



The Impact of Interest Coverage Ratio on Value Relevance of Reported Earnings: Evidence from South Korea

Hyunmi Ji

College of Business Administration, Keimyung University, Daegu 42601, Korea; hmji@kmu.ac.kr

Received: 18 November 2019; Accepted: 12 December 2019; Published: 16 December 2019



Abstract: This study examined the usefulness of the cash-based interest coverage ratio (CICR). It also verified the usefulness of accrual-based interest coverage ratio (AICR), which is used as a criterion for exiting insolvent companies. This paper analyzed whether the value relevance of earnings to stock price differs according to various interest coverage ratios. The CICR is measured by dividing the cash generated from operations by the interest payments. AICR is measured by operating income divided by interest expenses. The research model for the hypothesis test of this study is based on the Ohlson model, which has been used for the test of stock value relevance in many previous studies. As a result of the empirical analysis, the CICR is used as useful information by the investors in the capital market. CICR is used as useful information in the capital market as an indicator of sustainability of profits. This study suggests that supervisors and financial institutions can make rational decision-making if they consider AICR and CICR as criteria for exiting insolvent companies. The contribution of this study was to suggest that the CICR can be a useful indicator for determining whether a company is insolvent due to its relatively low forecast error and high predictability.

Keywords: earnings sustainability; interest coverage ratio; earnings persistence; value relevance

1. Introduction

The purpose of this study is to analyze the effect of accrual-based interest coverage ratio (AICR) and cash-based interest coverage ratio (CICR) on the relationship between net profit and stock price. Accounting information plays an important role in capital markets in order to efficiently allocate finite economic resources. In particular, accounting information helps to identify the intrinsic value of a company by providing useful information in assessing the timing, amount, and degree of uncertainty in future cash flows that it will generate [1].

The accrual profit information of accounting information has a positive relation with stock price [2,3]. The following variables further influence the earnings response coefficient for the stock price of accrued earnings. Firm risk, debt ratio, size, lost and profit firms, sustainability of earnings, growth, and earnings predictability have been shown to affect the earnings response coefficient for stock prices [4–9].

In particular, the higher the sustainability of earnings and the higher the likelihood that reported earnings will be realized in cash, the higher the quality of earnings and the greater the stock price response [10]. If the accruals included in accounting profits are large, the forecasting error of profits increases and the predictability of profits decreases [11]. In addition, cash flows, compared to accruals, were found to have a strong positive explanation for the sustainability of future profits [12].

Operating income in the statement of income is accrued by accrual. In other words, it is the income that includes the manager's discretionary accruals. The cash generated from the operations shown in the statement of cash flow indicates the extent to which the entity generates cash needed for



repayment of debts, maintenance of operating capacity, dividends, and investments without relying on external financial resources. Cash generated from operating a cash flow statement represents direct cash payments.

The statement of cash flows in accordance with the International Financial Reporting Standards adopted from 2011 in Korea separately indicates "cash generated from operations" and "net interest payments" among operating cash flows. Therefore, the ratio of "net interest payment" divided by "cash generated from operations" in the statement of cash flow is CICR. AICR is the operating profit of the income statement, which includes accruals at management's discretion.

The CICR, which is calculated using the cash flow statement, is relatively predictable and has a relatively low forecast error. Therefore, the CICR may be a useful indicator of financial soundness. In addition, the CICR is a useful indicator of earnings sustainability.

Based on these backgrounds, this paper examines the effect of AICR and CICR on the value relevance of net income. If AICR is less than 1 (when the accrual interest expense cannot be covered by accrual operating profit), the impact on additional value related to net income is analyzed. We also empirically test the impact of additional value relevance on net income if the CICR is less than 1 (when the net interest payments cannot be covered by cash generated from operations).

As a result of the empirical analysis, if the CICR is less than 1, it has a significant negative effect on the stock price itself, but it has a significant positive effect on the additional value related to the net profit. This result implies that the CICR is used as useful information by the investors in the capital market because the CICR is relatively low forecast error and relatively predictable. It also implies that the CICR is used as useful information in the capital market as an indicator of sustainability of profits.

On the other hand, if accrual interest expenses cannot be covered by accrued operating income in the income statement, it has a significant negative impact on additional value related to the stock price. Even if the AICR was larger than the CICR, it had a significant positive effect on the value relevance of net profit to the stock price. If the AICR is higher than the CICR, the capital market valuation of net income generated by accrual is positive.

