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REVENUE RECOGNITION ON PERCENTAGE OF COMPLETION BASIS AND FIRM VALUE

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ABSTRACT

Revenue recognition timing has caused conflicts between the reliability and usefulness of accounting information and become an important issue. Unbilled receivables are inevitable in long-term construction projects, but they can also result from premature revenue recognition for earnings management. This study evaluated the correlation between unbilled receivables and earnings management, between unbilled receivables and firm value, and between unbilled receivables with loss allowances and firm value from 2010 to 2016. The analysis results confirmed that companies engaged in earnings management via unbilled receivables. Unbilled receivables had a significantly negative correlation with firm value. The result implied that unbilled receivables were interpreted as a signal of poor management, and the market responded negatively. However, for companies that had established loss allowances for unbilled receivables, the correlation results were not significant or less significant than they were for companies without loss allowances. The results revealed that the market responded less negatively when loss allowances were established appropriately.

***Keywords**:* Revenue recognition; Unbilled receivables; Earnings management; Loss allowances; Firm value

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1. INTRODUCTION

According to PriceWaterhouseCoopers report, the International Accounting Standards Board (IASB) and Financial Accounting Standards Board (FASB) issued their converged standard on revenue recognition in May 2014. The standard provides a comprehensive, industry-neutral revenue recognition model intended to increase financial statement comparability across companies and industries and significantly reduce the complexity inherent in current revenue recognition guidance[1]. Accordingly, all Korean public companies were required to adopt the new revenue recognition standard for their annual reporting on or after January 1st, 2018.

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[1] https://www.pwc.com/us/en/cfodirect/issues/revenue-recognition.html

The main purpose of the new revenue recognition standard is to only record guaranteed sales. Revenue recognition timing is a frequently discussed topic related to revenue recognition. If the new revenue recognition standard is applied, it is highly likely that revenue recognition will change, which will have significant consequences. In particular, order-made production industries, including the construction and shipbuilding industries, which manufacture products over long periods of time, have traditionally relied on the percentage of completion method for revenue recognition. They are now concerned that their financial structure will be modified dramatically in the future.

In the United States, all public companies were required to adopt the new revenue recognition standard as of their first reporting period after December 15th, 2017. Five S&P 500 companies, including Alphabet, Raytheon, and the UnitedHealth Group, introduced the new revenue recognition standard in advance. These three companies expected an insignificant impact on their financial structures, but others anticipated major ramifications (McCann, 2017).

Understandably, many companies in many countries have expressed anxiety about applying the new standard. It is expected that it will bring tremendous changes for multiple industries and the financial structures of specific companies. Order-made production industries (e.g., the construction and shipbuilding industries) have traditionally recognized revenue according to the percentage of completion method, so it is expected that the change will have a negative impact on earnings. These industries are very aware of the change. In fact, the application of the new revenue recognition standard does not change the nature of the transaction or the total sales volume. However, it alters the revenue recognition timing, which will have a large impact on annual performance.

With regard to revenue recognition timing, the notion of providing timely accounting information and that of providing reliable information have always conflicted. Moreover, the usefulness of information, a positive aspect, should be taken into consideration when a company decides on its revenue recognition timing. However, it has been confirmed by many cases that companies have used various methods in applying accounting standards to achieve their target profits, and this often results in premature revenue recognition.

Aggressive revenue recognition (i.e., the use of premature revenue recognition) is one of the five primary problems that occur when financial reporting is carried out with the aim of meeting Wall Street expectations (Levitt, 1998). When companies worry over their earnings, they may create fictitious profits through fraudulent timing differences. A fraudulent timing difference involves recording revenues early and/or recording expenses and liabilities late (Wells, 2001).

Order-made production industries can recognize revenue early by intentionally calculating a higher percentage of completion to report the revenue desired by an executive. This is reflected as unbilled receivables in the assets of the statement of financial position. In South Korea, concerns over unbilled receivables have raised the issue of accounting for the construction industry in recent years. Unbilled receivables have increased significantly before large operating losses occur in the construction and shipbuilding industries, and this tendency is regarded as a signal of fraudulent accounting. Recently, the construction and shipbuilding industry in Korea has caused a series of accounting fraud. As an example, one of the largest shipbuilders in the industry suffered huge quarterly losses. The day after the loss announcement, the company's share price plummeted 30%. After recent accounting fraud scandals in South Korean construction and shipbuilding industries,

it was estimated that the amount of unbilled receivables of the top 20 companies in the field exceeded 30 trillion KRW. Since such a series of problems, accounting organizations and practitioners have discussed ways to improve accounting transparency in order-made production industry.

