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The Role of International Financial Reporting Standards in Accounting Quality: Evidence from the European Union

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Abstract

Previous studies on the effect of International Financial Reporting Standards (IFRS) on accounting quality often have difficulties to control for confounding factors on accounting quality. As a result, the observed changes in accounting quality could not be attributed mainly to IFRS. We use a unique research setting to address this issue by comparing the accounting quality of publicly listed companies in 15 member states of the European Union (EU) before and after the full adoption of IFRS in 2005. We use five indicators as proxies for

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accounting quality. We find that the majority of accounting quality indicators improved after IFRS adoption in the EU. That is, there is less of managing earnings toward a target, a lower magnitude of absolute discretionary accruals, and higher accruals quality. But our results also show that firms engage in more earnings smoothing and recognize large losses in a less timely manner in post-IFRS periods. In addition, we examine the effects of institutional variables on financial reporting quality. Our contribution to the literature is that we show the improved accounting quality is attributable to IFRS, rather than changes in managerial incentives, institutional features of capital markets, and general business environment, etc.

1. Introduction

There are currently two main schools of thought in the debate on International Financial Reporting Standards (IFRS) and accounting harmonization/convergence. The proponents contend that a single global set of accounting standards helps reduce information asymmetry, lower the cost of capital, and increase capital flow across borders. The opponents argue that the characteristics of local business environments and institutional frameworks determine the form and contents of accounting standards. Thus, accounting standards in two countries need not be the same and the use of IFRS does not necessarily improve accounting quality. Because more and more firms and countries have adopted IFRS or considered replacing their national standards with IFRS, together with the rapid development of economic globalization and the worldwide integration of capital markets, it is the right time to evaluate the impact of IFRS on accounting quality in the international setting.[1]

The purpose of this study is to examine the effect of IFRS adoption on accounting quality in the European Union (EU). On 19 July 2002, the European Parliament passed a regulation of "The European Union Act 1606/2002—the Application of International Accounting Standards." This regulation mandates the official adoption of IFRS in the EU starting from 1 January 2005, which is also a milestone in the development of international accounting convergence. To date, more than 100 countries (regions) around the world require or allow the use of IFRS (Deloitte Touche Tohmatsu, 2008). The United States' capital market regulator, the Securities and Exchange Commission (SEC), recently removed the requirement for U.S. exchange-listed foreign companies to reconcile with U.S. Generally Accepted Accounting Principles (GAAP) if they apply IFRS. The SEC is also considering the full adoption of IFRS for domestic-listed companies in the next 3–5 years (SEC, 2008). Given the SEC's plan of adopting IFRS for U.S. domestic firms, a study of the experience of countries and companies that have already adopted IFRS is certainly beneficial to evaluate the effectiveness of IFRS adoption.

This study examines the accounting quality of publicly listed companies in 15 EU member states before and after the IFRS adoption in 2005. However, ''accounting quality'' is an elusive concept, particularly in view of the multiple uses of financial reports. ''Accounting quality'' can be defined as the extent to which the financial statement information reflects the underlying economic situation. As the underlying economic situation can not be directly observed, we operationalize the concept by using five indicators, namely, earnings smoothing, managing earnings toward targets, the magnitude of absolute discretionary accruals, accruals quality, and timely loss recognition, as the proxies for accounting quality, which have been similarly used in prior studies (e.g., Dechow et al., 1995, 2003; Dechow and Dichev, 2002; Lang et al., 2003, 2006; Leuz et al., 2003; Larcker and Richardson, 2004; Kothari et al., 2005; Barth et al., 2007, 2008; Christensen et al., 2008; Jones et al., 2008).

Accounting standards and preparer incentives interact to produce accounting information. Financial reporting practice under a given set of standards is sensitive to the incentives of the managers and auditors responsible for the preparation of financial reports (Ball et al., 2003). Ball et al. (2003) show that high quality standards do not necessarily produce high-quality accounting information. For example, financial reporting in four East Asian countries (regions) of Hong Kong, Malaysia, Singapore, and Thailand is generally in low quality, even though their standards are derived from common law sources (the United Kingdom, the United States, and International Accounting Standards [IAS]) that are widely viewed as higher quality than code law standards. They conclude that this is due to poor preparer incentives and that reporting quality ultimately is determined by the underlying economic and political factors influencing managers' and auditors' incentives, and not by accounting standards *per se* (Ball et al., 2003; Jeanjean and Stolowy, 2008). Managerial incentives depend on the interplay between market and political forces, such as the demand for high-quality financial reporting (influenced, e.g., by the amount of publicly traded equity, and the extent of private versus public contracting in the economy), and the extent of government involvement in setting up and enforcing accounting standards, taxes, and political incentives to reduce or avoid the volatility of reported income (i.e., to smooth profits). In addition, there are other macro-economic factors that may impact financial reporting practices and accounting quality, for example, some countries may have introduced a more effective enforcement system or more corporate governance regulations.