The contributions of this study are as follows. First, we verified the AICR and CICR as useful criteria for exiting insolvent companies. Second, since 2011, the cash-based coverage ratio of International Financial Reporting Standards has been used as a new financial soundness indicator. Compared to accrual-based interest coverage, the CICR could be a complementary indicator for judging whether a company is insolvent because its earnings forecast error is relatively small and its predictability is high.

This study is structured as follows. In Section 2, this paper reviews the prior research and set the research hypothesis with a detailed description of the cash flow statement of International Financial Reporting Standards. Section 3 explains the research method and sample selection. Section 4 presents the empirical analysis results. Finally, Section 5 describes the research summary and conclusions.

2. Prior Research and Hypothesis

2.1. The Cash Flow Statement of International Financial Reporting Standards

In accordance with International Financial Reporting Standards 1007, the cash flows of interest, payments, and dividends must be disclosed separately. When used in conjunction with other financial statements, a cash flow statement is useful for assessing changes in net assets, financial structure (including liquidity and payability), and the ability to adjust the amount and timing of cash flows to adapt to changing circumstances and opportunities. In addition, cash flow information is useful for evaluating the ability to generate cash and cash equivalents, and removes the impact of applying different accounting policy to the same transactions, thereby increasing the comparability of companies to operating performance.

The amount of cash flows from operating activities is an important indicator of the extent to which a firm generates cash flows necessary for repayment of debts, maintenance of capabilities, dividends payment and investments without relying on external financial resources. Using cash flow information from operating activities together with other information is useful for predicting future operating cash flows. Table 1 below is an example of operating cash flow.

Indirect Method					
Cash flows from operating activities					
Profit before taxation	₩3,350,000				
Adjustments for:					
Depreciation	450,000				
Foreign exchange loss	40,000				
Investment income	(500,000)				
Interest expense	400,000				
	3,740,000				
Increase in trade and other receivables	(500,000)				
Decrease in inventories	1,050,000				
Decrease in trade payables	(1,740,000)				
Cash generated from operations	2,550,000				
Interest paid	(270,000)				
Income taxes paid	(900,000)				
Net cash from operating activities	1,380,000				

Table 1. Cash flow statement of operating activities (K-IFRS 1007).

2.2. Prior Research and Research Hypothesis

Accounting information explains a company's common stock price. Accounting profit is positively correlated with stock price, and the usefulness of net profit information is found [2]. Previous studies have shown that risk, earnings sustainability, size, debt ratio, potential growth, and earnings predictability have additional effects on earnings response coefficients for common stock price of accounting earnings [8,13,14].

Previous studies have shown that the higher the future sustainability of earnings and the higher the cash feasibility of profits, the higher the reporting profit quality [10]. According to a previous study, the higher the quality of net income, the more positive the stock price response to reported earnings [15].

Bradshaw et al. (2001) examined the quality of earnings by considering both accounting income and operating cash flow simultaneously, and reported that the financial analyst's earnings forecasting error was larger and forecasting accuracy was lowered when the accounting profit included a large amount of accruals [11].

According to Hayn (1995) and Collins et al. (1999), profit reporting firms have more value-related accounting gains than loss reporting firms [6,16]. Burgstahler and Dichev (1997) reported that the greater the return on capital, the higher the relative value of accounting profit [5]. Subramanyam and Venkatachalam (1998) also argue that the value-related of book value is higher than that of accounting income when the item includes temporary items [9].

Lee et al. (2010) found that cash flow showed a strong positive explanation for future earnings persistence compared to accruals [17]. Choi et al. (2006) validated the relative value of accounting profits and operating cash flows by life cycle. Empirical results show that, in the growth phase, accounting profits have a greater value relationship than operating cash flows. In the maturity and decline phases, there was no significant difference in the value-related relationship between accounting profit and operating cash flow. This implies that the value-related relationship between accounting profit and operating cash flow differs according to the firm's lifecycle stage [18].

Operating cash flows are used as complementary indicators of accrual-based net income in corporate performance evaluations. Investors will use accounting information when making investment decisions. The accrual-based accounting earnings information is found to be more useful for estimating future cash flows and evaluating investment performance compared to operating cash flows [19].

Compared to accrual accounting income information, operating cash flows are less risky to the discretion of management. Therefore, operating cash flows can be more useful information for corporate performance evaluation [20].

When operating cash flow is greater than net income, financial information users evaluate the quality of accounting profits better. The performance of the company can be properly assessed through accrual-based accounting profit information. However, it was verified that the earnings information is more useful when operating cash flows are used together [21].

Negative operating cash flow reporting increases the likelihood that a company will be designated as a bad company. Supervisors and banks base their negative operating cash flows on credit risk assessments [22,23].

