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Does the IFRS Effect Continue? An International Comparison

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Abstract: Previous research showed that in the early years after adoption, the change to International Financial Reporting Standards (IFRS) impacted accounting quality. The purpose of this study is to analyze whether those effects have changed over time in companies within countries that have different legal regimes, enforcement, and degrees of external investor protection. We measure accounting quality using discretionary accruals, real activities manipulation, and the stock price value relevance of earnings per share and book value per share. The findings show that the early effects of IFRS adoption continue with the passage of time in companies listed in countries with common law systems, such as the United Kingdom (UK) and Australia, which provide powerful outside investor protection in capital markets. Yet, the early effects of IFRS adoption do not continue after the passage of time in companies listed in Asian countries with statutory law systems, such as Korea and China, which have low levels of outside investor protection. Moreover, it is difficult to obtain evidence that value relevance has improved after the accounting measurement of corporate value shifted to IFRS. The results show that there are differences in the sustained effects on accounting quality, even after the application of IFRS due to the different social, economic, and cultural characteristics of countries.

Keywords: IFRS; accounting quality; outside investor protection; law system; value relevance

1. Introduction

The efficient use of limited resources or capital plays an important role in the sustainability of companies and in healthy economic development. Thus, for efficient capital allocation, investors need high-quality accounting information in order to enable them to make comparisons across borders that are relevant and have a faithful representation [1–4].

Widely accepted as high-quality financial reporting standards, the International Financial Reporting Standards (IFRS) provide a variety of potential advantages that allow investors to compare the financial information of companies worldwide [5]. As a result, as of November 2018, 144 jurisdictions around the world have adopted IFRS as their financial reporting standards.

Since 2011, South Korea has required all listed companies to apply IFRS in order to improve accounting transparency and resolve the Korea Discount, or investors' undervaluation of Korean stocks [6]. However, according to the annual report of the International Institute for Management Development (IMD), South Korea's ranking for accounting transparency has consistently declined since the adoption of IFRS. In addition, Daewoo Shipbuilding and Marine Engineering's large-scale accounting fraud, which was valued at about five trillion won, took place after the adoption of IFRS. Recently, due to Samsung BioLogics' accounting issues, social interest in IFRS's principles-based accounting has increased. In 2015, Samsung BioLogics excluded Bioepis, which was a subsidiary company in 2014, from its consolidated financial statements, and changed its accounting to the equity

method; as a result, its net loss of 99.7 billion won during the 2014 fiscal period turned into a profit of 1.9049 trillion won in 2015.

Since the adoption of IFRS, in contrast to its intended purpose, South Korea's national accounting transparency has declined, and large-scale accounting fraud scandals have occurred. Companies and investors have been confused about the application of the principles-based financial reporting standards, and many accounting experts have raised the fundamental question: has the costly investment in the adoption of IFRS promoted accounting transparency? Thus, this study aims to examine whether the adoption of IFRS improves accounting quality in countries that have adopted it, including South Korea.

Studies of IFRS can be divided into those that have examined the impact of IFRS adoption on accounting quality and those that have examined its economic impact on the country of adoption's capital market. Of these, the latter have mostly found that IFRS adoption had a positive impact on the capital market. In other words, after IFRS adoption, stock liquidity increased, foreign direct investment increased, and the information environment of financial analysts improved as well [7–13]. This means that the adoption of IFRS increases corporate value, improves the efficiency of the capital market, and reduces the capital costs of the companies that adopt them.

However, although IFRS are regarded as quality financial reporting standards, there are contrasting opinions on the impact of the adoption of IFRS on accounting quality [8,14–21]. In particular, of the studies in the South Korean context, those that examined the impact of IFRS adoption on the quality of reported profits do not present consistent results [22,23].

The inconsistent results of the previous studies may be caused by the following reasons. If a study includes many countries, the external validity of the study increases, but it is difficult to control for the characteristics of the countries or companies. In other words, with companies in several countries, it is difficult to properly control for the impact on the research results of the number or characteristics of the companies in the sample or the economic environment and capital market microstructure in each country. Moreover, the samples in the preceding related studies are limited to Anglophone countries or large enterprises. Only 36 Korean companies are included in the research of Ahmed et al. [15]. In addition, if long-term data are used to measure the effect of IFRS adoption, it is difficult to properly control for the impact of other economic environmental changes on accounting quality.

Therefore, this study compares the impact of IFRS adoption on accounting quality, selecting Korea and China as representatives of Asian countries, and Australia and three countries belonging to the European Union (EU) that have legal systems (code law or common law), investor protection and legal enforcement that differs from those of Asian countries. An investor protection system is a major institutional factor that affects corporate decision-making processes, since a company insider has incentive to conceal its performance from outside investors in order to enjoy private control benefits [24–28]. In addition, the period of five years after IFRS adoption was examined to perform a comparative analysis of changes in accounting quality in the individual countries that adopted IFRS.

This study excludes the possibility of the composition of the sample impacting the research results by including in the sample all of the listed companies in the Asian, Australia, and EU countries that applied IFRS. Moreover, unlike preceding studies that examined the effect of IFRS adoption in the short term, this study improves the external and internal validity of the research results through an analysis that divides the periods of comparison into short and intermediate terms by individual countries.

The results of this study demonstrate that the effect of IFRS adoption can vary over time if the social and economic accounting environments in which the accounting standards are applied are different. Specifically, the effects on earnings management and value relevance that are seen in the early period after IFRS adoption proved to be different with the passage of time in countries with different legal regimes, legal enforcement, and outside investor protection. Companies in the United Kingdom (UK) and Australia, which are Commonwealth countries with common law systems, show little significant change compared to the initial period after IFRS adoption, and the initial effects remain unchanged, even with the passage of time. Accounting quality measured by value relevance

differs from accounting quality measured by earnings management. In Germany, France, the UK, and Australia, no difference in significance is observed for value relevance measured by earnings per share (EPS) between the early period after IFRS adoption and later periods. In contrast, the value relevance of book value per share (BVPS) observed in the early period decreases with the passage of time. In addition, since the socialist country China does not allow companies to own land, value relevance measured by BVPS is either insignificant or negative, regardless of IFRS adoption.

The remainder of this paper is organized as follows. Chapter 2 explains the application of IFRS in each jurisdiction. Chapter 3 establishes research hypotheses based on preceding studies. Chapter 4 explains the sample, classification of national characteristics by country, and measures of earnings quality and value relevance, which were used in the study to verify the research hypotheses. Section 5 explains the results of the empirical analysis for each measure by country, and Section 6 presents conclusions.

2. Application of IFRS by Jurisdiction

In previous studies [24,25] on companies in the UK and Australia, countries with common law systems that are known to have high earnings quality and strong legal protection for outside capital market investors have maintained the same earnings quality over time, as found in the early periods following IFRS adoption. In addition, European companies in Germany and France with statutory law systems have maintained the same earnings quality exhibited in early post-IFRS adoption periods.

On the contrary, analyses of Asian companies in Korea and China, which have statutory law systems and are known to have low levels of outside investor protection, found that the effects of IFRS adoption did not last over time. However, in accordance with the results of Chen and Zhang [29], for Chinese companies with improved corporate governance structures as evidenced by the establishment and operation of an audit committee, earnings quality as measured by discretionary accruals in the initial period after IFRS adoption was sustained even with the passage of time. (China implemented various policies in stages to successfully establish IFRS prior to IFRS adoption in 2007. In 2001, China's Securities Regulatory Commission (CSRC) enforced strong regulatory policies to apply the same accounting treatment to the same economic transactions, whether the treatment was based on Chinese Generally Accepted Accounting Principles (GAAP) or on IFRS [25].)

To understand the results of these previous studies, it is necessary to understand the IFRS adoption process of the six countries that are the subject of this study before conducting the empirical analysis. Jurisdictions may follow the recommendations of the International Accounting Standards Board (IASB) for the IFRS adoption process or devise their own process [30]. That is, there are differences in the adoption of IFRS according to the adopting country's rules [31].

IFRS as adopted in South Korea (which are IFRS as issued by the IASB Board without modifications) are required for listed companies and financial institutions. Foreign listed companies are permitted to use IFRS, IFRS as adopted in Korea, or United States (US) GAAP. IFRS convergence in China has been driven by the Chinese government to facilitate its "Open Door" policy and by the rapid growth of the Chinese stock market. One of the most distinguishing features of IFRS implementation in China is the strong leadership provided by the Chinese Ministry of Finance (MOF) [32]. China's national standards have been substantially converged with IFRS, and China has committed to the adoption of IFRS for reporting by at least some domestic companies, although there is no timetable for the completion of the process. Chinese companies representing more than 30% of the total market capitalization of China's domestic market produce IFRS-compliant financial statements as a result of their dual listings in Hong Kong and other international markets. Foreign companies do not currently trade in Chinese securities markets. Therefore, there is no relevant regulation on whether those companies would be permitted to use IFRS standards.

