panel A : Subsample analysis based on the firm's leverage (Leverage > industry-year median)						
Variable	Dependent variable : REV_t					
	(1) Total RPT		(2) Non-operating RPT		(3) Operating RPT	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	−0.021	−0.90	−0.020	−0.89	−0.007	−0.29
RPT_t	−0.007	−2.16**	0.008	1.67*	−0.011	−1.87*
EXP_{t-1}	0.069	14.47***	0.068	15.27***	0.083	17.90***
EXP_t	0.903	166.84***	0.898	179.67***	0.865	165.07***
EXP_{t+1}	0.023	6.10***	0.029	8.68***	0.042	11.63***
$EXP_{t-1} \times RPT_t$	0.008	1.89*	0.008	1.37	−0.041	−4.50***
$EXP_t \times RPT_t$	−0.065	−11.44***	−0.127	−15.98***	0.054	4.78***
$EXP_{t+1} \times RPT_t$	0.050	9.54***	0.074	9.47***	−0.001	−0.09
$SIZE_t$	0.001	1.92*	0.001	1.82*	0.001	0.76
$SALESVOL_t$	0.014	2.43**	0.011	1.98**	0.014	2.30**
$CFOVOL_t$	−0.115	−6.39***	−0.108	−6.05***	−0.114	−6.23***
$LOSS_t$	0.000	−0.23	−0.001	−0.30	−0.001	−0.74
$OPCYCLE_t$	−0.005	−2.84***	−0.005	−3.15***	−0.005	−3.10***
$SALESGROWTH_t$	0.033	11.10***	0.033	11.17***	0.034	11.35***
ROA_t	1.063	122.49***	1.056	122.57***	1.066	122.18***
CFO_t	0.041	4.15***	0.042	4.32***	0.041	4.11***
$BIG4_t$	0.000	−0.20	−0.001	−0.45	−0.001	−0.32
Year FE	Yes		Yes		Yes	
Industry FE	Yes		Yes		Yes	
F-value	7,081***		7,240***		6,914***	
Adj.-R^2	98.85%		98.87%		98.82%	
N	6,188		6,188		6,188	

〈Table 5〉 The effect of a firm's leverage on the association between RPTs and revenue−expense matching (continued)

Panel B : Subsample analysis based on the firm's leverage (Leverage ≤ industry−year median)						
Variable	Dependent variable : REV_t					
	(1) Total RPT		(2) Non−operating RPT		(3) Operating RPT	
	Coeff.	t−value	Coeff.	t−value	Coeff.	t−value
Intercept	0.014	1.24	0.014	1.23	0.011	0.92
RPT_t	−0.013	−13.08***	−0.014	−10.94***	−0.015	−8.80***
EXP_{t-1}	0.003	2.02**	0.007	4.10***	0.006	3.36***
EXP_t	0.994	456.88***	0.993	487.74***	0.989	460.68***
EXP_{t+1}	−0.002	−1.05	−0.003	−1.98**	0.003	1.93*
$EXP_{t-1} \times RPT_t$	0.018	7.52***	0.018	5.17***	0.019	4.42***
$EXP_t \times RPT_t$	−0.014	−3.64***	−0.028	−5.11***	0.012	1.86*
$EXP_{t+1} \times RPT_t$	0.007	1.99**	0.026	5.65***	−0.020	−3.80***
$SIZE_t$	0.000	0.73	0.000	0.11	0.000	0.84
$SALESVOL_t$	−0.011	−5.38***	−0.012	−5.67***	−0.012	−5.74***
$CFOVOL_t$	0.009	1.48	0.010	1.56	0.012	1.88*
$LOSS_t$	0.001	1.03	0.001	0.95	0.001	1.04
$OPCYCLE_t$	−0.002	−3.49***	−0.002	−3.58***	−0.002	−2.93***
$SALESGROWTH_t$	−0.001	−0.77	−0.001	−0.89	−0.001	−1.40
ROA_t	1.009	285.33***	1.009	283.66***	1.011	285.94***
CFO_t	0.013	3.42***	0.013	3.66***	0.014	3.67***
$BIG4_t$	0.000	−0.19	0.000	−0.42	0.000	−0.68
Year FE	Yes		Yes		Yes	
Industry FE	Yes		Yes		Yes	
F−value	42,430***		42,120***		41,930***	
Adj.−R^2	99.82%		99.82%		99.81%	
N	6,459		6,459		6,459	

Note : (1) Robust t−statistics in parentheses. *** Statistical significance at the 1% level (p−value＜0.01). ** Statistical significance at the 5% level (p−value＜0.05). * Statistical significance at the 10% level (p−value＜0.1). (2) All continuous variables are winsorized at the top and bottom 1%. (3) The difference between the coefficient of $EXP_t \times RPT_t$ in the first column for panel A and B are statistically different (F−statistics=245.66, p−value＜0.001). (4) The difference between the coefficient of $EXP_t \times RPT_t$ in the third column for panel A and B are statistically different (F−statistics=483.39, p−value＜0.001).