Han et al. (2016) surveyed whether international coherence, purposefulness, and reliability of Korean corporate financial information have improved since the adoption of IFRS. According to the survey results, information users evaluated that the adoption of IFRS improved international usefulness, improving the usefulness of financial information, and reducing the uncertainty of investment in domestic companies, thus eliminating part of the Korea discount. Information users also assessed that the adoption of IFRS contributed to revitalizing international capital raising in Korea [24].

Choe and Son (2012) verified the increase in the exercise of discretion regarding management's presentation of financial statements after the adoption of IFRS. However, it was emphasized that this exercise of discretion was not intended to manage earnings [25]. The study of Jeong (2013) showed that the absolute value of discretionary accruals decreased after the adoption of IFRS. It should be noted whether this discretionary accrual is caused by a decrease in managerial opportunistic accounting options, or as a result of the direct impact of accounting systems on accounting quality due to changes in IFRS standards [26].

Bartove et al. (2005) examined the effect of IFRS adoption on the value relevance of accounting information for German companies. The result of empirical analysis shows that the value relevance of accounting information has increased since the introduction of IFRS [27]. Barth et al. (2014) examined the impact of the adoption of IFRS on the value relevance of accounting information in various countries. The results of the empirical analysis show that net asset and net profit from IFRS application are significantly related to the stock price [28].

De George et al. (2016) emphasized the importance of topics such as changes in management decision-making since the adoption of IFRS, changes in contractual relationships using accounting information based on IFRS, and changes in surveillance and governance structure after the introduction of IFRS [29].

One of the biggest purposes of each country's adoption of IFRS is to promote global capital markets by applying a single accounting standard throughout the world. Yu and Wahid (2014), Amiram (2012), and Covrig et al. (2007) verified that foreign investment has been active since the adoption of IFRS [30–32]. Meanwhile, research on the effect of the adoption of IFRS on the cost of capital also increased [33–39].

As mentioned above, many studies have verified changes in the quality of accounting information by the adoption of IFRS. In Korea, IFRS was adopted to improve international credibility by improving the quality of accounting information. In Korea, however, there is not much research in this field yet.

In summary, the higher the cash feasibility of earnings, the higher the quality of reported profits. Intangible capital and temporary gains and losses also influence investor's decision making, with sustainability differences between accounting profit, cash flow and accruals.

The AICR, divided by operating income, is included at management's discretionary accruals. The CICR multiplied by cash generated from operations divided by interest payments has removed management's discretion. Therefore, the impact of AICR and CICRs on the additional value related to net income will be different.

Based on the above background, this study examines the effects of AICR and CICR on the additional value related to net income, respectively. This paper also empirically analyzes the impact

of AICR on the additional value of net income if the AICR is higher than the CICR. In this study, the following hypotheses are established.

Hypothesis 1. The CICR will have an additional impact on the value relevance between net profit and stock price.

Hypothesis 2. The AICR will have an additional impact on the value relevance between net profit and stock price.

Hypothesis 3. If AICR is greater than CICR, it will have an additional impact on the value relevance between net profit and stock price.

3. Research Methodology

3.1. Research Methodology

This paper examines the impacts of AICR and CICR on the additional value relevance between net income and stock price. In addition, this study empirically verifies the additional value related to the stock price of net income when AICR is larger than CICR.

The CICR is measured by dividing the cash generated from operations by the interest payments. AICR is measured by operating income divided by interest expenses. To test the hypothesis of this paper, the following equation (1) was established.

The research model for the hypothesis test of this study is based on the Ohlson model, which has been used for the test of stock value relevance in many previous studies [40]. Simplifying the Ohlson model assuming the net surplus relation of net assets and the auto-regression of the time series of excess profit, we can express it as shown in the following equation [7,16]:

$$P_t + D_t = \alpha_0 + \alpha_1 B V_t + \alpha_2 E P S_t + \varepsilon_t, \tag{1}$$

where

 P_t : the stock price at the end of year t; D_t : the dividend at the end of year t; BV_t : the book value of equity at the end of year t; EPS_t : the earning per share during year t; and ε_t : other value relevant information.