In the cases of Germany, France, and the UK, all of the domestic companies whose securities trade in a regulated market are required to use IFRS as adopted by the EU to prepare their consolidated financial statements. However, a foreign company whose home jurisdiction's standards are deemed

by the EU to be equivalent to IFRS may use its home standards. Further, UK Small and medium-sized enterprises (SMEs) may use a national standard that is based on IFRS for SMEs, but with significant modifications. Alternatively, they may use IFRS as adopted by the EU. Australian equivalents to IFRS are required for all of the reporting entities in Australia, including listed companies and financial institutions. IFRS are required or permitted for listings by foreign companies. Alternatively, foreign companies may use their home standards if approved by the stock exchange. The IFRS for SMEs are not permitted if the SME meets the definition of a reporting entity. For other SMEs, no specific accounting framework is required (use of IFRS standards by jurisdiction: (<https://www.ifrs.org/>)).

As pointed out by Zeff and Nobes [30], the adoption of IFRS by a jurisdiction is not a simple decision. In combination with differences in the scope of application (all or some listed companies, domestic or cross-listed companies, exclusion or inclusion of certain industries, mandatory or voluntary use by non-listed companies, consolidated financial statements only or also in parent company statements), it is clear that the categorization of jurisdictions in terms of adoption is not an easy matter [33]. Nobes and Perramon [34] insisted that the national profile of IFRS policy choice could be explained by pre-adoption financial reporting practices. Mir and Rahaman [35] suggested that the level of IFRS relevance in emerging economies depends largely on the processes through which these standards are adopted. Tsalavoutas et al. [36] stated that the stronger the country's enforcement, the higher the compliance level.

3. Literature Review and Hypotheses Development

IFRS adoption may improve or have a negative effect on accounting quality. The argument that it improves accounting quality is based on the assumption that, since IFRS are internationally acceptable high-quality financial reporting standards, the quality of accounting information prepared by applying them would of course be higher. To create high-quality financial reporting standards, the IASB uses a principles-based approach; it reduces alternative accounting methods to limit managers' discretionary accounting choices, and it employs fair-value-oriented accounting that better reflects companies' financial position and business performance to improve capital market investors' decision making.

On the other hand, the grounds for the argument against IFRS adoption improving accounting quality are first that, since principles-based accounting rules often do not specify accounting methods for particular economic events, there is great flexibility in their application. Second, IFRS limit overall accounting methods, which may limit methods that could better reflect a company's financial position and business performance. Finally, accounting quality may be affected by the interpretation of IFRS or the possibility of enforcement and litigation [8,14].

In previous attempts to resolve these contrasting arguments, countries have been compared [14, 15,19,21,37], or studies have been limited to companies in one country [18,20–23,38–41]. As a result, in the main results of these studies, it turned out that accounting quality was affected more by the reasons for companies' adoption of IFRS, the compulsory enforcement in the countries that adopted them, and their legal and institutional environments than by the act of IFRS adoption [8,14–18,20,21,37,40]. In other words, accounting quality improved in companies that spontaneously adopted IFRS, countries that enforced IFRS, and where the accounting infrastructure was strong [16–18,20,21,37,40].

Since the concept of accounting quality as a research subject is broader than what is represented by measured values, fluctuations in the measured values of accounting quality do not necessarily represent changes in accounting quality [15]. Thus, preceding studies have measured accounting quality in various ways, and have conducted comparative analyses of whether multiple measured values represent a consistent result. For example, accounting quality has been measured by the degree of earnings management, the timeliness of loss recognition, and the value relevance of net profit and capital. Accounting quality has been measured less by the management of earnings or timelier loss recognition. Furthermore, the greater value relevance of net profit and capital for corporate value have been interpreted as leading to higher accounting quality. According to Francis et al. [42], measures of accounting quality can be classified as accounting-based measures and market-based measures.

A typical accounting-based measure of earnings management is discretionary accruals [43], which measures the difference between cash flows and earnings due to the timing of accrual recognition [44], and earnings management through the manipulation of real activities [45]. While strict accounting standards and strong legal enforcement increase the cost of earnings management, the marginal benefit of earnings management also increases because of the close relationship between earnings and stock prices [32,46–49].

Hence, an accounting-based measure simultaneously analyzes earnings management through discretionary accruals and earnings management through the manipulation of real activities, which is used when companies find it difficult to manage earnings through accruals [48]. Market-based measures use earnings per share (EPS) and book value per share (BVPS) as measures of the extent to which the economic benefits and losses recognized by accounting information are reflected in stock prices [43]. If adoption of IFRS improves accounting quality, it is expected that value relevance will be enhanced compared to the pre-adoption period, since more useful information may be provided to investors. Korea, China, France, Germany, the UK, and Australia are diversely geographically located in Asia, Europe, and Oceania, with different sets of legal systems, legal enforcement, and external investor protection.

Hypothesis 1. *The sustained effects of IFRS adoption on earnings quality differ among countries.*

Hypothesis 1.1. *The sustained effects of IFRS adoption on earnings management differ among countries.*

Hypothesis 1.2. *The sustained effects of IFRS adoption on value relevance differ among countries.*

4. Research Design

This study uses financial statements from two years before IFRS adoption and five years after adoption from companies in six countries that introduced IFRS: Korea, China, Germany, France, the UK, and Australia. Korea and China, Asian countries with statutory law systems, adopted IFRS in 2011 and 2007, respectively, and have weak systems of external investor protection. France, Germany, the UK, and Australia adopted IFRS in 2005. France and Germany are European countries with statutory law systems and strong law enforcement; however, their outside investor protection is weaker than countries with common law systems. The UK and Australia are members of the British Commonwealth with common law systems that have both strong outside investor protection and law enforcement. The data for this study were acquired from annual financial statements obtained from the OSIRIS database. These data are available through Osiris of Bureau van Dijk, which provides financial information of listed/unlisted companies around the world. The Statistical Analysis System (SAS) was used for all of the analyses, including regression analysis. Table 1 classifies by region the national characteristics of the legal systems of the six countries examined, based on legal system, legal enforcement, and level of outside investor rights, as proposed by Leuz et al. [25]. Since China, an Asian country with a statutory law system, has a socialist system, its legal enforcement is classified as strong (9), while its outside investor rights are classified as weak (2). Panel (a) of Table 2 presents the year of IFRS adoption, sample size, and percentage of sample for each country. Panel (b) shows the industry-specific distribution of the sample. As in previous studies [28,50], financial institutions (Standard Industrial Classification: SIC 60–69) were excluded, since their financial statements are fundamentally different from those of non-financial companies.

This model analyzes the long-term effects for each country over time by examining whether accounting qualities acquired one or two years after IFRS adoption are sustained three, four, and five years after adoption in countries with different legal systems, legal enforcement, and levels of outside investor rights by comparing accounting qualities in those periods with those in the pre-adoption period. The measures of accounting quality that were used to test the hypotheses are earnings

management and value relevance. Earnings management is measured using both discretionary accruals and earnings management through the manipulation of real activities.

Table 1. Characteristic classifications by country. UK: United Kingdom.

Country	Region	Legal Tradition	Outside Investor Rights	Legal Enforcement
Korea	Asia-Pacific	Code Law	weak (2)	medium (5.6)
China	Asia-Pacific	Code Law	weak (2)	strong (9.0)
France	European Union	Code Law	medium (3)	strong (8.7)
Germany	European Union	Code Law	weak (1)	strong (9.1)
UK	European Union	Common Law	strong (5)	strong (9.2)
Australia	Asia-Pacific	Common Law	strong (4)	strong (9.5)

Table 2. Descriptive statistics relating to the sample. IFRS: International Financial Reporting Standards.

(a) IFRS Adoption Year and Distribution across Countries			
Country	IFRS Adoption	Number of Samples	Percentage of Sample
Korea	2011	7342	28.08
China	2007	11,600	44.36
France	2005	1818	6.95
Germany	2005	1277	4.88
UK	2005	2314	8.85
Australia	2005	1797	6.87
Total		26,148	100.00
(b) Distribution across Industries			
Industry	SIC Codes	Number	Percentage of Sample
Agriculture, Forestry and Fishing	01–09	248	0.95
Mining	10–14	811	3.10
Construction	15–17	631	2.41
Manufacturing	20–39	17,775	67.98
Utilities	40–49	2,166	8.28
Wholesale trade	50–51	846	3.24
Retail trade	52–59	906	3.46
Services	70–89	2765	10.57
Total		26,148	100.00

4.1. Earnings Management: Discretionary Accruals

Earnings management is measured with discretionary accruals using the modified Jones model [51]. The regression coefficients were estimated based on Equation (1) and discretionary accruals corresponding to the equation residuals were calculated using cross-sectional data by industry for industries with more than 10 observations per year/industry per country during the study period.

$$TAC_{jt}/A_{jt-1} = a_0(1/A_{jt-1}) + a_1((\Delta REV_{jt} - \Delta AR_{jt})/A_{jt-1}) + a_2(PPE_{jt}/A_{jt-1}) + \varepsilon_{jt}, \quad (1)$$

where TAC = total accruals of company j in year t ; ΔREV = change in sales of company j in year t ; ΔAR = change in accounts receivable of company j in year t ; PPE = gross property, plant, and equipment of company j in year t ; ROA = total return on assets of company j in year t ; A = total assets of company j in year $t-1$; ε_{jt} = the residual of company j in year t .