This study addresses all these concerns by taking into account the fact that the application of IFRS reflects the combined effects of the features of financial reporting systems, the interpretation and enforcement of accounting standards, and other environmental factors affecting managerial incentives. To achieve this objective, we deliberately select a research setting that allows us to interpret our results as being affected mainly by IFRS. That is, we compare the accounting quality of the same countries before and after IFRS adoption, so that each country acts as its own control and the confounding influences of macro-economic and political variables are minimized.

Using data from the publicly listed companies of 15 EU member countries for the years 2000–2007, this study finds some evidence of accounting quality improvement after IFRS adoption. That is, there is less of managing earnings toward a target, a smaller magnitude of absolute discretionary accruals, and higher accruals quality after IFRS adoption. However, firms engage in more earnings smoothing and less timely recognition of large losses even after IFRS adoption. Overall, accounting quality has marginally improved after IFRS adoption in our sample EU firms and countries. Our results suggest that IFRS limit management opportunistic discretions by reducing available accounting alternatives. When managerial incentives are held constant, changing accounting standards does affect accounting quality. Our evidence is consistent with this notion and our inferences are robust to a number of sensitivity tests.

The study results enrich our understanding of the role of accounting standards in financial reporting quality. The question we address is holding economic and political forces (therefore, the managerial incentives) constant, why accounting standards make a difference in accounting quality? This question is far from clear in the extant literature. We offer several explanations. First, we argue that IFRS, with higher quality than national accounting standards, restrict or reduce alternative accounting choices. Thus, even though managers have incentives to manage earnings, they have less options/opportunities to do so. Second, IFRS reduce the ambiguity and inconsistence of local standards, as it is easier to interpret and implement. This will reduce the likelihood that managers take advantage of ambiguous local standards to manage earnings. Third, IFRS would also improve financial reporting quality by changing managerial incentives. It is generally accepted that managerial incentives are influenced/determined by economic and political systems. Accounting standards form part of the overall economic and political systems. Thus,

changes in accounting and reporting standards also create incentives for managers to produce high-quality financial reports. As international investors are more familiar with IFRS, it would be easier for stakeholders to monitor the managers through published accounts. As a result, this will increase the pressure and the incentives for managers to faithfully report their performance. Finally, the new accounting standards would likely create incentives for auditors to implement and enforce IFRS, because accounting profession is generally supporting a single set of accounting standards (such as IFRS) in the world.

In sum, this study contributes to the literature in several ways. First, we show that the observed changes in accounting quality in EU are primarily attributable to IFRS, rather than managerial incentives, institutional features of capital markets and legal enforcement, etc. Second, we use a large sample of publicly listed firms from the 15 EU countries so the results are more robust than those of previous studies. In addition, our data cover the first 3 years after mandatory IFRS adoption. In contrast, previous studies often concentrated on a single-country setting and the data covered only 1 or 2 years after IFRS adoption. Thus, our results should be more convincing than those of previous studies. Third, we use an array of accounting quality metrics (multiple measures) that were widely but rather individually used in previous studies, and our study results are robust and maintain internal validity. We believe that our research design is more representative of EU countries and the results are therefore more generalizable. Finally, with additional tests on the impact of institutional factors, our research design has a better control of the confounding variables for the effect of IFRS than previous studies in this area.

The rest of this paper is organized as follows: The next section reviews relevant previous research. Section 3 describes the unique institutional settings in the EU and develops our study's hypothesis. Section 4 illustrates sample selection, data sources, and research design. Section 5 presents descriptive statistics, empirical results, and robust tests. Section 6 analyzes the impact of other country-level institutional variables. A brief conclusion is provided in Section 7.