In order to verify the hypothesis of this study, Equation (1) was modified and constructed as follows. The stock price (P) of common stock at the end of year t was used as the dependent variable as the common stock price at the end of year. Dividends included in the dependent variable of Equation (1) are not considered in Equation (2–1) to (2–3). Because many previous studies that modified the Ohlson model did not consider dividends to dependent variables because the amount of dividends was small, dividends were excluded from Equation (2–1) to (2–3). Second, a dummy variable (CASHD) was added, giving 1 if CICR was less than 1 and 0 otherwise. We also added dummy variables (CASHD) and net income (EPS) interaction variables (EPS * CASHD). Third, we added a dummy variable (ACCD) that gave 1 if the AICR was less than 1 and 0 otherwise. The dummy variable (ACCD) and the net income (EPS) interaction variable (EPS * ACCD) were also added. Fourth, a dummy variable (GAPD) was added that gave 1 if the AICR was greater than the CICR and 0 otherwise. We also added the interaction variables (EPS * GAPD) between dummy variables (GAPD) and net income (EPS). Finally, the effects of other non-accounting information were replaced by intercept (α 0) and error term (ε t).

The following Equations ((2–1), (2–2), and (2–3)) were estimated to verify the hypothesis of this study.

$$P_{t} = \alpha_{0} + \beta_{1}BV_{t} + \beta_{2}EPS_{t} + \beta_{3}CASHD_{t} + \beta_{4}EPS^{*}CASHD_{t} + \beta_{5}YD_{t} + \varepsilon_{t}$$
(2-1)

$$P_{t} = \alpha_{0} + \beta_{1}BV_{t} + \beta_{2}EPS_{t} + \beta_{3}ACCD_{t} + \beta_{4}EPS^{*}ACCD_{t} + \beta_{5}YD_{t} + \varepsilon_{t}$$
(2-2)

$$P_{t} = \alpha_{0} + \beta_{1}BV_{t} + \beta_{2}EPS_{t} + \beta_{3}GAPD_{t} + \beta_{4}EPS^{*}GAPD_{t} + \beta_{5}YD_{t} + \varepsilon_{t}$$
(2-3)

where

Pt: the stock price at the end of year t; BVt: the book value of equity at the end of year t; EPSt: the earning per share during year t; CASHDt: 1 if CICR was less than 1 and 0 otherwise; ACCDt: 1 if the AICR was less than 1 and 0 otherwise; GAPDt: 1 if the AICR was greater than the CICR and 0 otherwise; YD: Year Dummy; and ε_t : other value relevant information.

Equation (2–1) to Equation (2–3) describe the value relevance of CICR and AICR in relation to the net profit. It was set up to verify the impact. As a result of empirical analysis, if the regression coefficient (β_3 and β_4) values of the dummy variables (CASHD, ACCD, GAPD) and interaction variables (EPS * CASHD, EPS * ACCD, EPS * GAPD) are significant, they can be interpreted as supporting the hypothesis of this study.

3.2. Sample and Data

The research period is from 2011 to 2018. The paper sample firms were 9232 firms-year observations. The samples meet the following criteria among the listed companies that use financial data from the KIS Value database during the research period:

- 1. All firms-year observations from the Korean Stock Exchange market during the period of 2011 to 2018, excluding non-December firms;
- 2. excluding financial institutions; and
- 3. excluding management firms.

Samples with a 1% upper and lower distribution in the whole sample were excluded to avoid distortion of the research results due to extreme values. The final sample selected by these criteria is shown in Table 2, as below.

Selection Criteria	Number of Firms-Year
All firms-year observations from the listed markets during the period of 2011 to 2018 (excluding non-December firms, managed firms, and financial institutions)	15,984
Less: Firms-year with insufficient data	(5801)
Less: Outliers (firms-year in the top and bottom 1% of independent variables distribution)	(951)
Final Sample	9232

Table 2. Sample selection.

4. Results

4.1. Descriptive Statistics

Table 3 describes the descriptive statistics for the variables. The mean value of the stock price (P) is 16,876 won. The median value is 5970 won. The mean value of equity per share (BV) is 13,446 won. The median value is 4696 won. The mean earnings per share (EPS) is 757 won. The median is 213 won.

The mean value of the dummy variable using the CICR (CASHD) is 0.80. The median value is 1. The mean value of the dummy variable using the AICR (ACCD) is 0.28. The median value is 0. The mean value of the dummy variable (GAPD) which is 1 if the AICR is greater than the CICR and 0 otherwise is 0.78. The median value is 1.

Variables	Mean	Std. Dev.	Min	Q1	Median	Q3	Max
Р	16,876	37,056	83	2830	5970	14,500	945,000
BV	13,446	27,198	71	2191	4696	10,226	276,278
EPS	757	2449	-12,803	-45	213	806	29,192
CASHD	0.806	0.395	0	1	1	1	1
ACCD	0.286	0.452	0	0	0	1	1
GAPD	0.788	0.408	0	1	1	1	1

Table 3. Descriptive statistics.