Specifically, discretionary accruals are calculated using Equation (2) below:

$$DA_{it} = (TAC_{it}/A_{it-1}) - [\hat{a}_0(1/A_{it-1}) + \hat{a}_1((\Delta REV_{it} - \Delta AR_{it})/A_{it-1}) + \hat{a}_2(PPE_{it}/A_{it-1})], \quad (2)$$

In Equation (2), DA_{it} represents the discretionary accruals of company i in year t . Discretionary accruals (DA) is used as the dependent variable to measure accounting quality. The controls include the debt ratio (LEV), asset growth ratio (GRW), change in capital ($ISSUE$) [52,53], return on assets (ROA), natural logarithm of total assets ($SIZE$), cash flow from operations (CFO) [54–62], and whether the auditor is a big four accounting firm (Big) [63–69].

Equation (3) is the research model used:

$$DA_{it} = \alpha_0 + \alpha_1 Post\ 1, 2_{it} + \alpha_2 Post\ 3, 4, 5_{it} + \alpha_3 LEV_{it} + \alpha_4 GRW_{it} + \alpha_5 ISSUE_{it} + \alpha_6 ROA_{it} \quad (3) \\ + \alpha_7 SIZE_{it} + \alpha_8 CFO_{it} + \alpha_9 Big_{it} + \varepsilon_{it}$$

In the research model, the variables *Post 1* and *Post 2* equal one if the financial statements are those created in the first or second years after IFRS adoption, and equal two otherwise. Variables *Post 3, 4, and 5* equal one if the financial statements are those created in the third, fourth, or fifth years after IFRS adoption, and zero otherwise. When the effect on discretionary accruals (DA) is significant in the first or second year after IFRS adoption (*Post 1* and *2*), the correlation coefficient α_1 is expected to be significant, whereas α_2 is expected to be significant when the effect is significant in the third, fourth, or fifth year after adoption (*Post 3, 4, and 5*). If the effects that were seen in the first or second year after IFRS adoption continue in the third, fourth, or fifth years, α_2 will also be significant. Discretionary accruals have been used in many preceding studies as a measure of earnings management [51,70]. This study uses the direction of earnings change as a measure of the degree of earnings management rather than the magnitude of discretionary accruals. A higher level corresponds to lower accounting quality.

4.2. Earnings Management: Real Activities Manipulation

In addition to discretionary accruals, we measure earnings management through real activities manipulation to judge accounting quality, because if it is difficult for companies to manage earnings using discretionary accruals, they will use real activities manipulation as an alternative means to (ostensibly) comply with IFRS [71]. Earnings management through real activities manipulation is measured using abnormal operating cash flows (*abocf*), abnormal discretionary expenses (*abde*), and abnormal production costs (*abprod*), as proposed by Roychowdhury [45]. Each variable is calculated by deducting the expected value, which is computed by estimating the regression coefficients of Equations (4)–(6), from the ex-post actual observed value. We analyze only industries with 10 or more companies in each country based on SIC industry classification. The measure of actual earnings management is calculated with the following equations:

$$OCF_{it}/Assets_{it-1} = b_1(1/Assets_{it-1}) + b_2(Sales_{it}/Assets_{it-1}) + b_3(+bets_{it}/Assets_{it-1}) + 1_{jt}; \quad (4)$$

$$EXP_{it}/Assets_{it-1} = b_1(1/Assets_{it-1}) + b_2(Sales_{it-1}/Assets_{it-1}) + 1_{jt}; \quad (5)$$

$$PROD_{it}/Assets_{it-1} = b_1(1/Assets_{it-1}) + b_2(Sales_{it}/Assets_{it-1}) \quad (6) \\ + b_3(b1ets_{it}/Assets_{it-1}) + b_4(+bet_{it-1}/Assets_{it-1}) + e_{jt}$$

where OCF = operating cash flows; EXP = welfare benefits + (general and administrative expenses – taxes and dues – depreciation costs – lease expenses – insurance premiums) + sales expenses + (research + ordinary research & development expenses + ordinary development expenses); $PROD$ = $COGS + \Delta INV$; $COGS$ = cost of goods sold; INV = inventory; $Assets_{it-1}$ = basic total assets; $Sales$ = sales (for the term). Decreases in operating cash flow (–) against sales, decreases in discretionary costs (–), and increases in production costs (+) are frequently observed when CEOs manipulate real activities to increase announced profits. For the convenience of analysis, the measures *abocf* and *abde* are multiplied by (–1) so that the announced profit increases with earnings management through real activities manipulation. The scale of real activities manipulation is measured by $RM1$ ($abprod + abde * (-1)$) and $RM2$ ($abocf * (-1) + abde * (-1)$), which are the partial sums of abnormal operating cash

flows ($abocf * (-1)$), abnormal discretionary expenses ($abde * (-1)$), and abnormal production costs ($abprod$) [48].

It is expected that the coefficient e_1 for the first and second years after IFRS adoption ($Post\ 1, 2$) will be significant if the effect on real activities manipulation ($RM1, RM2$) is significant, while α_2 is significant if the effect is significant in the third, fourth, and fifth years after IFRS adoption ($Post\ 3, 4, 5$). If the effects that are found in the first and second years after IFRS adoption continue in the third, fourth, and fifth years after IFRS adoption, α_2 will also be significant. Equations (7) and (8) are the study models that set $RM1$ and $RM2$ as dependent variables and measure accounting quality:

$$RM1_{it} = \alpha_0 + \alpha_1 Post1, 2_{it} + \alpha_2 Post3, 4, 5_{it} + \alpha_3 LEV_{it} + \alpha_4 GRW_{it} + \alpha_5 ISSUE_{it} + \alpha_6 ROA_{it} \quad (7)$$

$$+ \alpha_7 SIZE_{it} + \alpha_8 CFO_{it} + \alpha_9 Big_{it} + \varepsilon_{it};$$

$$RM2_{it} = \alpha_0 + \alpha_1 Post1, 2_{it} + \alpha_2 Post3, 4, 5_{it} + \alpha_3 LEV_{it} + \alpha_4 GRW_{it} + \alpha_5 ISSUE_{it} + \alpha_6 ROA_{it} \quad (8)$$

$$+ \alpha_7 SIZE_{it} + \alpha_8 CFO_{it} + \alpha_9 Big_{it} + \varepsilon_{it};$$

where $RM1 = abprod + abed$ (abnormal production cost + abnormal expenses), and $RM2 = abocf + abde$ (abnormal cash flow + abnormal expenses).

4.3. Value Relevance

The presumption of value relevance is that if EPS (earnings per share) and BVPS (book value per share) are more strongly associated with stock prices after IFRS adoption, accounting data has become more informative to investors [72]. The value relevance model that is used is Ohlson's [73] price-earnings model, which explains stock prices with EPS and BVPS. Stock price is the dependent variable of EPS and BVPS, and the research model is shown in Equation (9). It is expected that correlation coefficients α_4 and α_7 will be significant if the effects of EPS and BVPS on stock prices are significant in the first and second years after IFRS adoption, while α_5 and α_8 are significant if the effects are significant in the third, fourth, and fifth years after adoption. If the effects acquired in the first and second years after IFRS adoption continue into the third, fourth, and fifth years, the significance of the correlation coefficients α_4 and α_7 will be maintained in the correlation coefficients α_5 and α_8 .

$$P_{it} = \alpha_0 + \alpha_1 Post\ 1, 2_{it} + \alpha_2 Post\ 3, 4, 5_{it} + \alpha_3 EPS_{it} + \alpha_4 EPS1, 2_{it} + \alpha_5 EPS\ 3, 4, 5_{it} \quad (9)$$

$$+ \alpha_6 BVPS_{it} + \alpha_7 BVPS\ 1, 2_{it} + \alpha_8 BVPS\ 3, 4, 5_{it} + \varepsilon_{it};$$

where P = fiscal year-end share market price; EPS = fiscal year-end earnings per share; and $BVPS$ = book value of equity per share. The results of the empirical analysis indicate that α_4 and α_7 are positively correlated, and are interpreted as the increased value relevance of EPS and BVPS in the first and second years after IFRS adoption, whereas the results that α_5 and α_8 are positively correlated are interpreted as the increased value relevance of EPS and BVPS in the third, fourth, and fifth years.

The definitions of all of the variables are summarized in Table 3. The variables that were used in this study were measured in the same way as those used in related previous studies [24,74].

Table 3. Variable definitions.

Variables	Variable Measurement and Meaning
DA	discretionary accruals using the modified Jones model
RM1	$abprod + abed$ (abnormal production cost + abnormal expenses)
RM2	$abocf + abde$ (abnormal cash flows + abnormal expenses)
P	fiscal year-end market price
Post 1, 2	Post 1 and 2 equal one if the financial statements are created one year or two years after the adoption of IFRS, and zero otherwise.
Post 3, 4, 5	Post 3, 4, and 5 equal one if the financial statements are created three, four, or five years after adoption of IFRS, and zero otherwise.
EPS	fiscal year-end earnings per share
BVPS	book value of equity per share
LEV	total liabilities divided by total assets
GRW	firm's total assets divided by beginning of year total assets;
ISSUE	One if the number of shares outstanding increased by at least 10%, and zero otherwise.
ROA	net income in year t-1 divided by total assets in year t-2 (net income t-1/total assets t-2)
SIZE	natural log of beginning of year total assets
CFO	cash from operations deflated by beginning of year total assets;
BIG4	One if the firm's auditor is a Big4 firm, and zero otherwise.