Unbilled receivables are often viewed as signals of accounting fraud. Loughran and McDonald (2011) proved that companies actively utilizing unbilled receivables were later accused of accounting fraud, and Racanelli (2009) suggested that unbilled receivables were one of the important items that should be observed carefully to prevent unexpected investment losses. Although unbilled receivables are an essential accounting item in the order-made production industry and can be considered positively from the perspective of useful accounting information, they can also result from the early discretionary recognition of revenue for earnings management. Information users, including investors, need to look carefully at the companies with excessive unbilled receivables. The objectives of this study are to examine the correlation between unbilled receivables and earnings management, considering the specificity of shipbuilding industry. This study also evaluates the correlations between unbilled receivables and firm value if they were used as the means of earnings management, and verifies whether the trend would have differed when the loss allowances were established and there were unbilled receivables.

The remainder of the paper is organized as follows. Chapter 2 provides a literature review and hypothesis development. Chapter 3 discusses research samples and methodology. Chapter 4 presents descriptive statistics, correlations, and regression results. Chapter 5 discusses the results and suggestive points based on the analysis. The final chapter provides a summary and conclusions.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. Revenue Recognition - Unbilled Receivables and Earnings Management[2]

In May 2014, the FASB issued Accounting Standards Update (ASU) No. 2014-09, *Revenue from Contracts with Customers*, and the IASB issued International Financial Reporting Standards (IFRS) 15, *Revenue from Contracts with Customers*. The new standard provides an integrated revenue recognition model that can be applied to all contracts in common.

Under the new standard, firms must recognize revenue in accordance with the core principle by applying five steps, as follows. 1. Identify the contract(s) with a customer; 2. Identify the performance obligations in the contract; 3. Determine the transaction price; 4. Allocate the transaction price to the performance obligations in the contract; 5. Recognize revenue when the entity satisfies a performance obligation. Based on the determinations according to Steps 2 and 3, the new revenue recognition standard may result in changes in revenue recognition timing.

Changes in revenue recognition timing will not affect total sales, but they can influence annual

[2] IFRS 9 is effective for annual periods beginning on or after 1 January 2018. IFRS 9 requires companies to recognize expected credit losses and establish loss allowances.

performance considerably. Therefore, it is expected that order-made production industries such as the construction and shipbuilding industries will face big changes in their financial structures because they have traditionally relied on the percentage of completion method and used unbilled receivables as an asset item.

Unbilled receivables are outstanding bonds already reflected in sales. In other words, they are the unbilled costs of incurred construction. They are newly made accounts used by companies in order-made production industries, and they adhere to the international accounting standard (K-IFRS) set in 2011. They usually appear in the financial statements of construction companies that carry out projects over long periods of time. Although they are outstanding bonds that are not cashed, they are accepted as sales and treated as an asset. After an ordering organization and a construction company conclude a contract, the construction company realizes sales profits over several years in accordance with the progress of the construction. However, if unbilled receivables are overproduced due to premature revenue recognition and the payment is not collected from the ordering organization, the construction company can suffer from a massive loss all at once.

The Securities and Exchange Commission (SEC) has considered premature revenue recognition practices as the single largest concern contributing to financial restatements. Therefore, in 1999, the SEC issued Staff Accounting Bulletin (SAB) No. 101, *Revenue Recognition* (SEC 1999) to provide guidance on how to interpret and apply current revenue recognition rules. Altamuro et al. (2005) investigated the impact of the adoption of SAB No. 101 and determined firms accelerated revenue recognition toward increased earnings management. However, they also found that the informativeness of premature revenue recognition was greater than when the revenue recognition process was delayed.

Graham et al. (2004) confirmed that revenue recognition policies had been manipulated to meet or beat earnings benchmarks from their survey of 401 financial executives. Moreover, Burgstahler and Dichev (1997) also found that companies desired to meet or beat earnings benchmarks.

Teoh et al. (1998), sampling 1,649 US initial public offering (IPO) firms from 1985 to 1992, found that issuers with unusually high accruals in the IPO year experienced poor stock return performance in the three years thereafter.