2. Literature Review

2.1. Voluntary IFRS Adoption and Accounting Quality

Many firms have voluntarily adopted IFRS to prepare financial statements since the end of the 1990s. Previous studies document that

voluntary IFRS adoption is beneficial to firms in such ways as offering a lower cost of equity capital (Daske et al., 2007; Kim and Shi, 2007), making it relatively easy to cross list in well-developed international capital markets (e.g., NYSE, NASDAQ, or LSE) (Dumontier and Raffournier, 1998; Tarca, 2004; Cuijpers and Buijink, 2005), improving transparency and comparability of financial reports, reducing information asymmetry between insiders and outside shareholders (Leuz and Verrecchia, 2000; Leuz, 2003), improving analyst forecast accuracy (Ashbaugh and Pincus, 2001), and allowing for a more efficient allocation of savings worldwide (Street et al., 1999).

Barth et al. (2008) report that accounting quality has generally improved after voluntary IFRS adoption based on 1,896 firm-year observations from 21 countries (regions) for the years 1994–2003. Van Tendeloo and Vanstraelen (2005) examined whether voluntary IFRS adoption is associated with lower earnings management using German firms from 1999 to 2001. After controlling for differences in earnings management incentives and entrenchment mechanisms, contrary to Barth et al. (2008), they found that firms which voluntarily adopt IFRS have more discretionary accruals and a lower negative correlation between accruals and cash flows from operations than firms reporting under German GAAP. However, the decrease effect of voluntary IFRS adoption on accounting quality is significantly reduced when the firms is audited by Big 4/5 auditors.

Similarly, Hung and Subramanyam (2007) report that accounting quality is higher under IFRS than under German GAAP (i.e., *Handelsgesetzbuch* – HGB) for the test period of 1998–2002. But they show no significant difference in the value relevance of book value and earnings between IFRS and HGB. Christensen et al. (2008) also investigated the impact of incentives on accounting quality changes around IFRS adoption using German publicly listed companies from 1998 to 2004. They found that the improvement effect of voluntary IFRS adoption only happened to firms with incentives to adopt, which is consistent with previous findings that incentives dominate accounting standards in determining accounting quality (e.g., Ball et al., 2003; Soderstrom and Sun, 2007).

2.2. Mandatory IFRS Adoption and Accounting Quality

Beuselinck et al. (2007) examined the comparability of accounting earnings using 14 EU member states from 1990 to 2005. They used accruals-cash flows association as a proxy for earnings comparability and

found that accruals measurement was substantially affected by business cycle stages and firm-specific reporting incentives. Overall, their results show that earnings comparability across Europe does not improve after mandatory IFRS adoption.

Paananen (2008) examined whether accounting quality increased after compulsory IFRS adoption using Swedish publicly listed firms from 2003 to 2006. Following Barth et al. (2008), earnings smoothing, managing earnings toward targets, timely loss recognition, and value relevance were used as proxies for accounting quality. Interestingly, Paananen found that accounting quality decreased after IFRS adoption in Sweden, especially for the committed adopters. Similarly, Paananen and Lin (2008) examined the development of accounting quality under IAS and IFRS over time among German companies from 2000 to 2006 and found that accounting quality decreased after IFRS adoption in Germany.

Jeanjean and Stolowy (2008) examined the effect of the mandatory adoption of IFRS on earnings management by using 1,146 firm-year observations from Australia, France, and the United Kingdom from 2005 to 2006. They report that earnings management in these countries did not decline after mandatory adoption of IFRS, and even increased in France. More recently, Landsman et al. (2009), by measuring abnormal return volatility and abnormal trading volume, found that information content increased in IFRS-adopting countries, but this happened only when they used abnormal return volatility as the proxy for information content. When abnormal trading volume was used as a proxy, the increase in information content disappeared. Moreover, they found that increase in abnormal return volatility is concentrated in code law countries.

Overall, the findings on the effects of IFRS adoption on accounting quality are mixed in previous studies. Those studies were confined to the first 1 or 2 years after the mandatory adoption of IFRS. Also, their sample size is relatively small. As publicly listed firms need some time to understand and implement IFRS, whether IFRS adoption is associated with the improvement of accounting quality is still an empirical issue. In this study we use a larger sample, more countries, more years following adoption, and more accounting quality proxies to examine this issue.