Note: (1) Variables definitions are as follows (unit: Korea won); P_t : the stock price at the end of year t; BV_t : the book value of equity at the end of year t; EPS_t : the earnings per share during year t; $CASHD_t$: 1 if CICR was less than 1 and 0 otherwise; $ACCD_t$: 1 if the AICR was less than 1 and 0 otherwise; $GAPD_t$: 1 if the AICR was greater than the CICR and 0 otherwise.

Table 4 describes the Pearson correlation between the variables. The correlation analysis shows a significant positive correlation between the stock price (P) and equity (BV). There is a significant positive correlation between the stock price (P) and the earnings per share (EPS). It can be predicted that the firm's shareholders' equity (BV) and earnings per share (EPS) are the accounting information that best describe the common stock price (P).

Table 4. Pearson correlation matrix.

Variables	Р	BV	EPS	CASHD	ACCD	GAPD
Р	1					
BV	0.618 ***	1				
EPS	0.612 ***	0.653 ***	1			
CASHD	0.076 ***	0.098 ***	0.161 ***	1		
ACCD	-0.141 ***	-0.140 ***	-0.308 ***	-0.318 ***	1	
GAPD	0.110 ***	0.126 ***	0.238 ***	0.732 ***	-0.563 ***	1

Note: (1) Variables definitions are as follows (unit: Korea won); P_t : the stock price at the end of year t; BV_t : the book value of equity at the end of year t; EPS_t : the earnings per share during year t; $CASHD_t$: 1 if CICR was less than 1 and 0 otherwise; $ACCD_t$: 1 if the AICR was less than 1 and 0 otherwise; $GAPD_t$: 1 if the AICR was greater than the CICR and 0 otherwise. (2) *** denotes that it is significant at the 1% level.

There is a significant positive correlation between the stock price (P) and the dummy variable (CASHD and GAPD). There is a significant negative correlation between the stock price (P) and the dummy variable (ACCD).

This shows that the CICR, the AICR, and the difference of these are useful information that describes the stock price (P).

4.2. Regression Results

Table 5 shows the results of empirically verifying whether CICR have an additional effect on the value relevance between net profit and stock price. As a result of the empirical analysis, the regression coefficients of the equity per share (BV) and the earnings per share (EPS) are shown as a positive value, which is consistent with the previous studies.

The dummy variable (CASHD), which is assigned 1 if CICR is less than 1, and 0 otherwise, represents a significant negative value. Meanwhile, the regression coefficient of the interaction variable between dummy and net income (EPS * CASHD) shows a significant positive value. These results can be interpreted as a negative impact on the stock price if the CICR is less than 1, but a significant positive impact on the additional value related to net income. This suggests that the CICR, which is calculated from the newly applied International Financial Reporting Standards in Korea from 2011, can be used as a new financial soundness indicator.

Predicted Signs	Estimates (<i>t</i> -Value) Equation (2-1)		Estimates (<i>t</i> -Value) Equation (2-2)	
	7507	(8.10) ***	5349	(6.79) ***
+	0.517	(37.65) ***	0.464	(33.20) ***
+	2.620	(5.78)***	6.665	(39.24) ***
+/	-1862.671	(-2.56) ***		
+/	3.179	(6.94) ***		
			511.647	(0.77)
			-6.605	(-15.62) ***
	Year Dumm	ies: Included	Year Dumm	nies: Included
usted R ²	0.4	635	0.4	4748
Value	725.	93 ***	759	.74 ***
Ν	92	232	9	232
	Predicted Signs + + +/- +/- +/- usted R ² Value N	Predicted Signs Estimate Equation 7507 7507 $+$ 0.517 $+$ 2.620 $+/ -1862.671$ $+/ 3.179$ Vear Dumm usted R ² 0.4 Value $725.$ N 92	Predicted Signs Estimates (t-Value) Equation (2-1) $+$ 7507 (8.10) *** $+$ 0.517 (37.65) *** $+$ 2.620 (5.78)** $+/ -1862.671$ (-2.56) *** $+/ 3.179$ (6.94) *** $+/ 3.179$ (6.94) *** \times -1862.671 (-2.56) *** $+/ 3.179$ (6.94) *** \times -1862.671 (-2.56) *** \times 725.93 *** N 9232	Predicted Signs Estimates (t-Value) Equation (2-1) Estimates Equation E

Table 5. The effect of interest	coverage ratio on valu	e relevance of earnings per	share.
---------------------------------	------------------------	-----------------------------	--------

Note: (1) Variables definitions are as follows (unit: Korea won); P_t : the stock price at the end of year t; BV_t : the book value of equity at the end of year t; EPS_t : the earnings per share during year t; $CASHD_t$: 1 if CICR was less than 1 and 0 otherwise; $ACCD_t$: 1 if the AICR was less than 1 and 0 otherwise; $GAPD_t$: 1 if the AICR was greater than the CICR and 0 otherwise. (2) *** denotes that it is significant at the 1% level.