A number of previous studies examined how the means of arbitrary discretionary reporting earnings were used to achieve the target revenue. Plummer and Mest (2001) adjusted the reporting earnings after selecting companies with a high likelihood of manipulating reporting earnings by using the methodology set out by Burgstahler and Dichev (1997). They evaluated selected accounts used among sales, operating expenses, non-operating expenses, and depreciation expenses. Their analysis results confirmed that reporting earnings were manipulated upward by increasing sales and decreasing operating expenses. The key finding of this study was that the most effective means of adjusting reporting earnings was to directly manipulate the sales amounts. Marquardt and Wiedman (2004) analyzed whether abnormalities appeared in account receivables, account payables, inventories, depreciation expenses, and extraordinary items to adjust reporting earnings. Their results revealed that companies scheduled to issue new shares used account receivables to increase reporting earnings by advancing the revenue recognition so the account was abnormally overstated. Caylor (2010) examined whether companies increased reporting earnings by using discretionary revenue recognition in order to evade a decrease of operation income, the occurrence

of a deficit, and lower-than-forecast performance earnings. He assumes that account receivables and deferred revenue will be affected by managerial discretionary revenue recognition and predict that both accounts will increase or decrease abnormally due to aggressive revenue recognition. He considered account receivables and deferred revenue as items affected by the discretionary revenue recognition of an executive and predicted that these two accounts would abnormally increase or decrease due to aggressive revenue recognition. The results of the study showed that unexpected earnings were avoided by increasing reporting earnings arbitrarily, and it abnormally increased account receivables and decreased deferred revenue.

As shown in previous studies, companies have frequently manipulated revenue recognition policies or used accrual accounting items to achieve target profits. The revenue recognition processes used in industries like construction and shipbuilding are relatively complex. It is possible that an executive can arbitrarily manipulate the amount of money and the timing of revenue recognition to produce reporting earnings satisfying the desired level when it is necessary to estimate the amount.

Based on the aforementioned literature, this study sets Hypothesis 1.

H1. *The amount of unbilled receivables is positively associated with a firm's earnings management.*

We additionally use an alternative measure for unbilled receivables, the discretionary (abnormal) unbilled receivables. In terms of the usefulness of accounting information, the use of the percentage of completion method is preferred over the completed contract method, and unbilled receivables may be inevitably recorded in a timely manner. Therefore, we separate the abnormal unbilled receivables from total unbilled receivables.

2.2. Unbilled Receivables, Loss Allowance, and Firm Value

As previously stated, many companies arbitrarily engage in premature revenue recognition, and the US government enacted Staff Accounting Bulletin (SAB) No. 101, Statement of Position (SOP) No. 91-1, and SOP 97-2 to prevent these arbitrary actions. However, the FASB issued Accounting Standards Update (ASU) 2009-13 and ASU 2009-14 (hereafter, ASU 2009-13/14), which has drawn criticism. Some studies have examined the effects of these new standards related to the revenue recognition of companies.

Rasmussen (2013) examined the implications of revenue recognition methods using a sample of semiconductor firms during the period running from 2001 to 2008. He found that earnings management was more likely when firms recognized uncertain revenues early. According to his findings, informativeness was stronger when firms deferred revenue recognition until uncertainties were resolved. Meanwhile, Linda et al. (2017) found that ASU 2009-13 and 2009-14 increased the discretionary acceleration of revenue recognition, and the accelerated revenue recognition increased the value relevance of reported earnings and results in higher quality accruals.

Additionally, some studies have evaluated how the discretionary earnings manipulation actions of companies affected the performance and value of those companies. Liu (2005) confirmed that earnings management behavior significantly reduced operating results. Li et al. (2017) examined the relationship of private equity investment and earnings management and enterprise value. They

found a significant positive correlation between private equity investment and corporate value, and they found a negative correlation between earnings management and enterprise value. Fairfield et al. (2003) found that working capital accruals were negatively related with future profitability using a sample of US firms from 1963 to 1992.

Chan et al. (2001) also considered accruals as the difference between cash flow and accounting profits, and they proved that the increased profit accompanying the high accruals led to lower stock returns. Francis et al. (2005) analyzed whether general investors evaluated the quality of accruals in lieu of the information risks on investment returns. The results of their study showed that companies with lower accruals quality required the higher cost of capital when investors evaluated the accruals.

More recently, Jung et al. (2018) find that average operating profit is significantly negatively associated with unbilled receivables and this implies that unbilled receivables may possibly occur losses. Kwon and Lee (2019a) find that firms use unbilled receivables for the purpose of earnings management. Kwon and Lee (2019b) also find that unbilled receivables were discovered to be used actively in upward earnings management or big bath accounting.

Observers may become suspicious of companies with a rapidly increasing amount of unbilled receivables, which is considered a signal of insolvency. As such, they may suspect that these companies are using abnormal accounting means to hide their insolvency due to of low-priced orders. Consequently, these companies will receive poor evaluations in the market due to the possibility of losses.

Based on the aforementioned literature and cases, this study sets Hypothesis 2.