Panels A and B of Table 6 show the effects of financial distress on the association between RPTs and revenue-expense matching by dividing the sample firms into two subgroups based on Altman's (1968) Z-score. Panels A and B of Table 6 show that the coefficient of $EXP_t \times RPT$ (-0.032 and -0.067, respectively) for firms both with and without financial distress were negative and significant.

〈Table 6〉 The effect of the firm's financial health on the association between RPTs and revenue-expense matching

Panel A : Subsample analysis based on Altman's (1968) Z-score (Z-score > industry-year median)						
Variable	Dependent variable : REV_t					
	(1) Total RPT		(2) Non-operating RPT		(3) Operating RPT	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	-0.004	-0.38	-0.004	-0.43	-0.003	-0.33
RPT_t	-0.014	-11.36***	-0.016	-9.77***	-0.016	-7.58***
EXP_{t-1}	0.008	4.33***	0.011	6.01***	0.009	4.85***
EXP_t	0.994	406.23***	0.991	431.24***	0.988	410.91***
EXP_{t+1}	-0.003	-1.66*	-0.001	-0.51	0.005	2.69***
$EXP_{t-1} \times RPT_t$	0.014	4.93***	0.011	2.54**	0.016	3.31***
$EXP_t \times RPT_t$	-0.032	-7.63***	-0.043	-6.62***	-0.005	-0.71
$EXP_{t+1} \times RPT_t$	0.028	7.61***	0.049	8.61***	-0.002	-0.39
$SIZE_t$	0.001	2.57**	0.001	2.09**	0.001	2.27**
$SALESVOL_t$	-0.003	-1.13	-0.002	-0.86	-0.003	-1.33
$CFOVOL_t$	-0.012	-1.75*	-0.012	-1.69*	-0.010	-1.33
$LOSS_t$	0.003	3.16***	0.003	2.97***	0.003	3.20***
$OPCYCLE_t$	-0.002	-2.84***	-0.002	-2.83***	-0.002	-2.49**
$SALESGROWTH_t$	0.000	-0.24	0.000	-0.38	-0.001	-1.08
ROA_t	1.015	223.85***	1.014	222.75***	1.018	223.06***
CFO_t	0.012	2.69***	0.013	3.12***	0.012	2.78***
$BIG4_t$	0.000	-0.19	0.000	-0.44	0.000	-0.54
Year FE	Yes		Yes		Yes	
Industry FE	Yes		Yes		Yes	
F-value	46,780***		46,590***		45,980***	
Adj.-R^2	99.83%		99.82%		99.82%	
N	6,139		6,139		6,139	

〈Table 6〉 The effect of the firm's financial health on the association between RPTs and revenue−expense matching (continued)

Panel B : Subsample analysis based on Altman's (1968) Z−score (Z−score ≤ industry−year median)						
Variable	Dependent variable : REV_t					
	(1) Total RPT		(2) Non−operating RPT		(3) Operating RPT	
	Coeff.	t−value	Coeff.	t−value	Coeff.	t−value
Intercept	−0.013	−0.31	−0.010	−0.23	0.004	0.10
RPT_t	0.001	0.19	0.018	4.42***	−0.014	−2.40**
EXP_{t-1}	0.071	14.81***	0.069	15.75***	0.084	18.19***
EXP_t	0.894	159.32***	0.889	172.38***	0.852	156.25***
EXP_{t+1}	0.030	7.89***	0.036	10.45***	0.049	13.10***
$EXP_{t-1} \times RPT_t$	0.006	1.36	0.005	0.85	−0.042	−4.59***
$EXP_t \times RPT_t$	−0.067	−11.68***	−0.129	−16.72***	0.072	6.09***
$EXP_{t+1} \times RPT_t$	0.039	7.59***	0.057	7.64***	−0.011	−1.10
$SIZE_t$	0.001	1.69*	0.001	1.41	0.000	0.47
$SALESVOL_t$	0.004	0.74	−0.001	−0.09	0.004	0.74
$CFOVOL_t$	−0.100	−5.48***	−0.092	−5.11***	−0.100	−5.38***
$LOSS_t$	−0.003	−1.55	−0.003	−1.69*	−0.003	−1.88*
$OPCYCLE_t$	−0.005	−2.96***	−0.005	−3.22***	−0.005	−2.89***
$SALESGROWTH_t$	0.032	11.62***	0.032	11.79***	0.032	11.63***
ROA_t	1.039	122.09***	1.030	122.13***	1.044	122.46***
CFO_t	0.044	4.44***	0.047	4.76***	0.046	4.56***
$BIG4_t$	0.000	0.12	0.000	−0.16	0.000	0.13
Year FE	Yes		Yes		Yes	
Industry FE	Yes		Yes		Yes	
F−value	4,404***		4,526***		4,303***	
Adj.−R^2	98.28%		98.32%		98.24%	
N	6,410		6,410		6,410	