In Table 5, the dummy variable (ACCD) that gave 1 if the AICR was less than 1 and 0 otherwise was not significant. However, the regression coefficient between the dummy variable and reported earnings (EPS * ACCD) shows a significant negative value. These results can be interpreted as having a negative impact on the additional value related to net income if AICR is less than one. This result can be interpreted as AICR can still be used as an indicator of financial soundness for exiting insolvent companies. This confirms that AICR and CICR are still used as valid financial ratios.

Table 6 includes a dummy variable (GAPD) that indicates when AICR is higher than CICR. The regression coefficient values of the interaction variable (EPS * GAPD) represent a significant positive value relevance. These results imply that there is a significant additional correlation between net profit and stock price if AICR is greater than CICR.

Variables	Variables Predicted Signs		Estimates (<i>t</i> -Value) Equation (2-3)		
Intercept		6665	(7.22) ***		
BV	+	0.499	(36.09) ***		
EPS	+	1.600	(3.52) ***		
GAPD	+/-	-1065.065	(-1.47)		
EPS*GAPD	+/-	4.458	(9.43) ***		
		Year Dumm	ies: Included		
Adjusted R ²		0.4660			
F Value		733.46 ***			
Ν		9232			

Table 6. The effect of the interest coverage ratio difference on value relevance of earnings per share.

Note: (1) Variables definitions are as follows (unit: Korea won); P_t : the stock price at the end of year t; BV_t : the book value of equity at the end of year t; EPS_t : the earnings per share during year t; $CASHD_t$: 1 if CICR was less than 1 and 0 otherwise; $ACCD_t$: 1 if the AICR was less than 1 and 0 otherwise; $GAPD_t$: 1 if the AICR was greater than the CICR and 0 otherwise. (2) *** denotes that it is significant at the 1% level.

5. Conclusions

This study verified the usefulness of the CICR. It also verified the usefulness of AICR, which is used as a criterion for exiting insolvent companies. This study examined 9232 companies-years in December of 2011 through 2018, which do not belong to the financial industry, among the companies listed in Korea's securities market and KOSDAQ market. We analyzed whether the value relevance of net income to stock price differs according to various interest coverage ratios using Ohlson model [40].

As a result of the empirical analysis, if the CICR is less than 1, it has a significant negative effect on the stock price itself, but it has a significant positive impact on the additional value related to the net income. This result implies that the CICR is used as useful information by the investors in the capital market because the CICR is relatively low forecast error and relatively predictable. It also implies that the CICR is used as useful information of sustainability of profits.

If accrual interest expenses cannot be covered by accrued operating income in the income statement, it has a significant negative impact on additional value related to the stock price of net income. Even if the AICR was larger than the CICR, it had a significant positive effect on the value relevance of net profit to the stock price. If the AICR is higher than the CICR, the capital market valuation of net income generated by accrual is positive.

This research empirically verifies the usefulness of the CICR and the AICR. AICR was calculated when Korean-GAAP was applied before the adoption of IFRS, but the CICR financial ratio index can only be calculated using the IFRS-based cash flow statement. In other words, it was again confirmed that the adoption of IFRS provided financial information useful for the decision-making of accounting information users.

The adoption of IFRS has been shown to enhance the usefulness of financial statements by increasing the international consistency of accounting standards. Korea's adoption of IFRS has been shown to reduce Korea's discount by reducing information risks of foreign investors. In addition, the comparability of financial information between domestic and foreign companies increased, which contributed to the activation of international capital raising.

As a result of this study, the fact that the CICR calculated from the financial statements after the adoption of IFRS can be a financial indicator that has a significant influence on the value relevance of accounting information is consistent with the previous studies that verified the positive effects of the adoption of IFRS.

The limitations of this study are as follows. First, the verification period is rather short. Since Korea adopted IFRS in 2011, the accumulated data is rather insufficient. Therefore, future research will be able to derive robust analysis results based on more accumulated data. Second, the Ohlson model used in this study assumes that future excess profits are linearly related to current excess profits and other information. However, there may be a question as to whether this linearity assumption is appropriate in reality. In addition, the lack of materialization of other information is a limitation of the Ohlson model.