H2. *Unbilled receivables are negatively associated with firm value.*

On the other hand, loss allowances are accounts associated with unbilled receivables. A loss allowance is a calculation of the possibility of a loss occurrence in account receivables when estimating the amount of expected losses and deducting the estimated amount from the relevant account.

A number of studies have tested market responses to loss allowances for uncollectible accounts. Some studies have also confirmed that loss allowances have had a positive correlation with market value (Beaver and Engel, 1996; Beaver et al., 1989, Liu et al., 1997). Contrarily, Docking et al. (1997) and Ahmed et al. (1999) showed that loss allowances for uncollectible accounts had a negative correlation with stock prices.

The setting of loss allowances may temporarily decrease sales profits. However, the increased accumulation rate of appropriation for an irrecoverable debt can be considered as a positive factor in terms of financial soundness. As stipulated in the Measures to Improve the Accounting Transparency of Order-made Production Industries in 2015, it is necessary to periodically recalculate unbilled receivables and accumulate loss allowances for unbilled receivables with low recoverability to prepare for losses due to uncollectible accounts. This may temporarily decrease the sale profits of construction companies, but the increased accumulation rate of appropriation for an irrecoverable debt is a positive measure in terms of financial soundness. This also can prevent

the negative stock market responses that can occur when astronomical losses are disclosed without having unusual changes in financial statements. Therefore, companies that have appropriately accumulated loss allowances for uncollectible accounts for unbilled receivables may be taken less negatively in the market than companies without accumulating those loss allowances.
Based on the aforementioned literature and cases, this study sets Hypothesis 3.

H3. *Unbilled receivables with loss allowances are less negatively associated with firm value than unbilled receivables without loss allowances.*

3. RESEARCH DESIGN

3.1. Sample Selection

This study employs financial data made available by KIS-DATA, a database developed by Korea Investors Service, Inc., for the years 2010 to 2016.[3] The sample only includes publicly traded nonfinancial firms on the Korean Stock Exchange (KSE) having a fiscal year-end of December 31. The top and bottom 1% of all continuous variables are winsorized to moderate the influence of outliers. Thus, the final sample includes 955 firm-year observations. <Table 1> below shows the industry distribution of the sample.

Table 1: Industry Distribution of the Sample

Industry	Number of Firms	%
Manufacturing	483	50.6%
Construction	316	33.1%
Wholesale / Retail	32	3.4%
Publication / Broadcasting / Communication	61	6.4%
Medical / Computer / Information	63	6.5%
Total	955	100%

3.2. Regression Model and Measurement of Variables

For an empirical analysis of Hypothesis 1, the OLS model is employed with discretionary accruals as the dependent variable. The regression model is as follows.

$$\text{Disacc}_{i,t} = \alpha + \beta_1 \text{Unbilled}_{i,t} + \sum \alpha_j X_j + \sum \alpha_k \text{IND}_k + \sum \alpha_l \text{YEAR}_l + \varepsilon_{i,t} \quad (1)$$

where $\text{Disacc}_{i,t}$ is discretionary accruals, $\text{Unbilled}_{i,t}$ is the amount of unbilled receivables, $X_{j,t}$ is the other factors affecting earnings management using accruals (explained below), IND is the industry indicator variable, and YEAR is the year indicator variable.

[3] Unbilled receivables accounts, the main variables of this research, have appeared since 2010, around the year IFRS reporting became mandatory.

Following the modified Jones model developed by Dechow et al. (1995), the OLS regression model below is performed, and the residual is determined. The estimated residual is the proxy for discretionary accruals.

$$\frac{Tacc_{i,t}}{\text{Assets}_{i,t-1}} = \alpha_1 \frac{1}{\text{Assets}_{i,t-1}} + \alpha_2 \frac{\Delta\text{Sales}_{i,t}}{\text{Assets}_{i,t-1}} + \alpha_3 \frac{\text{PPE}_{i,t}}{\text{Assets}_{i,t-1}} + \alpha_4 \text{ROA}_{i,t} + \varepsilon_{i,t} \quad (2)$$

where Tacc is the total accruals calculated by subtracting operating cash flows from net income using the measure of total accruals developed by (Hribar & Collins, 2002), thereafter divided by the beginning of year assets. PPE is property, plant, and equipment. ΔSales is the change in sales relative to the previous year, and ROA is return on assets. We estimate Equation (2) for each industry and in each year.

The model includes control variables that can affect earnings management. These variables include leverage, size, ROA, sales growth, and the market-to-book ratio. Finally, industry dummy variables, defined by the one-digit Korea Standard Industry Code, and year dummy variables are included as control variables.