3. Institutional Setting and Hypothesis Development

The convergence of IAS and financial reporting practices is a controversial issue. The proponents contend the current version of IFRS has

reduced allowable accounting alternatives, limited management's opportunistic discretions, and required accounting measurement and disclosure that can better reflect a company's financial position and economic performance. This will lead to higher quality financial reporting (Leuz and Verrecchia, 2000; Leuz, 2003; Daske et al., 2007, 2008; Barth et al., 2008). The opponents, however, argue that the characteristics of local business environments and institutional frameworks determine the form and contents of accounting standards. Thus, accounting standards in two countries with distinct economic systems and business cultures need not be the same. Moreover, restricting managerial discretion relating to accounting alternatives could eliminate a firm's ability to report accounting numbers that are more reflective of the firm's economic situation. In addition, the inherent flexibility in IFRS as the principles-based standards may provide greater opportunity for earnings management relative to rules-based domestic standards. As a result, the use of IFRS does not necessarily improve accounting quality (Ball et al., 2003; Ball and Shivakumar, 2005, 2006; Christensen et al., 2008; Jeanjean and Stolowy, 2008).

Each EU member state used its own accounting standards before IFRS adoption in 2005. Since the 1960s, the European Commission (EC, the predecessor of the EU) has been dedicated to harmonizing the accounting practices of member states, aiming at improving disclosure quality, such as comparability and transparency, of the publicly listed companies in the EC and reducing transaction costs and promote intra-trade among member states, in order to clear barriers to establish a uniform European financial market. On 19 July 2002, the EU Parliament passed a regulation requiring all publicly listed companies in the EU to adopt IFRS to prepare consolidated financial statements starting from 1 January 2005.[2] At the same time, the EU enacted several measures to ensure that IFRS will be strictly implemented and to strengthen accounting convergence, including establishing corresponding mechanisms to harmonize accounting standards-setting institutions in each member state, strengthening public monitoring of the auditing industry, revising the related EU directives, and building an effective monitoring mechanism for IFRS implementation. Moreover, the EU has built up solid institutional infrastructures, such as strong investor protection and legal enforcement, clean government, and so on (e.g., Wingate, 1997; La Porta et al., 1998, 2006; Transparency International, 2000–2007; Djankov et al., 2008; Kaufmann et al., 2008). Thus, it is expected that IFRS will be rigorously followed by publicly listed companies in the EU.

It is generally accepted that the quality of IFRS is higher than most domestic accounting standards (DAS) (e.g., Leuz and Verrecchia, 2000; Ashbaugh and Pincus, 2001; Leuz, 2003; Barth et al., 2007, 2008). We therefore posit that accounting quality is higher after the adoption of IFRS in EU member states. Nonetheless, even if we observe that accounting quality indicators are improved, we may not be able to attribute the results to accounting standards. This is because the efficiency of legal/judicial systems and the quality of legal enforcement vary widely among different countries (La Porta et al., 1998; Kaufmann et al., 2008), and the effectiveness of regulation depends largely on proper enforcement (Bhattacharya and Daouk, 2002; DeFond and Hung, 2004; Tang et al., 2008). These macro-economic factors may have a significant impact on accounting quality. We chose the EU as our research setting in order to control for those confounding macro-economic and business environmental influences. As we compare the accounting quality between the pre- and post-IFRS adoption periods for the same countries, each country acts as its own control so that those non-accounting standards effects on accounting quality can be minimized. Our study hypothesis is formalized as below:

***Hypothesis*:** *Ceteris paribus*, accounting quality in the EU is higher in the IFRS adoption period (2005–2007) than in the pre-adoption period (2000–2004).

4. Data and Research Design

4.1. Sample and Data

Our sample period starts from year 2000, when the core set of standards issued by the International Accounting Standards Committee (IASC) in 1998 had been endorsed by the International Organization of Securities Commission (IOSCO), who recommended that the world's securities regulators permit foreign issuers to use IAS for cross-border offering (IOSCO, 2000). The sample period ends in year 2007, as it is the latest year data are available from databases. We define years 2000–2004 as the pre-adoption period, and years 2005–2007 as the adoption period.