5. Results

Table 4 presents the basic statistics of the variables used in the regression analysis, divided into the pre-adoption period, the first and second years after the adoption of IFRS, and the third, fourth, and fifth years after adoption. Although to conserve space, we do not present a table in the manuscript, Pearson correlation analysis shows that no difference was found in the correlations between DA, RM1, and RM2, which are used as variables of accounting quality, and market price, EPS, and BVPS, which are used to measure value relevance before the adoption of IFRS, in the first and second years after adoption, and in the third, fourth, and fifth years after adoption. Highly significant correlations may lead to multicollinearity among variables. Consistent with most research, we use the variance inflation factor (VIF) to estimate whether there is multicollinearity among the variables. If the VIF is less than 10, there is no significant correlation or multicollinearity among variables. The VIFs are less than two, indicating that multicollinearity is not a problem in this model. We performed multivariate regression analysis to determine how the early effect of IFRS adoption has changed over time in the panel data regression, which has also been presented in the robustness test.

Table 4. Descriptive statistics relating to variables used in analyses.

Variables	Mean	Q1	Median	Q3	Std. Dev.
Pre-Adoption					
<i>DA</i>	−0.005	−0.055	−0.001	0.050	0.125
<i>RM1</i>	−0.048	−0.154	−0.027	0.081	0.303
<i>RM2</i>	−0.031	−0.110	−0.027	0.059	0.193
<i>P</i>	16.852	0.420	1.900	10.751	44.380
<i>EPS</i>	1.535	0.018	0.145	0.880	4.274
<i>BVPS</i>	14.694	0.283	1.813	8.172	42.233
<i>LEV</i>	0.552	0.408	0.554	0.685	0.224
<i>GRW</i>	0.171	0.022	0.121	0.246	0.330
<i>ISSUE</i>	0.253	0.000	0.000	1.000	0.435
<i>ROA</i>	0.028	0.006	0.034	0.078	0.122
<i>SIZE</i>	12.188	11.201	12.015	12.981	1.622
<i>CFO</i>	0.069	0.014	0.066	0.129	0.112
<i>BIG</i>	0.373	0.000	0.000	1.000	0.484
Post 1, 2 Adoption					
<i>DA</i>	−0.005	−0.054	−0.003	0.047	0.119
<i>RM1</i>	−0.066	−0.194	−0.035	0.089	0.344
<i>RM2</i>	−0.038	−0.124	−0.028	0.060	0.203
<i>P</i>	17.364	0.862	2.474	10.648	47.430
<i>EPS</i>	1.496	0.041	0.172	0.767	4.429
<i>BVPS</i>	13.760	0.553	1.765	6.963	41.552
<i>LEV</i>	0.550	0.397	0.554	0.688	0.228
<i>GRW</i>	0.208	0.015	0.130	0.286	0.402
<i>ISSUE</i>	0.315	0.000	0.000	1.000	0.464
<i>ROA</i>	0.038	0.008	0.042	0.093	0.136
<i>SIZE</i>	12.298	11.224	12.138	13.215	1.729
<i>CFO</i>	0.060	0.007	0.061	0.118	0.123
<i>BIG</i>	0.396	0.000	0.000	1.000	0.489
Post 3, 4, 5 Adoption					
<i>DA</i>	0.009	−0.043	0.008	0.059	0.119
<i>RM1</i>	−0.055	−0.180	−0.027	0.098	0.338
<i>RM2</i>	−0.032	−0.118	−0.023	0.066	0.204
<i>P</i>	16.564	1.079	2.344	9.041	47.234
<i>EPS</i>	1.311	0.042	0.155	0.685	4.071
<i>BVPS</i>	13.271	0.542	1.731	6.671	41.835
<i>LEV</i>	0.515	0.352	0.519	0.666	0.231
<i>GRW</i>	0.207	−0.027	0.089	0.258	0.486
<i>ISSUE</i>	0.288	0.000	0.000	1.000	0.453
<i>ROA</i>	0.039	0.008	0.045	0.097	0.143
<i>SIZE</i>	12.351	11.216	12.166	13.310	1.768
<i>CFO</i>	0.057	0.004	0.060	0.119	0.127
<i>BIG</i>	0.330	0.000	0.000	1.000	0.470

Note: All variables are winsorized at 1 and 99 percent. See Table 3 for all variable definitions.

Table 5 shows the results of the regression analysis using discretionary accruals as the dependent variable to measure earnings management. In China, France, and the UK, discretionary accruals significantly decrease in the first and second years after IFRS adoption. Germany, Australia, and Korea do not show a significant association in the first and second years after IFRS adoption. In the third, fourth, and fifth years after IFRS adoption, China, Germany, France, and Australia continue to exhibit the effects observed in the first and second years of IFRS adoption. In the case of the UK, the effect of decreasing discretionary accruals is significant at the 10% level in the first and second years after adoption, but the effect is not found in the third, fourth, and fifth years. However, in Korea, compared to the first and second years after adoption, discretionary accruals in the third, fourth, and fifth years after IFRS adoption are significantly positive at the 1% level. This suggests that, in the case of Korea, while accounting quality measured by discretionary accruals is improved at the beginning of IFRS adoption as a result of strict monitoring by regulatory authorities, the initial effects disappear over time.

Table 5. The effect of IFRS adoption on discretionary accruals.

Variables	Korea	China	Germany	France	UK	Australia
Intercept	0.029 *** (9.23)	−0.104 *** (−18.07)	0.279 *** (10.81)	0.079 *** (4.09)	0.063 *** (6.73)	0.061 *** (4.08)
Post 1, 2	0.000 (0.06)	−0.026 *** (−16.13)	0.012 (0.63)	−0.042 *** (−5.33)	−0.009 * (−1.86)	−0.005 (−0.67)
Post 3, 4, 5	0.008 *** (8.80)	−0.018 *** (−12.90)	0.023 (1.30)	−0.019 *** (−2.71)	−0.003 (−0.68)	0.002 (0.25)
LEV	0.008 *** (4.29)	−0.013 *** (−5.47)	0.001 (0.08)	−0.004 (−0.24)	0.005 (0.84)	0.017 * (1.87)
GRW	0.002 (1.61)	−0.000 (−0.66)	−0.012 (−1.38)	−0.009 (−0.96)	0.015 *** (4.45)	0.019 *** (4.24)
ISSUE	−0.001 (−1.13)	0.003 *** (2.67)	−0.002 (−0.26)	−0.006 (−0.99)	−0.006 ** (−2.10)	−0.015 *** (−3.11)
ROA	0.909 *** (217.00)	0.802 *** (125.42)	0.647 *** (30.91)	0.779 *** (23.22)	0.793 *** (75.58)	0.803 *** (56.53)
SIZE	−0.001 *** (−4.26)	0.012 *** (25.39)	−0.020 *** (−11.14)	−0.003 * (−1.93)	−0.003 *** (−3.86)	−0.004 *** (−2.88)
CFO	−0.942 *** (−227.91)	−0.880 *** (−178.71)	−0.806 *** (−27.90)	−0.883 *** (−26.06)	−0.839 *** (−66.57)	−0.882 *** (−49.99)
BIG	0.002 *** (3.24)	−0.005 ** (−2.21)	−0.007 (−0.99)	0.000 (0.04)	−0.007 ** (−2.14)	−0.005 (−0.84)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R ²	0.904	0.782	0.532	0.321	0.737	0.676
n	7342	11,600	1277	1818	2314	1797

Note: *, **, *** Indicate significance at the 10%, 5%, and 1% levels, respectively. See Table 3 for all of the variable definitions.

Table 6 shows the results of the regression analysis using *RM1*, which is the sum of abnormal production costs (*abprod*) and abnormal expenses (*abde*), as the dependent variable. In Germany, earnings management measured using *RM1* significantly decreased in the first and second years after IFRS adoption, and the significantly decreased measure persisted in the third, fourth, and fifth years. In Korea, France, the UK, and Australia, *RM1* as the measure of earnings management is not significant in the first and second years after IFRS adoption, and the insignificant results are maintained in the third, fourth, and fifth years. However, in China, while the measure of earnings management did not show a significant difference in the first and second years after IFRS adoption, in the third, fourth, and fifth years, *RM1* as a measure of earnings management was significantly positive at the 1% level, indicating a significant increase in earnings management. This suggests that while Chinese companies maintained the accounting quality effects measured by discretionary accruals that were acquired in the

early periods after IFRS adoption, the measure of real activities manipulation ($abprod+abde$), which is substitutable for discretionary accruals, increased in the third, fourth, and fifth years due to an increase in the marginal benefit of earnings management.