For an additional analysis of Hypothesis 1, we use the discretionary (abnormal) unbilled receivables. Therefore, the following regression model is also employed.

$$\text{Disacc}_{i,t} = \alpha + \beta_1 \text{DISCunbilled}_{i,t} + \sum \alpha_j X_j + \sum \alpha_k \text{IND}_k + \sum \alpha_l \text{YEAR}_l + \varepsilon_{i,t} \quad (3)$$

where $\text{DISCunbilled}_{i,t}$ is discretionary (abnormal) unbilled receivables relative to the previous year. We separate the abnormal unbilled receivables from total unbilled receivables. We run the following regression model by year and industry and take the residual for the analysis.

$$\text{Unbilled}_{i,t} = \alpha + \sum \alpha_j X_j + \varepsilon_{i,t} \quad (4)$$

where $\text{Unbilled}_{i,t}$ is the amount of unbilled receivables, $X_{i,t}$ is the other factors affecting unbilled receivables, including leverage, size, ROA, assets growth, and the natural log of sales.
For the analysis of Hypothesis 2, the OLS model is employed with Tobin's Q as the dependent variable. The regression model is as follows. We employ Tobin's q to assess firm value as used in prior studies (McConnell and Servaes, 1990; Simon and Sullivan, 1993; Rao et al., 1994; Dahya et al., 2007).

$$\text{Tobin's q}_{i,t} = \alpha + \beta_1 \text{Unbilled}_{i,t} + \sum \alpha_j X_j + \sum \alpha_k \text{IND}_k + \sum \alpha_l \text{YEAR}_l + \varepsilon_{i,t} \quad (5)$$

Tobin's q is computed as the market value of equity plus liabilities, all divided by total assets. The market-to-book ratio is calculated as the market value of equity divided by the book value of equity. X is the other factors affecting firm value (Tobin's Q) – leverage, size, ROA, sales growth and the liquidity ratio, which is measured as total assets divided by total liabilities.
We additionally use an alternative measure for unbilled receivables (i.e., the discretionary (abnormal) unbilled receivables). Therefore, the following regression model is also employed.

$$\text{Tobin's q}_{i,t} = \alpha + \beta_1 \text{DISCunbilled}_{i,t} + \sum \alpha_j X_j + \sum \alpha_k \text{IND}_k + \sum \alpha_l \text{YEAR}_l + \varepsilon_{i,t} \quad (6)$$

For the analysis of Hypothesis 3, the unbilled interaction term with the allowance dummy is included. For unbilled variables, both the total unbilled receivables and the abnormal unbilled receivables are used. The allowance dummy is coded 1 if the firm establishes loss allowances. Otherwise, it is coded as 0. The regression model is as follows.

$$\text{Tobin's } q_{i,t} = \alpha + \beta_1 \text{Unbilled}_{i,t} + \beta_2 \text{Unbilled*Allest}_{i,t} + \sum \alpha_j X_j + \sum \alpha_k \text{IND}_k + \sum \alpha_l \text{YEAR}_l + \varepsilon_{i,t} \quad (7)$$

4. EMPIRICAL RESULTS

4.1. Descriptive Statistics and Correlations

<Table 2> shows the descriptive statistics for the main variables. The mean (median) for Discacc is 0.1382 (0.0538). The mean (median) for TQ is 0.3559 (0.0418). The mean (median) for Unbilled and DISCunbilled are 0.1821 (0.0805) and -0.0977 (-0.0725), respectively. The mean (median) for ALLest is 0.1130 (0), meaning that 11% of the sample firms have unbilled receivables accounts with loss allowances. The mean (median) values for control variables LEV, SIZE, ROA, GROW, and MTB are 0.5199 (0.5273), 19.5870 (19.2118), 0.0394 (0.0176), and 0.3867 (0.0938), respectively.

Table 2: Descriptive Statistics

Variables	Mean	StdDev	Median	Q1 (the first quartile)	Q3 (the third quartile)
Discacc	0.1382	0.5949	0.0538	0.0269	0.1010
TQ	0.3559	1.8818	0.0418	0.0125	0.1540
Unbilled	0.1821	0.6089	0.0805	0.0200	0.1677
DISCunbilled	-0.0977	0.3346	-0.0725	-0.2349	0.0840
ALLest	0.1130	0.3167	0	0	0
LEV	0.5199	0.2182	0.5273	0.3608	0.6611
SIZE	19.5870	1.6407	19.2118	18.3633	20.6501
ROA	0.0394	0.6475	0.0176	-0.0173	0.0570
GROW	0.4429	2.2629	0.0131	-0.1402	0.1893
MTB	0.3867	0.9708	0.0938	0.9369	0.2931

Note.
Discacc : book-tax gap residual calculated using modified Jones model developed by Dechow et al. (1995)
TQ : Tobin's q, computed as the market value of equity plus liabilities, all divided by total assets
Unbilled : the amount of unbilled receivables
DISCunbilled : discretionary (abnormal) unbilled receivables
ALLest : coded 1 for firms that establish loss allowances, and 0 otherwise
LEV : total liabilities divided by total assets
SIZE : the natural logarithm of total assets
ROA : net income divided by total assets

GROW : sales growth
MTB : market-to-book ratio, market value of equity divided by book value of equity.