Future research directions related to this study are as follows. First, a more generalized conclusion about the effects of IFRS adoption may be obtained by verifying the usefulness of financial information after the adoption of IFRS using a variety of methodologies. Second, the study of verifying the value relevance of accounting information is important and significant in evaluating the fundamental role of accounting information in the capital market. Although this study verified the usefulness of financial ratio indicators such as CICR and AICR calculated using financial statements, it will be necessary to investigate the effect of the overall quality or comprehensibility of financial information on value relevance in the future.

This study suggests that supervisors and financial companies can make decision-making if they consider AICR as well as CICR as a criterion for exiting insolvent companies.

In this paper, we used the CICR as a new financial soundness indicator, which was calculated using the cash flow statement information of the International Financial Reporting Standards applied in Korea since 2011. The contribution of this study was to suggest that the CICR can be a useful indicator for determining whether a company is insolvent due to its relatively low forecast error and high predictability.

Funding: This research received no external funding.

Conflicts of Interest: The author declare no conflict of interest.

References

- 1. FASB. Concept No. 1. Objectives of Financial Reporting by Business Enterprises; FASB: Norwalk, CT, USA, 1978.
- 2. Ball, R.; Brown, P. An empirical evaluation of accounting income numbers. *J. Account. Res.* **1968**, *6*, 159–178. [CrossRef]
- 3. Beaver, W.; Lambert, R.; Morse, D. The information content of security prices. *J. Account. Econ.* **1980**, *2*, 3–28. [CrossRef]
- 4. Barth, M.; Clement, M.; Foster, G.; Kasznik, R. Brand values and capital market valuation. *Rev. Account. Stud.* **1998**, *3*, 41–68. [CrossRef]
- 5. Burgstahler, D.; Dichev, I. Earning, adaptation and equity value. Account. Rev. 1997, 72, 187–215.
- 6. Hayn, C. The information content of losses. J. Account. Econ. 1995, 20, 125–153. [CrossRef]
- Collins, D.; Maydew, E.; Weiss, I. Changes in the value—Relevance of Earnings and Book Values over the Past Forty Years. J. Account. Econ. 1997, 24, 39–67. [CrossRef]
- 8. Collins, D.W.; Kothari, S.P. An analysis of intertemporal and cross-sectional determinants of earnings response coefficients. *J. Account. Econ.* **1989**, *11*, 143–181. [CrossRef]
- 9. Subramanyam, K.; Venkatachalam, M. *The Role of Book Value on Equity Valuation: Does the Stock Variable Merely Proxy for Relevant Past Flow?* University of Stanford Research Paper; University of Southern California: Los Angeles, CA, USA, 1998.
- 10. Comiskey, E. Assessing Financial Quality: An organizing theme for credit analysts. *J. Commer. Bank Lend.* **1982**, *12*, 32–47.
- 11. Bradshaw, M.T.; Richardson, S.A.; Sloan, R.G. Do analysts and auditors use Information in accruals. *J. Account. Res.* **2001**, *39*, 45–74. [CrossRef]
- 12. Lee, C.E.; Kim, M.T.; Ma, S.S. The impacts of earnings components on earnings persistence. *Account. Inf. Rev.* **2008**, *26*, 1–18. (in Korean).
- 13. Easton, P.D.; Zmijewski, M.E. Cross-sectional variation in the stock-market response the accounting earnings announcements. *J. Account. Econ.* **1989**, *11*, 117–141. [CrossRef]
- 14. Dhaliwal, D.S.; Lee, K.J.; Fargher, N.L. The association between unexpected earnings and abnormal security returns in the presence of financial leverage. *Contemp. Account. Res.* **1991**, *8*, 20–41. [CrossRef]
- 15. Imhoff, E., Jr. The relation between perceived accounting quality and economic characteristics of the firm. *J. Account. Public Policy* **1992**, *11*, 97–118. [CrossRef]
- 16. Collins, D.; Pincus, M.; Xie, H. Equity Valuation and Negative Earnings: The Role of Book Value of Equity. *Account. Rev.* **1999**, *74*, 29–61. [CrossRef]
- 17. Lee, J.S. Effect of audit quality on the value relevance of cash and accruals—Panel data analysis -. *J. Korean Data Anal. Soc.* **2010**, *12*, 2795–2806. (in Korean).
- 18. Choi, H.S.; Jang, J.I.; Shin, S.C. The relative value-relevance of earnings and cash flow measures in each life-cycle stage. *Bus. Rev.* **2006**, *35*, 1339–1360. (in Korean).
- 19. Lee, L.F. Incentives to inflate reported cash from operations using classification and timing. *Account. Rev.* **2012**, *87*, 1–33. [CrossRef]
- 20. Wild, J.; Subramanyam, K.R.; Hasley, R. *Financial Statement Analysis*; McGraw-Hill/Irwin: New York, NY, USA, 2004.
- 21. Libby, R.; Libby, P.; Short, D. Financial Accounting; McGraw-Hill/Irwin: New York, NY, USA, 2008.
- 22. Lee, B.Y. Domestic banks' difficult operating environment and correspondence strategies. *Wkly. Financ. Brief* **2013**, *22*, 3–9. (in Korean).
- 23. Choi, Y.J. Development of corporate vulnerability index and a connection with corporate insolvency. *Bank Korea Econ. Res.* **2016**, *20*. (in Korean). [CrossRef]
- 24. Han, B.H.; Yi, J.; Park, I.H.; Seo, Y. *IFRS Adoption and Capital Globalization in Korea*; KASB Research Report 38; KASB: Busan, Korea, 2016. (in Korean)
- 25. Choe, K.H.; Son, Y.J. The effect of K-IFRS adoption on the financial statements items, financial ratios, and accruals. *Korean Account. J.* 2012, *21*, 209–256. (in Korean).
- 26. Jeong, T.B. Adoption of IFRS and earnings management. Korean Account. J. 2013, 22, 327–348. (in Korean).
- 27. Bartov, E.; Goldberg, S.R.; Kim, M. Comparative value relevance among German, U.S., and international accounting standards: A German stock market perspective. *J. Account. Audit. Financ.* **2005**, *20*, 95–119. [CrossRef]