Note : (1) Robust t−statistics in parentheses. *** Statistical significance at the 1% level (p−value < 0.01). ** Statistical significance at the 5% level (p−value < 0.05). * Statistical significance at the 10% level (p−value < 0.1). (2) All continuous variables are winsorized at the top and bottom 1%. (3) The difference between the coefficient of $EXP_t \times RPT_t$ in the first column for panel A and B are statistically different (F−statistics=15.83, p−value < 0.001). (4) The difference between the coefficient of $EXP_t \times RPT_t$ in the third column for panel A and B are statistically different (F−statistics=11.42, p−value < 0.001).

However, the results of the difference test show that the coefficient of the firms with financial distress (the Altman's (1968) Z-score lower than the industry median) was significantly higher than that of firms without financial distress (F-statistics=15.83, p-value<0.001). This suggests that the negative effect of RPTs on revenue-expense matching is more pronounced for financially distressed firms. Moreover, the results in columns (2) of Panels A and B show an adverse association between non-operating RPTs and revenue-expense matching for both firms with and without financial distress. However, consistent with our prediction, the adverse effects of non-operating RPTs were stronger for financially distressed firms, as the difference test shows that the coefficient of $EXP_t \times Non\_Op\_RPT$ is statistically higher for financially distressed firms (F-statistics=20.30, p-value<0.001). Therefore, results indicate that a firm's financial health significantly affects the association between RPTs and revenue-expense matching. It also supports our hypothesis 3b that for financially distressed firms, the negative association between RPTs and revenue-expense matching is more pronounced for non-operating RPTs.

Ⅴ. Robustness Tests

1. The Effects of recent IPOs (Newly listed firms)

According to Srivastava (2014), the degree of revenue-expense matching has declined over time due to the distinct characteristics of recent IPO firms. In general, recent IPO firms tend to spend more on period costs such as advertising and R&D expenses. This increase in period costs may lead to reduced revenue-expense matching as firms tend to recognize expenses early in such cases. Period costs require more time than other types of expenses to generate outputs. Thus, it can be argued that the effects of recent IPO firms may drive our results or may reduce the validity of our analyses.

To address this concern, following Cho and Choi (2021), we divided the sample based on the listing year of the sample firms. Specifically, we divided the sample into groups of firms listed before 1990 and those listed in or after 1990. Panel A and B of Table 7 report the estimation results after the partition. The coefficients on $EXP_t \times RPT$ are negative and significant for both groups. $EXP_t \times Non\_Op\_RPT$ also has significantly negative coefficient in either groups. Collectively, our main findings on the effects of RPTs and non-operating RPTs on revenue-expense matching still hold even after the division of the sample based on listing years, supporting our hypotheses.