The Pearson correlation results are reported in <Table 3>. Significant correlations are observed between earnings management and unbilled receivables ($p < 0.01$). Significant positive correlations are also seen between earnings management and some of the control variables (SIZE, ROA, GROW) ($p < 0.01$). Significant negative correlations are observed between firm value and abnormal unbilled receivables ($p < 0.01$). Significant positive correlations are also seen between earnings management and some of the control variables (SIZE, ROA, GROW, MTB) ($p < 0.01$). To test for multi-collinearity, the variance inflation factors (VIFs) are computed. No multi-collinearity problems are evident.

Table 3: Correlations

Variable	*discacc*	*TQ*	*Unbilled*	*DISCunbilled*	*ALLest*	*LEV*	*SIZE*	*ROA*	*GROW*	*MTB*
discacc	1.0000									
TQ	0.3891 0.0000	1.0000								
Unbilled	0.7487 0.0000	0.2292 0.0000	1.0000							
DISCunbilled	-0.0410 0.2054	-0.1334 0.0001	0.0438 0.1765	1.0000						
ALLest	-0.0335 0.3017	-0.0240 0.4696	0.0033 0.9186	0.0252 0.4358	1.0000					
LEV	0.0311 0.3374	-0.0272 0.4127	0.0951 0.0033	-0.3206 0.0000	0.0855 0.0082	1.0000				
SIZE	0.1438 0.0000	0.0001 0.9973	0.1985 0.0000	-0.3697 0.0000	0.0699 0.0306	0.4637 0.0000	1.0000			
ROA	0.5631 0.0000	0.2048 0.0000	0.6277 0.0000	0.1823 0.0000	-0.0169 0.6026	-0.0930 0.0040	0.0974 0.0026	1.0000		
GROW	0.5377 0.0000	0.4150 0.0000	0.6908 0.0000	-0.2911 0.0000	-0.0256 0.4302	0.1124 0.0005	0.2214 0.0000	0.2957 0.0000	1.0000	
MTB	0.0112 0.7355	0.4875 0.0000	0.0323 0.3300	-0.0381 0.2513	-0.0034 0.9174	-0.0652 0.0492	-0.2289 0.0000	-0.0430 0.1955	0.0697 0.0355	1.0000

Note: See Table 2 for variable definitions.

4.2. Regression Results

<Table 4> shows the OLS regression results for the association between earnings management and the amount of unbilled receivables. The results in both models show that the amount of unbilled receivables is significantly positively associated with earnings management ($p < 0.01$), which provides support for H1. Model 2 includes the amount of discretionary (abnormal) unbilled receivables as the explanatory variable. The results imply that firms strategically use unbilled receivables accounts for earnings management. Significant associations are also seen between earnings management and the control variables. Two of the control variables – LEV and ROA are – significantly positively associated with earnings management, and two others – SIZE and GROW – are significantly negatively associated with earnings management.

Table 4: Regression Results: Unbilled Receivables - Earnings Management

Variables	Expected sign	Dependent Variable: *Discretionary Accruals*	
		Model 1	**Model 2**
Constant	?	0.3892**(2.44)	0.0381(0.24)
Unbilled	+	**0.4116***(10.75)**	
DISCunbilled	+		**0.3579***(11.43)**
LEV	+	0.1992***(10.34)	0.3025***(17.22)
SIZE	+/—	-0.0144*(-1.85)	0.0026(0.32)
ROA	+	0.1958***(7.77)	0.1570***(2.76)
GROW	—	-0.0943***(-7.01)	-0.0883***(-6.33)
Industry dummies		Included	
Year dummies		Included	
F value		*108.51***	*69.72***
Adjusted R^2		*0.6283*	*0.5196*
N		*955*	*954*

<Table 5> represents the OLS regression results for the association between firm value and unbilled receivables. The results in both models show that unbilled receivables are significantly negatively associated with firm value as measured by Tobin's Q ($p < 0.01$), which provides support for H2. For Model 2, the amount of discretionary (abnormal) unbilled receivables is used an explanatory variable. The results imply that unbilled receivable accounts may have raised questions about the quality of the firms' revenue and their future growth. Significant associations are also seen between firm value and the control variables. For the analysis of Model 1, control variables such as SIZE, ROA, GROW, and MTB are significantly positively associated with firm value. For the analysis of Model 2, control variables such as ROA, GROW, and MTB are significantly positively associated with firm value.