Sample firm selection starts by reviewing annual financial statements (from the Worldscope dataset) of all publicly listed firms in the 15 EU member states from 2000 to 2007.[3] These data are used to calculate accounting quality measures and related control variables, including total assets; net incomes; cash flow from operations; total liabilities;

properties, plants, and equipments; accounts receivables; sales; market value of equity; Big 4/5 auditors; industry; accounting standards followed; and so on. Consistent with previous studies (e.g., Hung, 2001; Leuz et al., 2003; Francis and Wang, 2008), financial institutions (i.e., those with four-digit Standard Industrial Classification [SIC] codes between 6000 and 6999) were excluded from the sample of the main tests due to their particular regulation and disclosure requirements.[4] All variables (except for indicator variables) were winsorized at the 1st and 99th percentiles to mitigate the effects of outliers (Francis et al., 2005).

4.2. Measurement of Accounting Quality

We adopt two categories of accounting quality measures that were frequently used in previous studies, namely, earnings management and timely loss recognition (e.g., Dechow et al., 1995, 2003; Dechow and Dichev, 2002; Lang et al., 2003, 2006; Leuz et al., 2003; Larcker and Richardson, 2004; Kothari et al., 2005; Barth et al., 2007, 2008; Christensen et al., 2008; Jones et al., 2008).

4.2.1. Earnings management. Earnings management by nature is either to mislead stakeholders about a firm's underlying economic performance or to influence contractual outcomes that depend on reported accounting numbers (Healy and Wahlen, 1999). This study uses four earnings management metrics to assess accounting quality: earnings smoothing, managing earnings toward targets, the magnitude of cross-sectional absolute discretionary accruals, and accruals quality. More specifically, earnings smoothing includes two metrics: the variability of the change in net income, and the variability of change in net income over the variability of change in cash flow from operations. A high variability is consistent with less earnings smoothing (Lang et al., 2003, 2006; Leuz et al., 2003; Ball and Shivakumar, 2005, 2006; Barth et al., 2008; Christensen et al., 2008). The magnitude of cross-sectional absolute discretionary accruals is calculated based on estimated discretionary accruals, where estimated discretionary accruals are defined as total accruals minus estimated normal accruals. Estimated normal accruals are determined from four discretionary accruals models that were widely used in previous studies: the modified Jones model, the adapted Jones model, the modified Jones model with book-to-market ratio and cash

flows from operations, and the modified Jones model with current-year ROA (Dechow et al., 1995, 2003; Larcker and Richardson, 2004; Kothari et al., 2005; Jones et al., 2008).[5] A higher magnitude of cross-sectional absolute discretionary accruals indicates a greater level of earnings management, or lower accounting quality. Accruals quality is measured as the standard deviation of a firm's residuals that are estimated by the cross-sectional Dechow–Dichev (hereafter DD) model (Dechow and Dichev, 2002). A larger standard deviation of the firm's residuals indicates poorer accruals quality, or lower accounting quality.

4.2.1.1. Earnings smoothing

We use the variance of residuals from the regressions expressed in equations (1) and (2) as a proxy for earnings smoothing to mitigate confounding effects (Barth et al., 2008):

$$\begin{aligned}\Delta NI_{i,t} = {} & \alpha_0 + \alpha_1 SIZE_{i,t} + \alpha_2 GROWTH_{i,t} + \alpha_3 EISSUE_{i,t} \\ & + \alpha_4 LEV_{i,t} + \alpha_5 DISSUE_{i,t} + \alpha_6 TURN_{i,t} + \alpha_7 CFO_{i,t} \\ & + \alpha_8 AUD_{i,t} + \alpha_9 NUMEX_{i,t} + \alpha_{10} XLIST_{i,t} + \alpha_{11} CLOSE_{i,t} \\ & + \sum_{k=1}^{14} \alpha_{k+11} Country_i + \sum_{j=1}^{42} \alpha_{j+25} Industry_i + \varepsilon_{i,t}\end{aligned} \tag{1}$$

$$\begin{aligned}\Delta CFO_{i,t} = {} & \alpha_0 + \alpha_1 SIZE_{i,t} + \alpha_2 GROWTH_{i,t} + \alpha_3 EISSUE_{i,t} \\ & + \alpha_4 LEV_{i,t} + \alpha_5 DISSUE_{i,t} + \alpha_6 TURN_{i,t} + \alpha_7 CFO_{i,t} \\ & + \alpha_8 AUD_{i,t} + \alpha_9 NUMEX_{i,t} + \alpha_{10} XLIST_{i,t} + \alpha_{11} CLOSE_{i,t} \\ & + \sum_{k=1}^{14} \alpha_{k+11} Country_i + \sum_{j=1}^{42} \alpha_{j+25} Industry_i + \varepsilon_{i,t}\end{aligned} \tag{2}$$