〈Table 7〉 Robustness tests

Panel A : The effects of recent IPO firms (IPO before 1990)						
Variable	Dependent variable : REV_t					
	(1) Total RPT		(2) Non-operating RPT		(3) Operating RPT	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	0.042	2.65***	0.034	2.13**	0.030	1.80*
RPT_t	−0.018	−8.01***	−0.017	−6.13***	−0.022	−5.51***
EXP_{t-1}	0.024	4.50***	0.030	6.10***	0.027	4.70***
EXP_t	0.990	156.38***	0.973	165.56***	0.964	142.16***
EXP_{t+1}	−0.014	−3.14***	−0.002	−0.40	0.009	2.05**
$EXP_{t-1} \times RPT_t$	0.036	8.12***	0.034	5.34***	0.052	5.43***
$EXP_t \times RPT_t$	−0.120	−18.31***	−0.165	−18.23***	−0.107	−7.00***
$EXP_{t+1} \times RPT_t$	0.087	15.60***	0.118	14.82***	0.072	5.66***
$SIZE_t$	−0.000	−0.02	0.000	0.36	−0.000	−0.15
$SALESVOL_t$	−0.023	−4.06***	−0.016	−2.92***	−0.026	−4.40***
$CFOVOL_t$	0.025	1.13	0.028	1.29	0.022	0.92
$LOSS_t$	0.001	0.84	0.002	1.10	0.002	1.16
$OPCYCLE_t$	−0.007	−4.90***	−0.008	−4.86***	−0.005	−2.85***
$SALESGROWTH_t$	0.002	0.76	0.001	0.40	−0.001	−0.25
ROA_t	0.995	101.61***	0.996	102.30***	1.010	96.92***
CFO_t	−0.009	−0.85	0.007	0.70	−0.004	−0.39
$BIG4_t$	−0.001	−0.64	−0.002	−1.30	−0.002	−1.52
Year FE	Yes		Yes		Yes	
Industry FE	Yes		Yes		Yes	
F-value	11,900***		14,770***		10,400***	
Adj.-R^2	99.68%		99.16%		99.63%	
N	2,255		2,255		2,255	

Note : (1) Robust t-statistics in parentheses. *** Statistical significance at the 1% level (p-value < 0.01). ** Statistical significance at the 5% level (p-value < 0.05). * Statistical significance at the 10% level (p-value < 0.1). (2) All continuous variables are winsorized at the top and bottom 1%.

〈Table 7〉 Robustness tests (continued)

Panel B : The effects of recent IPO firms (IPO after 1990)						
Variable	Dependent variable : REV_t					
	(1) Total RPT		(2) Non-operating RPT		(3) Operating RPT	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	−0.011	−0.44	−0.012	−0.48	−0.005	−0.18
RPT_t	−0.011	−5.24***	−0.003	−0.94	−0.013	−3.55***
EXP_{t-1}	0.043	14.76***	0.043	15.84***	0.055	19.63***
EXP_t	0.932	268.19***	0.930	287.69***	0.904	267.62***
EXP_{t+1}	0.020	8.10***	0.024	10.79***	0.034	14.56***
$EXP_{t-1} \times RPT_t$	0.016	4.95***	0.024	5.45***	−0.030	−4.70***
$EXP_t \times RPT_t$	−0.054	−12.35***	−0.103	−16.61***	0.053	6.35***
$EXP_{t+1} \times RPT_t$	0.041	10.21***	0.061	10.31***	−0.009	−1.21
$SIZE_t$	0.001	2.28**	0.001	2.10**	0.001	1.21
$SALESVOL_t$	0.004	1.05	0.002	0.48	0.004	1.02
$CFOVOL_t$	−0.061	−5.61***	−0.055	−5.14***	−0.059	−5.37***
$LOSS_t$	−0.000	−0.39	−0.001	−0.52	−0.001	−0.79
$OPCYCLE_t$	−0.003	−2.80***	−0.003	−3.00***	−0.003	−2.82***
$SALESGROWTH_t$	0.019	11.36***	0.019	11.28***	0.020	11.77***
ROA_t	1.052	189.01***	1.049	188.63***	1.055	188.96***
CFO_t	0.019	2.99***	0.021	3.31***	0.019	3.07***
$BIG4_t$	−0.000	−0.21	−0.000	−0.36	−0.000	−0.38
Year FE	Yes		Yes		Yes	
Industry FE	Yes		Yes		Yes	
F-value	14,620***		14,770***		14,420***	
Adj.-R^2	99.15%		99.16%		99.14%	
N	10,392		10,392		10,392	

Note : (1) Robust t-statistics in parentheses. *** Statistical significance at the 1% level (p-value < 0.01). ** Statistical significance at the 5% level (p-value < 0.05). * Statistical significance at the 10% level (p-value < 0.1). (2) All continuous variables are winsorized at the top and bottom 1%.