Table 6. The effect of IFRS adoption on real activity manipulation ($abprod + abde$).

Variables	Korea	China	Germany	France	UK	Australia
Intercept	0.193 *** (6.56)	0.061 *** (2.70)	−0.260 ** (−2.38)	−0.083 (−1.22)	−0.126 * (−1.65)	−0.375 *** (−4.36)
Post 1, 2	−0.005 (−0.54)	−0.003 (−0.47)	−0.203 *** (−2.61)	−0.022 (−0.81)	−0.042 (−1.03)	−0.005 (−0.13)
Post 3, 4, 5	−0.005 (−0.59)	0.032 *** (5.69)	−0.133 * (−1.80)	−0.010 (−0.39)	−0.049 (−1.28)	−0.033 (−0.90)
LEV	0.179 *** (10.5)	0.119 *** (12.74)	−0.157 ** (−2.53)	0.281 *** (5.27)	0.241 *** (5.40)	0.171 *** (3.30)
GRW	−0.007 (−0.48)	0.013 *** (2.60)	−0.098 *** (−2.77)	−0.032 (−0.97)	−0.061 ** (−2.22)	−0.054 ** (−2.12)
ISSUE	−0.036 *** (−3.59)	−0.021 *** (−4.29)	−0.034 (−1.17)	−0.010 (−0.48)	−0.009 (−0.34)	−0.007 (−0.25)
ROA	−0.134 *** (−3.37)	−0.364 *** (−14.52)	−0.039 (−0.44)	0.186 (1.58)	0.399 *** (4.67)	0.146 * (1.77)
SIZE	−0.016 *** (−6.34)	−0.009 *** (−4.95)	0.036 *** (4.79)	−0.008 (−1.48)	−0.002 (−0.34)	0.016 ** (2.03)
CFO	−0.359 *** (−9.14)	−0.630 *** (−32.58)	−0.450 *** (−3.68)	−0.275 ** (−2.31)	−0.577 *** (−5.62)	−0.336 *** (−3.30)
BIG	−0.037 *** (−5.34)	−0.048 *** (−5.54)	−0.046 (−1.52)	−0.041 * (−1.75)	−0.094 *** (−3.36)	−0.065 * (−2.10)
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R ²	0.063	0.187	0.043	0.017	0.038	0.026
n	7342	11,600	1277	1818	2314	1797

Note: *, **, *** Indicate significance at the 10%, 5%, and 1% levels, respectively. See Table 3 for all variable definitions

Table 7 shows the results of the regression analysis in which $RM2$, the sum of abnormal cash flows ($abocf$) and abnormal expenses ($abde$), is the dependent variable. In Korea and Germany, earnings management measured using $RM2$ significantly decreased in the first and second years after IFRS adoption, and the significantly decreased measure persisted in the third, fourth, and fifth years. On the other hand, in China, while the measure of earnings management was not significantly different in the first and second years after IFRS adoption, $RM2$ as the measure of earnings management was significantly positive at the 1% level in the third, fourth, and fifth years, indicating a significant increase in earnings management. The results of $RM2$ in China are similar to those for $RM1$ in Table 5. In France and Australia, the change in earnings management that was measured using $RM2$ in the first and second years after IFRS adoption was not significant, and this insignificant result was sustained in the third, fourth, and fifth years. In the UK, earnings management through real activities manipulation was not significant in the first and second years after IFRS adoption, and significantly decreased in the third, fourth, and fifth years.

In sum, earnings quality in China as measured by discretionary accruals significantly decreased in the first, second, third, fourth, and fifth years after IFRS adoption, demonstrating the decrease in earnings management using discretionary accruals. However, while earnings management through real activities manipulation ($RM1$ and $RM2$), which is substitutable for discretionary accruals, did not significantly change in the first and second years after IFRS adoption, it significantly changed in the third, fourth, and fifth years at the 1% significance level. In the early stage of IFRS adoption, neither discretionary accruals nor earnings management through real activities manipulation showed significant results in the first and second years after adoption, as the Chinese government strongly monitored companies' application of IFRS. Over time, in the third, fourth, and fifth years, as the

marginal benefit of earnings management increased, these results suggest that firms used earnings management by real activities manipulation, which has a substitutable relationship with discretionary accruals. Beginning in 2001, the China Securities Regulatory Commission gradually stepped up a strong policy of treating Chinese GAAP the same as IFRS until the adoption of IFRS in 2007 [25]. This suggests that Chinese companies chose earnings management through real activities manipulation to manage their earnings while complying with IFRS.

Table 7. The effect of IFRS adoption on real activity manipulation (*abocf + abde*).

Variables	Korea	China	Germany	France	UK	Australia
Intercept	0.152 *** (10.13)	0.192 *** (16.77)	−0.079 (−1.31)	0.059 (1.52)	−0.053 (−1.31)	−0.318 *** (−6.78)
Post 1, 2	−0.014 *** (−2.85)	0.003 (0.80)	−0.153 *** (−3.62)	−0.021 (−1.32)	−0.034 (−1.58)	−0.011 (−0.51)
Post 3, 4, 5	−0.015 *** (−3.43)	0.010 *** (3.59)	−0.083 ** (−2.04)	−0.007 (−0.50)	−0.041 ** (−1.98)	−0.020 (−1.01)
LEV	0.107 *** (12.28)	0.057 *** (12.11)	−0.073 ** (−2.15)	0.153 *** (5.00)	0.152 *** (6.39)	0.147 *** (5.19)
GRW	−0.029 *** (−3.97)	−0.006 ** (−2.27)	−0.085 *** (−4.37)	−0.064 *** (−3.46)	−0.072 *** (−4.93)	−0.071 *** (−5.11)
ISSUE	−0.015 *** (−2.88)	−0.001 (−0.51)	−0.032 ** (−2.02)	0.013 (1.01)	0.002 (0.17)	0.015 (0.98)
ROA	0.131 *** (6.44)	0.042 *** (3.29)	0.123 ** (2.53)	0.277 *** (4.10)	0.439 *** (9.66)	0.284 *** (6.35)
SIZE	−0.009 *** (−7.27)	−0.015 *** (−16.51)	0.018 *** (4.37)	−0.009 *** (−2.99)	0.000 (0.09)	0.017 *** (4.03)
CFO	−0.933 *** (−46.62)	−1.007 *** (−102.34)	−0.840 *** (−12.56)	−0.798 *** (−11.71)	−0.930 *** (−17.05)	−0.702 *** (−12.62)
BIG	−0.018 *** (−5.1)	−0.008 * (−1.83)	−0.033 ** (−1.96)	−0.026 * (−1.94)	−0.048 *** (−3.21)	−0.034 ** (−2.00)
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R ²	0.310	0.528	0.166	0.108	0.152	0.136
n	7342	11,600	1277	1818	2314	1797

Note: *, **, *** Indicate significance at the 10%, 5%, and 1% levels, respectively. See Table 3 for all variable definitions.

Table 8 presents the results of a regression analysis where stock price is the dependent variable. In China, *EPS* is significantly positive in the first, second, third, fourth, and fifth years after the adoption of IFRS. By contrast, the value relevance of *BVPS* is significantly negative in the first, second, third, fourth, and fifth years after the adoption of IFRS. In China, the results for the value relevance of *BVPS* are either insignificant or significantly negative both before and after IFRS adoption. This may be because financial statements for Chinese companies exclude land, since companies in China, a socialist country, cannot own land; however, the value of land can be reflected in stock prices. This suggests that Chinese companies have maintained the value relevance of *EPS* since their adoption of IFRS. For Korea, *EPS* is significantly positive in the first and second years after the adoption of IFRS, but is insignificant in the third, fourth, and fifth years, indicating that although Korea experienced enhanced value relevance of *EPS* at the beginning of IFRS adoption, this was not sustained in later years. On the other hand, the value relevance of *BVPS* is inconsistent, with significantly negative results in the first and second years after IFRS adoption and significantly positive results in the third, fourth, and fifth years.

Table 8. The effect of IFRS adoption on value relevance.