Table 5: Regression Results: Unbilled Receivables – Firm Value

Variables	Expected sign	Dependent Variable: *Tobin's Q*	
		Model 1	**Model 2**
Constant	?	-0.9605(-1.41)	0.3147(0.46)
Unbilled	—	**-0.9310***(-6.84)**	**-**
DISCunbilled	—	**-**	**-0.7096***(-5.73)**
LEV	—	-0.3061(-1.21)	-0.0139(-0.05)
SIZE	+/—	0.0803**(2.22)	0.0096(0.26)
ROA	+	0.7066***(7.14)	2.2041***(9.59)
GROW	+	0.4188***(13.81)	0.2175***(9.27)
MTB	+	0.9433***(18.33)	0.9450***(18.75)

Variables	Expected sign	Dependent Variable: *Tobin's Q*	
		Model 1	Model 2
Industry Dummies		Included	
Industry Dummies		Included	
F value		*44.63****	*46.61****
Adjusted R^2		*0.4344*	*0.4456*
N		*910*	*909*

Note: See Table 2 for variable definitions.

t-values are shown in parentheses. * p < 0.10 ** p < 0.05 *** p < 0.01

<Table 6> shows the OLS regression results for the association between firm value and unbilled receivables with loss allowances. The results support H3. The results for Model 1 reveal that the unbilled receivables of the sample firms that establish loss allowances for unbilled receivables are less significantly negatively associated with earnings management than the firms that do not establish loss allowances for unbilled receivables (p < 0.01). For Model 2, the amount of discretionary (abnormal) unbilled receivables is used as an explanatory variable. The negative relationship between firm value and unbilled receivables with loss allowances is insignificant. The results imply that the establishment of loss allowances for unbilled receivables accounts may alleviate suspicion about the firm's premature revenue recognition using unbilled receivables. Significant associations are also seen between firm value and the control variables. For the analysis of Model 1, control variables such as SIZE, ROA, GROW, and MTB are significantly positively associated with firm value. For the analysis of Model 2, control variables such as ROA, GROW, and MTB are significantly positively associated with firm value.

Table 6: Regression Results: Unbilled Receivables with Loss Allowances– Firm Value

Variables	Expected sign	Dependent Variable: *Tobin's Q*	
		Model 1	Model 2
Constant	?	-1.0264(-1.50)	0.3153(0.46)
Unbilled	—	**-0.9159*******(-6.73)**	**-**
DISCunbilled	—	**-**	**-0.7094*******(-5.66)**
Unbilled*Allest	—	**-0.7104******(-1.99)**	**-**
DISCunbilled*Allest	—	**-**	**-0.0056(-0.01)**
LEV	—	-0.2935(-1.16)	-0.0139(-0.05)
SIZE	+/—	0.0827**(2.29)	0.0096(0.26)
ROA	+	0.6940***(7.01)	2.2041***(9.58)
GROW	+	0.4263***(13.97)	0.2175***(9.25)
MTB	+	0.9429***(18.46)	0.9450***(18.73)
Industry Dummies		Included	
Industry Dummies		Included	
F value		*42.38****	*43.82****

Variables	Expected sign	Dependent Variable: *Tobin's Q*	
		Model 1	Model 2
Adjusted R^2		*0.4362*	*0.4450*
N		*910*	*909*

Note:
Unbilled*ALLest : the unbilled interaction term with establishment of loss allowances
DISCunbilled*ALLest : the discretionary unbilled interaction term with establishment of loss allowances
Other variables : See Table 2 for variable definitions.
t-values are shown in parentheses. * p < 0.10 ** p < 0.05 *** p < 0.01

4.3. Additional Analysis

An additional analysis is carried out on the regression models using panel regression techniques to eliminate the influence of outlier biases in all specifications. Panel A, B and C of <Table 7> shows the fixed effect regression results. For the main explanatory variables, these results remained consistent with the OLS results.