〈Table 7〉 Robustness tests (continued)

Panel C : The effects of period costs						
Variable	Dependent variable : REV_t					
	(1) Total RPT		(2) Non-operating RPT		(3) Operating RPT	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	0.007	0.24	0.009	0.33	0.010	0.36
RPT_t	−0.016	−8.53***	−0.011	−4.38***	−0.023	−6.51***
EXP_{t-1}	0.054	17.14***	0.054	18.38***	0.065	20.91***
EXP_t	0.935	247.69***	0.930	264.03***	0.905	244.21***
EXP_{t+1}	0.017	6.41***	0.022	9.32***	0.035	13.60***
$EXP_{t-1} \times RPT_t$	0.015	4.48***	0.021	4.42***	−0.022	−3.29***
$EXP_t \times RPT_t$	−0.069	−14.69***	−0.117	−17.68***	0.036	4.00***
$EXP_{t+1} \times RPT_t$	0.055	12.76***	0.084	13.11***	−0.002	−0.22
$SIZE_t$	0.001	2.05**	0.001	1.33	0.001	1.09
$SALESVOL_t$	−0.002	−0.56	−0.005	−1.18	−0.002	−0.57
$CFOVOL_t$	0.022	1.90*	0.029	2.47**	0.024	2.07**
$LOSS_t$	0.003	2.17**	0.002	1.98**	0.002	1.82*
$OPCYCLE_t$	0.003	3.18***	0.003	2.87***	0.004	3.47***
$SALESGROWTH_t$	0.024	13.07***	0.024	13.12***	0.024	13.10***
ROA_t	0.992	167.91***	0.990	167.21***	0.999	167.93***
CFO_t	0.024	3.65***	0.028	4.14***	0.024	3.64***
$BIG4_t$	0.006	5.41***	0.006	5.16***	0.006	5.06***
Year FE	Yes		Yes		Yes	
Industry FE	Yes		Yes		Yes	
F-value	13,460***		13,480***		13,150***	
Adj.-R^2	98.88%		98.88%		98.85%	
N	12,647		12,647		12,647	

Note : (1) Robust t-statistics in parentheses. *** Statistical significance at the 1% level (p-value < 0.01). ** Statistical significance at the 5% level (p-value < 0.05). * Statistical significance at the 10% level (p-value<0.1). (2) All continuous variables are winsorized at the top and bottom 1%.

2. The Effects of Period Costs

Previous research provides evidence that period costs lead to a decline in revenue-expense matching (Hyun and Cho, 2018 ; Srivastava, 2014). For example, Hyun and Cho (2018) found that changes in the capital structure lower the degree of the contemporaneous relationship between revenues and interest expenses. Similarly, Srivastava (2014) provided evidence that an increase in period costs, such as R&D and advertising expenses, reduces the revenue-expense matching of newly listed firms.

These results suggest that the effect of period costs may reduce the validity or accuracy of the current study's results. Thus, following Cho and Choi (2021), we re-ran the analyses by adding back the depreciation, amortization, R&D, advertising, and interest expenses. As shown in Panel C of Table 7, the results support our hypotheses by being qualitatively consistent.

Ⅵ. Conclusion

This study investigates how RPTs affect the contemporaneous relation between revenues and expenses. Revenue-expense matching is one of the most important conventions of the accounting system. It determines firms' earnings and the quality of these earnings, which is the single most important output of financial reporting. Prior research has proven that there has been a decline in revenue-expense matching over time, which can be attributed to the increase in the use of special items, the influx of newly listed firms, the increase in period costs, and changes in the capital structure. Other studies found that firms' earnings quality and earnings management behavior adversely affect revenue-expense matching. Although several studies have examined the accounting and economic factors influencing revenue-expense matching, only a few studies examined the effects of business activities or transactions on revenue-expense matching.

This study fills this gap by examining the effect of RPTs on revenue-expense matching. Previous studies that support the conflict-of-interest hypothesis regarding the effect of RPTs showed that firms engage in RPTs for the purpose of tunneling. Additionally, they found that firms with RPTs are more likely to engage in earnings management, providing managers with the incentive to delay the recognition of expenses, thereby reducing earnings quality. Given that revenue-expense matching is significantly associated with earnings quality, this study hypothesized that RPTs adversely affect revenue-expense matching.

Using data on Korean listed firms for the period 2012-2019, this study obtained the following

results. First, a negative association was observed between RPTs and revenue-expense matching. Second, when RPTs are divided into operating and non-operating RPTs, only non-operating RPTs are negatively related to revenue-expense matching. Third, the results showed that the adverse effect of RPTs on revenue-expense matching is more pronounced for firms with poor financial health. Moreover, the results revealed that, for firms with poor financial health, the adverse effect of RPTs on revenue-expense matching is more pronounced for non-operating RPTs. The result showed that a firm's financial constraints and distress can exacerbate the negative association between non-operating RPTs and revenue-expense matching.