Variables	Korea	China	Germany	France	U.K.	Australia
Intercept	5.480 *** (3.08)	0.185 ** (2.55)	−9.487 (−0.93)	8.086 ** (2.25)	2.459 (1.42)	0.405 (0.52)
Post 1, 2	0.783 (0.62)	0.491 *** (9.39)	15.245 (1.47)	5.259 (1.42)	−1.598 (−0.91)	0.530 (0.66)
Post 3, 4, 5	2.573 ** (2.27)	0.829 *** (18.70)	18.697 * (1.87)	−0.338 (−0.1)	−1.471 (−0.88)	0.429 (0.60)
EPS	5.892 *** (21.13)	2.837 *** (4.75)	2.509 (1.08)	4.716 *** (5.24)	7.703 *** (4.35)	−1.063 (−0.53)
EPS 1, 2	1.158 *** (3.05)	2.087 *** (3.14)	−1.819 (−0.76)	1.729 * (1.68)	−1.096 (−0.56)	0.141 (0.07)
EPS 3, 4, 5	−0.036 (−0.1)	1.934 *** (3.10)	−0.581 (−0.25)	1.351 (1.42)	1.375 (0.77)	4.197 ** (2.09)
BVPS	0.341 *** (12.08)	−0.092 (−1.26)	1.755 *** (4.33)	0.604 *** (7.25)	0.350 (0.91)	1.885 *** (4.05)
BVPS 1, 2	−0.129 *** (−3.34)	−0.186 ** (−2.17)	−0.293 (−0.70)	−0.157 (−1.62)	0.863 ** (2.09)	0.320 (0.61)
BVPS 3, 4, 5	0.100 *** (2.97)	−0.194 ** (−2.49)	−0.922 ** (−2.26)	−0.194 ** (−2.19)	−0.193 (−0.50)	−0.804 * (−1.72)
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R ²	0.768	0.268	0.741	0.817	0.876	0.865
n	5108	6054	762	1095	1339	838

Note: *, **, *** Indicate significance at the 10%, 5%, and 1% levels, respectively. See Table 3 for all of the variable definitions. EPS 1 and 2 equal one if they are representing EPS for the first or second years after the adoption of IFRS, and zero otherwise. EPS 3, 4, and 5 equal one if they are figures for the third, fourth, or fifth years after IFRS adoption, and zero otherwise; BVPS is the book value of equity per share; BVPS 1 and 2 equal one if they represent BVPS for the first or second years after IFRS adoption, and zero otherwise; BVPS 3, 4, and 5 equal one if they are figures for the third, fourth, or fifth years after IFRS adoption, and zero otherwise.

Germany, the UK, and Australia demonstrate an insignificant association between *EPS* and stock prices in the first and second years after the adoption of IFRS. While *EPS* in France is positive in the first and second years after IFRS adoption, it is only significant at the 10% level. In Germany and the UK, insignificant effects of *EPS* in the first and second years after adoption continue in the third, fourth, and fifth years. There were also insignificant effects of *EPS* in France in the third, fourth, and fifth years. In Australia, the value relevance of *EPS* in the third, fourth, and fifth years was positive at the 5% level. Examining value relevance in Germany, France, and Australia, *BVPS* was not significant in the first and second years after IFRS adoption. In the UK, *BVPS* was significantly positive at the 5% level in the first and second years after adoption. *BVPS* was found to lack value relevance in Germany, France, and Australia, as the coefficient was not significant in either the first or second years after adoption, and was significantly negative in the third, fourth, and fifth years after adoption. For the UK, where *BVPS* was significantly value-relevant at the beginning of IFRS adoption, the results are insignificant in the third, fourth, and fifth years after adoption. In Germany, France, the UK, and Australia, the value relevance of *BVPS* decreases in the third, fourth, and fifth years compared to the levels in the early years after IFRS adoption. The data were also analyzed after separating the sample data for the first and second years after IFRS adoption from those of the third, fourth, and fifth years into the variables Post 1 and 2 and variables Post 3, 4, 5, respectively, for all of the study models that test hypotheses. The results of the additional empirical analyses are not different when the sample is divided and analyzed in a separate study model with samples from the pre-IFRS adoption period. We judge that the change in accounting standards, which is a method of measuring corporate value, does not improve the value relevance of *EPS* and *BVPS*.

Since Germany is a country that follows a code law system, financial reporting standards are based on protecting company stakeholders, as well as the rules in the tax codes, so it adopts a relatively prudent accounting system. However, in countries that follow a common law system, an accounting

system is adopted that attaches importance to shareholders' wealth, so these environmental differences and characteristics may affect accounting quality [18]. Chalmers et al. [21] investigated whether IFRS adoption affects the value relevance of the accounting information of listed companies in Australia. They argued that the value relevance of net profit increased, but the value relevance of capital did not. Chalmers et al. [21] also noted that, despite the high quality of financial reporting standards used in Australia and the effectiveness of institutional strategies to force investor protection and implementation of accounting principles, the adoption of IFRS affected accounting quality.

6. Robustness Test

To demonstrate the robustness of the results, we winsorized the variables for each country, and performed the Hausman test to determine the correlation between individual effects and descriptive variables. If the significance level ($Pr > m$) was 0.05 or lower in the Hausman test, a fixed effects model was used for the analysis. In all of the other cases, a random effects model was applied, and a panel data regression was performed. The analysis results of the research model using the panel data regression were similar to those of the pooled ordinary least squares (OLS) regression, and support the results of this study. The panel data regression solves the problem of omitted variables by reflecting the unobserved attributes of objects, and reduces the bias of the estimates. In addition, the possibility of multicollinearity among descriptive variables decreases, and the efficiency of estimation improves.

The results of the panel data regression to examine robustness are summarized as follows. In European or European-influenced countries such as Germany, France, the UK, and Australia, the measures of discretionary accruals (*DA*) and real activities manipulation (*RM1* and *RM2*), which were used to analyze the impact of IFRS adoption on accounting quality, declined or were maintained over time. France, the UK, and Australia established institutional mechanisms to better enforce the protection of investors and IFRS accounting principles than Korea and China.

In contrast, in China, although *DA*, a measure that reflects manipulation of book earnings, has decreased since the adoption of IFRS, real activities manipulation (*RM1* and *RM2*) has increased. This indicates that companies in China have replaced the use of discretionary accruals with real activities manipulation (*RM1* and *RM2*) as a method of earnings management due to China's adoption of more principled IFRS and its stronger law enforcement powers. In Korea, the panel data regression shows that discretionary accruals have increased since IFRS adoption, while real activities manipulation declined or was maintained for the first two years and increased in the third, fourth, and fifth years after adoption.

The effect of IFRS adoption on *EPS* in the first and second years after IFRS adoption was also maintained in the third, fourth, and fifth years in all of the countries. In Germany, France, and the UK, the early effect of IFRS adoption on *EPS* was not significant, and continued to be insignificant in the third, fourth, and fifth years. In Australia, Korea, and China, the value relevance of *EPS* increased significantly in the early period after IFRS adoption, and its significance was maintained in the third, fourth, and fifth years after adoption. On the other hand, the value relevance of IFRS adoption on *BVPS* decreased in the first and second years after adoption in Korea and China, while no significant changes were observed in Germany, France, or Australia. In the third, fourth, and fifth years after IFRS adoption, the value relevance of *BVPS* decreased significantly in China, France, and Australia, while no significant changes were observed in Korea, Germany, and the UK. Only in the UK did *BVPS* increase significantly in the first and second years after IFRS adoption, as also observed in the pooled OLS regression analysis. In summary, the effects of IFRS adoption on *EPS* and *BVPS* that were observed in this study are similar to the results found in the value relevance study by Chalmers et al. [21]. Chalmers et al. [21] studied the effect of IFRS adoption on value relevance for Australian listed companies, and argued that the value relevance of net earnings increased, but that of capital did not.

7. Conclusions

This study demonstrates that the sustained effects of IFRS adoption on earnings management and value relevance depend on differences in the legal systems and institutions of each country. Specifically, the effects on earnings management and value relevance shown in the early periods after IFRS adoption proved to differ with the passage of time in countries with different legal regimes, legal enforcement, and outside investor protection. Countries with common law systems that provide strong legal protection for outside capital market investors have experienced consistent results from the early periods after IFRS adoption over time. In contrast, Asian countries with statutory law systems and low levels of outside investor protection demonstrated improved earnings quality based on some measures of earnings management in the early periods after IFRS adoption, but this improvement was not maintained over time.

The effects in Korea seem to have gradually vanished after the powerful monitoring of IFRS compliance by supervisory authorities in the early periods after IFRS implementation. Moreover, with the adoption of IFRS, Germany and France, as European countries with statutory law systems, experienced improved earnings quality measured by earnings management, which has been maintained even with the passage of time. Companies in the UK and Australia, which are Commonwealth countries with common law systems, showed little significant change compared to the early period after IFRS adoption, and the initial effects remained unchanged even with the passage of time. It is likely that significant changes are not observed in companies in the UK and Australia, which are countries that are known to have high accounting quality, since their local accounting standards prior to the adoption of IFRS were similar to IFRS, and they already had sufficient legal and institutional infrastructures in place.

Accounting quality measured by value relevance differs from quality measured by earnings management. In Germany, France, the UK, and Australia, no difference in significance was observed for value relevance as measured by EPS between the early period after IFRS adoption and later periods. On the contrary, the value relevance of BVPS that was shown in the early period decreased with the passage of time. In addition, since the socialist country China does not allow companies to own land, the value relevance as measured by BVPS was either insignificant or negative, regardless of IFRS adoption.

However, China's value relevance as measured by EPS continues to be significant for the pre-adoption, early, and later post-IFRS adoption periods. Value relevance in Korea, as measured by EPS and BVPS, is not maintained, and reverses in both the early and later periods after IFRS adoption. The effect of IFRS implementation on the value relevance of accounting information is not maintained either in the early period after adoption or after the passage of time, which leads to uncertainty about any improvement in value relevance. This implies that a change in accounting standards, which is a method that is used to measure corporate value, does not necessarily improve value relevance.