Table 7: Fixed effect regression Results

Panel A. Unbilled Receivables - Earnings Management

Variables	Expected sign	Dependent Variable: *Discretionary Accruals*	
		Model 1	Model 2
Constant	?	0.4747(0.53)	-1.3583(-1.51)
Unbilled	+	**0.4043***(9.56)**	
DISCunbilled	+		**0.3596***(10.21)**
LEV	+	0.2024***(9.67)	0.2993***(15.61)
SIZE	+/—	-0.0347(-0.77)	0.0547(1.21)
ROA	+	0.1583***(5.58)	0.0856(1.34)
GROW	—	-0.0850***(-5.65)	-0.0776***(-5.08)
Industry dummies		Included	
Year dummies		Included	
F value		*114.82****	*77.42****
Adjusted R^2		*0.5557*	*0.3219*
N		*955*	*954*

Panel B. Unbilled Receivables – Firm Value

Variables	Expected sign	Dependent Variable: *Tobin's Q*	
		Model 1	Model 2
Constant	?	-0.1998(-0.05)	1.1296(0.31)
Unbilled	—	**-0.9203***(-6.19)**	**-**

Variables	Expected sign	Dependent Variable: *Tobin's Q*	
		Model 1	Model 2
DISCunbilled	—	**-**	**-0.5947***(-4.48)**
LEV	—	-0.3521(-0.72)	0.2692(0.56)
SIZE	+/—	-0.0577(-0.31)	-0.1396(-0.75)
ROA	+	-0.1234(-1.05)	1.5464***(6.19)
GROW	+	0.4359***(13.64)	0.2248***(9.19)
MTB	+	1.0344***(18.00)	1.0429***(18.72)
Industry Dummies		Included	
Industry Dummies		Included	
F value		*47.88****	*47.98****
Adjusted R^2		*0.0947*	*0.1580*
N		*910*	*909*

Panel C. Unbilled Receivables with Loss Allowances– Firm Value

Variables	Expected sign	Dependent Variable: *Tobin's Q*	
		Model 1	Model 2
Constant	?	-0.0752(-0.02)	1.0804(0.30)
Unbilled	—	**-0.9112***(-6.13)**	**-**
DISCunbilled	—	**-**	**-0.6234***(-4.65)**
Unbilled*Allest	—	**-0.6979*(-1.88)**	**-**
DISCunbilled*Allest	—	**-**	**0.7463(1.47)**
LEV	—	-0.3291(-0.68)	0.2932(0.61)
SIZE	+/—	-0.0666**(-0.35)	-0.1367(-0.74)
ROA	+	-0.1331***(-1.13)	1.5496***(6.21)
GROW	+	0.4446***(13.79)	0.2213***(9.01)
MTB	+	1.0303***(17.95)	1.0394***(18.65)
Industry Dummies		Included	
Industry Dummies		Included	
F value		*44.87****	*44.78****
Adjusted R^2		*0.4622*	*0.4620*
N		*910*	*909*

Note.

See Tables 2 and 6 for variable definitions.

t-values are shown in parentheses. * p < 0.10 ** p < 0.05 *** p < 0.01

5. CONCLUSIONS

The new revenue recognition standard (International Financial Reporting Standards (IFRS) 15, *Revenue from Contracts with Customers*) has been applied in many countries in recent years. Revenue recognition has always been an issue because of the timing of the recognition. Some companies have performed premature revenue recognition strategically to achieve their target profits. The application of the new revenue recognition standard is aimed at preventing premature revenue recognition and, consequently, some companies are concerned that their financial structure will change dramatically in the future.

Order-made production industries such as the construction and shipbuilding industries earn profits from long-term construction projects, and companies within these industries have traditionally relied on the percentage of completion method to recognize revenue. This caused many of these companies to report an astronomical amount of unbilled receivables that could not be verified. Moreover, unbilled receivables were often used as an anomalous accounting tool to hide insolvency.

In the present study, the analysis results showed that, first, there was a significantly positive correlation between unbilled receivables and earnings management. An additional analysis using discretionary (abnormal) unbilled receivables was conducted to obtain a more sophisticated understanding of unbilled receivables. All results using the two measures revealed significant positive correlations. The results indicated that companies strategically used unbilled receivable accounts for earnings management.

Second, there was a significantly negative correlation between unbilled receivables and firm value. In other words, observers perceived unbilled receivables as a signal of insolvency, and the market responded negatively.

Third, it was confirmed that when unbilled receivables had established loss allowances, the negative correlation between unbilled receivables and firm value was insignificant or less significant. These results suggest that unbilled receivables were inevitable due to the nature of the business, but the market responded less negatively when loss was allowances for unbilled receivables were established.
This study can aid stakeholders in correctly interpreting unbilled receivables, and it provides useful information for decision making. Of note, there have not been many empirical studies on unbilled receivables. It is expected that the introduction of the new revenue recognition standard will produce effects within several years. In particular, it is expected that earnings management via premature revenue recognition will diminish.

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