This study has practical implications for investors, regulators, and standard setters. RPTs significantly affect the fundamental quality of earnings, which critically influences the accuracy of a firm's valuation. Given that revenue-expense matching critically influences earnings volatility and persistence, it also impacts investors' ability to forecast a firm's long-term performance. Therefore, investors should carefully consider firms' engagement in RPTs when they undertaking investment decisions. Moreover, the study results suggest that regulators and standard setters should carefully evaluate firms' RPTs.

However, this study has some limitations. First, owing to the limited dataset, it was difficult to identify the true nature of RPTs. For example, we could not pinpoint which specific RPTs affect revenue-expense matching. Second, this study did not classify financial transactions with related parties, e.g., loans. Due to the distinct characteristics of financial transactions, they may have different effects on revenue-expense matching. Lastly, this study does not explain the further economic consequences of the negative association between RPTs and revenue-expense matching. Therefore, future research could investigate whether a decline in revenue-expense matching owing to RPTs affects a firm's value and investor reactions to the firm's accounting earnings.

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특수 관계자 거래와 수익비용 대응

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〈요 약〉

본 연구는 기업의 특수관계자 거래가 수익과 비용 대응에 미치는 영향을 조사하였다. 특수관계자 거래가 이익의 질에 부정적인 영향을 미치고 기업의 이익조정을 촉진한다는 점을 감안할 때 본 연구에서는 특수관계자 거래가 수익 비용 대응에 부정적인 영향을 미칠 것으로 예측한다. 본 연구는 2012년부터 2019년까지의 한국 상장 기업 데이터를 사용하여 특수관계자 거래와 수익 비용 대응 사이에 음(−)의 관계를 발견했다. 특히 영업외 특수관계자거래가 수익 비용 대응에 부정적인 영향을 미치는 것으로 나타났으며 특수관계자 거래와 수익 비용 대응 사이의 음(−)의 관계는 재무건전성이 좋지 않은 기업에서 더 두드러졌다. 재무적으로 취약한 기업의 경우 영업 외 특수관계자 거래가 수익 비용 대응에 부정적인 영향을 미쳤다. 본 연구는 특수관계자 거래가 이익의 질에 미치는 영향을 확인함으로써 투자자와 규제 기관에 시사점을 제공한다. 특수관계자 거래는 투자자의 평가 프로세스에 영향을 미칠 수 있으며, 규제 기관은 회계기준이나 규제 제정 시 특수관계자 거래를 고려해야 한다.

〈주제어〉 특수관계자거래, 수익비용대응, 이익의 질, 회계이익

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Appendix A. Variable Definition

Variable	Definition
Dependent Variables	
REV	Sales in year *t* divided by the average value of total assets in years *t*−*1* and *t*
Independent Variables	
EXP	Total expenses in year *t* divided by the average value of total assets in years *t*−*1* and *t*. We calculate total expenses as sales minus net income before extraordinary items.
Total RPT	Amount of total related-party transactions in year *t* (=operating sales and purchases + non-operating transactions) divided by sales in year *t*
Operating RPT	Amount of operating related-party transactions in year *t* (=operating sales and purchases) divided by sales in year *t*
Non-operating RPT	Amount of non-operating related-party transactions in year *t* (=non-operating transactions) divided by sales in year *t*
SIZE	Natural logarithm of total assets in year *t*
SALESVOL	Standard deviation of sales which are divided by the average sales over at least three of the last five years (*t*−*4, t*)
CFOVOL	Standard deviation of cash from operations which is divided by the average total assets over at least three of the last five years (*t*−*4, t*)
LOSS	Indicator variable that equals 1 if net income in year *t*−*1* is negative, and 0 otherwise
OPCYCLE	Natural log of the length of the firm's operating cycle, defined as sales turnover days plus inventory turnover days [360/(sales/average receivables) + 360/(cost of goods sold/average inventories)] and is averaged over at least three of the last five years (*t*−*4, t*)
SALESGROWTH	Sales in year *t* divided by Sales in year *t*−*1*
ROA	Net income in year *t* divided by the average value of total assets in years *t*−*1* and *t*
CFO	Cash flows from operating activities divided by the average value of total assets in years *t*−*1* and *t*
BIG4	Indicator variable that equals 1 if the firm is audited by big 4 auditors, and 0 otherwise

Leverage	Total liabilities in year t divided by total assets in year t
Z−score	$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 0.999X_5$
	where, X_1 = Working Capital / Total Assets X_2 = Retained Earnings / Total Assets X_3 = Earnings Before Interest and Taxes / Total Assets X_4 = Market Value of Equity / Total Liabilities X_5 = Sales / Total Assets