This study analyzes whether the early effects of IFRS adoption are sustained in different countries with different legal systems, law enforcement, and outside investor rights. It is difficult to classify the qualitative characteristics of a country's accounting information as defined by its national legal system, legal enforcement, and level of outside investor protection. However, the early effects of IFRS adoption are maintained even with the passage of time in the UK and Australia, which have common law systems with strong outside investor rights and legal enforcement. The UK and Australia appear to have adopted high-quality accounting standards, which have melded with their existing social and economic infrastructures without much difficulty. On the other hand, Korea and China, as emerging and transitional economies compared to the European Union (EU) countries and Australia, do not show sustained effects of IFRS adoption. We could not reach a clear conclusion that accounting quality has been improved in all of the countries in this study that adopted IFRS. The results of this study suggest that the effects of IFRS both at adoption and after a period of time differ depending on the social, economic, and accounting environments of the countries in which the accounting standards are applied.

We believe that the results of this study can be interpreted in a more meaningful way by comparing countries with different accounting environments to see if the original purposes of IFRS were achieved after adoption. We expect that, in reviewing the performance of IFRS adoption at present and establishing policies for future improvements, appropriate measures can be developed by considering the levels of political, economic, and social institutions in each country.

To verify the sustainability of the IFRS effect, this study conducted country-specific tests using various measures, such as discretionary accruals, real earnings management, and the value relevance of accounting measurements on stock prices. This study's measurement of accounting quality is limited to financial data, and yet, it is necessary to use general variables other than the three proxy variables used here and consider non-financial factors for individual countries. A limitation of this study is the study's duration; the verification of sustainability is limited due to the five-year verification period after the introduction of IFRS due to differences in the timing of IFRS adoption by each country. Therefore, in order to draw generalized conclusions about the effects of adoption of IFRS in the future, more countries with long-term data of at least 10 years should be analyzed. In addition, due to differences in the timing of IFRS adoption by country, additional studies should be performed that consider the economic situation of the adopting countries.

Studies of IFRS have been limited to the effects of IFRS adoption. According to the financial accounting conceptual framework, accounting information is meaningful when the benefit of the information that is produced is greater than its cost. There have also been discussions about an increase in audit fees due to IFRS adoption [75–77]; future studies should examine the effect of IFRS adoption on costs.

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References

1. Landsman, W.R.; Maydew, E.L.; Thornock, J.R. The information content of annual earnings announcements and mandatory adoption of IFRS. *J. Account. Econ.* **2012**, *53*, 34–54. [[CrossRef](#)]
2. Mueller, G.G.; Gernon, H.; Meek, G. *Accounting: An International Perspective, a Supplement to Introductory Accounting Textbooks (Irwin Perspectives in International Business)*, 2nd ed.; Richard D Irwin: Homewood, IL, USA, 1990; ISBN1 13 978-0256090895. ISBN2 10 0256090890.
3. Gray, S.J. Towards a theory of cultural influence on the development of accounting systems internationally. *Abacus* **1988**, *24*, 1–15. [[CrossRef](#)]
4. La Porta, R.; Lopez-de-Silanes, F.; Shleifer, A.; Vishny, R. Legal determinants of finance. *J. Financ.* **1997**, *52*, 1131–1150. [[CrossRef](#)]
5. La Porta, R.; Lopez-de-Silanes, F.; Shleifer, A.; Vishny, R. Law and finance. *J. Polit. Econ.* **1998**, *106*, 1113–1155. [[CrossRef](#)]
6. KAI. *IFRS Adoption Road Map Announcement*; KAI: Seoul, Korean, 2007.
7. Ashbaugh, H.; Pincus, M. Domestic accounting standards, international accounting standards, and the predictability of earnings. *J. Account. Res.* **2001**, *39*, 417–434. [[CrossRef](#)]
8. Byard, D.; Li, Y.; Yu, Y. The effect of mandatory IFRS adoption on financial analysts' information environment. *J. Account. Res.* **2011**, *49*, 69–96. [[CrossRef](#)]
9. Covrig, V.; DeFond, M.; Hung, M. Home bias, foreign mutual fund holdings, and the voluntary adoption of International Accounting Standards. *J. Account. Res.* **2007**, *45*, 41–70. [[CrossRef](#)]
10. DeFond, M.; Hu, X.; Hung, M.; Li, S. The impact of mandatory IFRS adoption on foreign mutual fund ownership: The role of comparability. *J. Account. Econ.* **2011**, *51*, 240–258. [[CrossRef](#)]

11. Gordon, L.; Loeb, M.; Zhu, W. The impact of IFRS adoption on foreign direct investment. *J. Account. Public Pol.* **2012**, *31*, 374–398. [[CrossRef](#)]
12. Tan, H.; Wang, S.; Welker, M. Analyst following and forecast accuracy after mandated IFRS adoptions. *J. Account. Res.* **2011**, *49*, 1307–1357. [[CrossRef](#)]
13. Horton, J.; Serafeim, G.; Serafeim, I. Does mandatory IFRS adoption improve the information environment? *Contemp. Account. Res.* **2013**, *30*, 388–423. [[CrossRef](#)]
14. Barth, M.; Landsman, W.; Lang, M. International accounting standards and accounting quality. *J. Account. Res.* **2008**, *46*, 467–498. [[CrossRef](#)]
15. Ahmed, A.; Neel, M.; Wang, D. Does mandatory adoption of IFRS improve accounting quality? Preliminary evidence. *Contemp. Account. Res.* **2013**, *30*, 1344–1372. [[CrossRef](#)]
16. Soderstrom, N.; Sun, K. IFRS adoption and accounting quality: A review. *Eur. Account. Rev.* **2007**, *16*, 675–702. [[CrossRef](#)]
17. 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.
18. Hung, M.; Subramanyam, K. Financial statement effects of adopting International Accounting Standards: The case of Germany. *Rev. Account. Stud.* **2007**, *12*, 623–657. [[CrossRef](#)]
19. Capkun, V.; Collins, D.W.; Jeanjean, T. *Does Adoption of IAS/IFRS Deter Earnings Management? Working Paper*; HEC: Saclay, Paris, 2011.
20. Christensen, H.B.; Lee, E.; Walker, M. *Incentives or Standards: What Determines Accounting Quality Changes around IFRS Adoption? Working Paper*; University of Manchester: Manchester, UK, 2008.
21. Chalmers, K.; Clinch, G.; Godfrey, J.M. Changes in value relevance of accounting information upon IFRS adoption: Evidence from Australia. *Aust. J. Bus.* **2011**, *36*, 151–173. [[CrossRef](#)]
22. Choe, K.H.; Son, Y.J. The effects of K-IFRS adoption on the financial statements items. financial ratios, and accruals. *Korean Account. J.* **2012**, *21*, 209–256.
23. Choi, J.H. The adoption of IFRS and value relevance of accounting information. *Korea Account. Rev.* **2013**, *38*, 391–424.
24. Van Tendeloo, B.; Vanstraelen, A. Earnings management under German GAAP versus IFRS. *Eur. Account. Rev.* **2005**, *14*, 155–180. [[CrossRef](#)]
25. Leuz, C.; Nanda, D.; Wysocki, P.D. Earnings management and investor protection: An international comparison. *J. Financ. Econ* **2003**, *69*, 505–527. [[CrossRef](#)]
26. Shleifer, A.; Vishny, R.W. A survey of corporate governance. *J. Financ.* **1997**, *52*, 737–783. [[CrossRef](#)]
27. La Porta, R.; Lopez-de-Silanes, F.; Shleifer, A.; Vishny, R. Corporate ownership around the world. *J. Financ.* **1999**, *54*, 471–517. [[CrossRef](#)]
28. Navarro-García, J.C.; Bastida, F. An empirical insight on Spanish listed companies' perceptions of International Financial Reporting Standards. *J. Int. Account. Audit. Tax.* **2010**, *19*, 110–120. [[CrossRef](#)]
29. Chen, J.J.; Zhang, H. The impact of regulatory enforcement and audit upon IFRS compliance—Evidence from China. *Eur. Account. Rev.* **2010**, *19*, 665–692. [[CrossRef](#)]
30. Zeff, S.; Nobes, C. Commentary: Has Australia (or any other jurisdiction) 'adopted' IFRS? ' *Aust. Account. Rev.* **2010**, *20*, 178–184. [[CrossRef](#)]
31. Nobes, C. Accounting classification in the IFRS era. *Aust. Account. Rev.* **2008**, *18*, 191–198. [[CrossRef](#)]
32. Qu, W.; Fong, M.; Oliver, J. Does IFRS convergence improve quality of accounting information? - Evidence from the Chinese stock market. *Corp. Ownersh. Control* **2012**, *9*, 187–196. [[CrossRef](#)]
33. Camfferman, K.; Zeff, S.A. The challenge of setting standards for a worldwide constituency: Research implications from the IASB's early history. *Eur. Account. Rev.* **2018**, *27*, 289–312. [[CrossRef](#)]
34. Nobes, C.; Perramon, J. Firm size and national profiles of IFRS policy choice. *Aust. Account. Rev.* **2013**, *23*, 208–215. [[CrossRef](#)]
35. Mir, M.; Rahaman, A. The adoption of International Accounting Standards in Bangladesh: An exploration of rationale and process. *Account. Audit. Account. J.* **2005**, *18*, 816–841.
36. Tsalavoutas, I.; André, P.; Dionysiou, D. *Worldwide Application of IFRS 3, IAS 36 and IAS 38, Related Disclosures, and Determinants of Non-Compliance*; ACCA Research Report 134; ACCA: London, UK, 2014.
37. Capkun, V.; Jeny, A.; Jeanjean, T.; Weiss, L.A. Earnings Management and Value Relevance during the Mandatory Transition from Local GAAPs to IFRS in Europe. 2008. Available online: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1125716 (accessed on 25 April 2008).