- 28. Barth, M.E.; Landsman, W.R.; Young, D.; Zhuang, Z. Relevance of differences between net income based on IFRS and domestic standards for European firms. *J. Bus. Financ. Account.* **2014**, *41*, 297–327. [CrossRef]
- 29. De George, E.; Li, X.; Shivakumar, L. A review of the IFRS adoption literature. *Rev. Account. Stud.* **2016**, 21, 898–1004. [CrossRef]
- 30. Yu, G.; Wahid, A.S. Accounting Standards and international portfolio holdings. *Account. Rev.* **2014**, *89*, 1895–1930. [CrossRef]
- 31. Amiram, D. Financial information globalization and foreign investment decisions. *J. Int. Account. Res.* **2012**, 11, 57–82. [CrossRef]
- 32. Covrig, V.M.; Defond, M.L.; Hung, M. Home bias, foreign mutual fund holdings, and the voluntary adoption of international accounting standards. *J. Account. Res.* **2007**, *45*, 41–70. [CrossRef]
- 33. Leuz, C.; Verrecchia, R. The economic consequences of increased disclosure. *J. Account. Res.* **2000**, *38*, 91–124. [CrossRef]
- 34. Leuz, C.; Nanda, D.; Wysocki, P.D. Earnings management and investor protection: An international comparison. *J. Financ. Econ.* **2003**, *69*, 505–527. [CrossRef]
- 35. Daske, H. Economic benefits of adopting IFRS or US-GAAP—Have the expected cost of equity capital really decreased? *J. Bus. Financ. Account.* **2006**, *33*, 329–373. [CrossRef]
- 36. Daske, H.; Hail, L.; Leuz, C.; Verdi, R. Mandatory IFRS reporting around the world: Early evidence on the economic consequences. *J. Account. Res.* **2008**, *46*, 1085–1142.
- 37. Li, S. Does mandatory adoption of international financial reporting standards in the European union reduce the cost of equity capital? *Account. Rev.* **2010**, *85*, 607–636. [CrossRef]
- Christensen, H.B.; Hail, L.; Leuz, C. Mandatory IFRS reporting and changes in enforcement. J. Account. Econ. 2013, 56, 147–177. [CrossRef]
- 39. Hong, H.A.; Mingyi, H.; Lobo, G.J. The impact of mandatory IFRS adoption on IPOs in global capital markets. *Account. Rev.* **2014**, *89*, 1365–1397. [CrossRef]
- 40. Ohlson, J. Earnings, book values, and dividends in equity valuation. *Contemp. Account. Res.* **1995**, *11*, 661–687. [CrossRef]



© 2019 by the author. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (http://creativecommons.org/licenses/by/4.0/).