38. Elbannan, M. Accounting and stock market effects of international accounting standards adoption in an emerging economy. *Rev. Quant. Financ. Account.* **2011**, *36*, 207–245. [[CrossRef](#)]
39. Outa, E.R. *The Impact of International Financial Reporting Standards (IFRS) Adoption on the Accounting Quality of Listed Companies in Kenya*; Working Paper; United States International University Africa: Nairobi, Kenya, 2011.
40. Paananen, M.; Lin, H. The development of accounting quality of IAS and IFRS over time: The case of Germany. *J. Int. Account. Res.* **2009**, *8*, 31–55. [[CrossRef](#)]
41. Jung, S.J.; Kim, B.J.; Chung, J.R. The association between abnormal audit fees and audit quality after IFRS adoption: Evidence from Korea. *Int. J. Account. Inf. Man.* **2016**, *24*, 252–271. [[CrossRef](#)]
42. Francis, J.; LaFond, R.; Olsson, P.M.; Schipper, K. Costs of equity and earnings attributes. *Account. Rev.* **2004**, *79*, 967–1010. [[CrossRef](#)]
43. Park, H. Market reaction to other comprehensive income. *Sustainability* **2018**, *10*, 1837. [[CrossRef](#)]
44. Christensen, H.B.; Hail, L.; Leuz, C. Mandatory IFRS reporting and changes in enforcement. *J. Account. Econ.* **2013**, *56*, 147–177. [[CrossRef](#)]
45. Roychowdhury, S. Earnings management through real activities manipulation. *J. Account. Econ.* **2006**, *42*, 335–370. [[CrossRef](#)]
46. Ewert, R.; Wagenhofer, A. Economic effects of tightening accounting standards to restrict earnings management. *Account. Rev.* **2005**, *80*, 1101–1124. [[CrossRef](#)]
47. Callao, S.; Jarne, J.I. Have IFRS affected earnings management in the European Union? *Account. Eur.* **2010**, *7*, 159–189. [[CrossRef](#)]
48. Cohen, D.A.; Zarowin, P. Accrual-based and real earnings management activities around seasoned equity offerings. *J. Account. Econ.* **2010**, *50*, 2–19. [[CrossRef](#)]
49. Xu, L.; Zhang, S.; Liu, N.; Chen, L. Corporate hypocrisy: Role of non-profit corporate foundations in earnings management of for-profit founder firms. *Sustainability* **2018**, *10*, 3991. [[CrossRef](#)]
50. Ball, R.; Robin, A.; Wu, J.S. Incentives versus standards: Properties of accounting income in four East Asian countries. *J. Account. Econ.* **2003**, *36*, 235–270. [[CrossRef](#)]
51. Jones, J.J. Earnings management during import relief investigations. *J. Account. Res.* **1991**, *29*, 193–228. [[CrossRef](#)]
52. Rangan, S. Earnings management and the performance of seasoned equity offerings. *J. Financ. Econ* **1998**, *50*, 101–122. [[CrossRef](#)]
53. Teoh, S.H.; Welch, I.; Wong, T.J. Earnings management and the long-run market performance of initial public offerings. *J. Financ.* **1998**, *6*, 1935–1974. [[CrossRef](#)]
54. Dou, Y.W.; Khan, M.; Zou, Y. Labor unemployment insurance and earnings management. *J. Account. Econ.* **2016**, *61*, 166–184. [[CrossRef](#)]
55. Du, X.Q.; Jian, W.; Lai, S.J. Do foreign directors mitigate earnings management? Evidence from China. *Int. J. Account.* **2017**, *52*, 142–177. [[CrossRef](#)]
56. Lakshmana, I.; Yang, Y.W. Product market competition and earnings management: Evidence from discretionary accruals and real activity manipulation. *Adv. Account.* **2014**, *30*, 263–275. [[CrossRef](#)]
57. Liu, M.Z.; Shi, Y.L.; Wilson, C.; Wu, Z.Y. Does family involvement explain why corporate social responsibility affects earnings management? *J. Bus. Res.* **2017**, *75*, 8–16. [[CrossRef](#)]
58. Zhu, T.T.; Lu, M.T.; Shan, Y.W.; Zhang, Y.L. Accrual-based and real activity earnings management at the back door: Evidence from Chinese reverse mergers. *Pac.-Basin Financ. J.* **2015**, *35*, 317–339. [[CrossRef](#)]
59. Abdelsalam, O.; Mitropoulos, P.; Elnahass, M.; Leventis, S. Earnings management behaviors under different monitoring mechanisms: The case of Islamic and conventional banks. *J. Econ. Behav. Organ.* **2016**, *132*, 155–173. [[CrossRef](#)]
60. Buchner, A.; Mohamed, A.; Saadouni, B. The association between earnings forecast in IPOs prospectuses and earnings management: An empirical analysis. *J. Int. Financ. Mark. I* **2017**, *8*, 1042–1056. [[CrossRef](#)]
61. Kim, J.; Kim, Y.; Zhou, J. Languages and earnings management. *J. Account. Econ.* **2017**, *63*, 288–306. [[CrossRef](#)]
62. Sundvik, D. Book-tax conformity and earnings management in response to tax rate cuts. *J. Int. Account. Audit. Tax.* **2017**, *28*, 31–42. [[CrossRef](#)]
63. Bao, S.R.; Lewellyn, K.B. Ownership structure and earnings management in emerging markets—An institutionalized agency perspective. *Int. Bus. Rev.* **2017**, *26*, 828–838. [[CrossRef](#)]

64. Beuselincka, C.; Deloof, M. Earnings management in business groups: Tax incentives or expropriation concealment? *Int. J. Account.* **2014**, *49*, 27–52. [[CrossRef](#)]
65. Kuo, J.M.; Ning, L.T.; Song, X.Q. The real and accrual-based earnings management behaviors: Evidence from the split share structure reform in China. *Int. J. Account.* **2014**, *49*, 101–136. [[CrossRef](#)]
66. Lin, Y.M.; Shen, C.A. Family firms' credit rating, idiosyncratic risk, and earnings management. *J. Bus. Res.* **2015**, *68*, 872–877. [[CrossRef](#)]
67. Nurwati A. Zaluki, A.; Campbell, K.; Goodacre, A. Earnings management in Malaysian IPOs: The East Asian crisis, ownership control and post-IPO performance. *Int. J. Account.* **2011**, *46*, 111–137. [[CrossRef](#)]
68. Hwang, I.T.; Kang, S.M.; Jin, S.J. A delisting prediction model based on nonfinancial information. *Asia-Pac. J. Account. Econ.* **2014**, *21*, 328–347. [[CrossRef](#)]
69. Park, KE. Pay disparities within top management teams and earnings management. *J. Account. Public Pol.* **2017**, *36*, 59–81. [[CrossRef](#)]
70. Dechow, P.M.; Sloan, R.G.; Sweeney, A.P. Detecting earnings management. *Account. Rev.* **1995**, *70*, 193–225.
71. Cohen, D.A.; Dey, A.; Lys, T.Z. Real and accrual-based earnings management in the pre-and post-Sarbanes-Oxley periods. *Account. Rev.* **2008**, *83*, 757–787. [[CrossRef](#)]
72. Lang, M.; Raedy, J.S.; Wilson, W. Earnings management and cross listing: Are reconciled earnings comparable to US earnings? *J. Account. Econ.* **2006**, *42*, 255–283. [[CrossRef](#)]
73. Ohlson, J.A. Earnings, book values, and dividends in equity valuation. *Contemp. Account. Res.* **1995**, *11*, 661–687. [[CrossRef](#)]
74. Zeghal, D.; Chtourou, S.M.; Fourati, Y.M. The effect of mandatory adoption of IFRS on earnings quality: Evidence from the European Union. *J. Int. Account. Res.* **2012**, *11*, 1–25. [[CrossRef](#)]
75. DeGeorge, T.; Ferguson, C.; Spear, N. How much does IFRS cost? IFRS adoption and audit fees. *Account. Rev.* **2013**, *88*, 429–462. [[CrossRef](#)]
76. Lee, M.G.; Chang, S.J.; Cho, S.M. The adoption of International Financial Reporting Standards (IFRS), audit hours and audit fees. *Account. Audit. Res.* **2013**, *54*, 473–504.
77. Hwang, I.T.; Zhang, X.; Kang, S.M. Has IFRS adoption increased audit fees in China? *Korean Account. Rev.* **2014**, *39*, 143–178.



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