where $\Delta NI_{i,t}$ is the change in net income before extraordinary items scaled by lagged total assets for firm i year t; $\Delta CFO_{i,t}$ is the change in cash flow from operations scaled by lagged total assets for firm i year t; $SIZE_{i,t}$ is the natural logarithm of sales in millions of U.S. dollars for firm i year t; $GROWTH_{i,t}$ is the annual percentage change in sales for firm i year t; $EISSUE_{i,t}$ is the annual percentage change in common stock for firm i year t; $LEV_{i,t}$ is the end of year total liabilities divided by total assets for firm i year t; $DISSUE_{i,t}$ is the annual percentage change in total liabilities for firm i year t; $TURN_{i,t}$ is the sales divided by lagged total assets for firm i year t; $CFO_{i,t}$ is the annual net cash flow from operations

scaled by lagged total assets for firm i year t; $AUD_{i,t}$ is an indicator variable that equals 1 if a Big 4/5 auditor is hired and 0 otherwise for firm i year t; $NUMEX_{i,t}$ is the number of exchanges on which a firm's stock is listed for firm i year t; $XLIST_{i,t}$ is an indicator variable that equals 1 if the firm is also listed on any U.S. stock exchange for firm i year t;[6] $CLOSE_{i,t}$ is the percentage of closely held shares of the firm as reported by Worldscope for firm i year t;[7] *Country* is a country indicator variable (Austria is used as a benchmark); and *Industry* is a Fama and French (1997) industry classification indicator variable[8] (Agric [Agricultural] as benchmark). Consistent with Francis et al. (2005), we require at least 20 observations in each Fama and French (1997) industry classification, which defines 43 Fama and French (1997) industries.

4.2.1.2. Managing earnings toward targets

Previous studies document that corporate managers engage in managing earnings toward small positive earnings to avoid reporting negative earnings (Burgstahler and Dichev, 1997; Leuz et al., 2003; Burgstahler et al., 2006; Tang et al., 2008). Barth et al. (2008) found that a firm's voluntary adoption of IFRS exhibits a less extent of managing earnings toward a target after controlling for potential incentives for voluntary IFRS adoption. However, different from Barth et al. (2008), we investigate whether firms engage in managing earnings toward a target less after full IFRS adoption in the EU. Based on previous research (e.g., Lang et al., 2003, 2006; Barth et al., 2008), this study controls for potential incentives for managing earnings toward targets even IFRS adoption is compulsory. More specifically, we run the logistic regression expressed in equation (3) to investigate whether IFRS adoption reduces firms' managing of earnings toward small positive earnings:

$$\begin{aligned} SPOS_{i,t} = {} & \alpha_0 + \alpha_1 POST_{i,t} + \beta_1 SIZE_{i,t} + \beta_2 GROWTH_{i,t} \\ & + \beta_3 EISSUE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 DISSUE_{i,t} \\ & + \beta_6 TURN_{i,t} + \beta_7 CFO_{i,t} + \beta_8 AUD_{i,t} \\ & + \beta_9 NUMEX_{i,t} + \beta_{10} XLIST_{i,t} + \beta_{11} CLOSE_{i,t} \\ & + \sum_{k=1}^{14} \beta_{k+11} Country_i + \sum_{j=1}^{42} \beta_{j+25} Industry_i + \varepsilon_{i,t} \end{aligned} \tag{3}$$

where $SPOS_{i,t}$ is an indicator variable that equals 1 for observations of firms with annual net incomes scaled by lagged total assets between 0 and 0.01 for firm i year t (Lang et al., 2003; Barth et al., 2008; Christensen

et al., 2008); $POST_{i,t}$ is an indicator variable that equals 1 for observations in the adoption period (i.e., 2005–2007), and 0 otherwise for firm i year t. The definitions of other variables are the same as in equations (1) and (2).

A significant negative coefficient on *POST* (i.e., $\alpha_1 < 0$) demonstrates that firms managed earnings toward small positive amounts more frequently in the pre-adoption period than they did in the adoption period, which should indicate higher accounting quality in the adoption period.

4.2.1.3. Magnitude of cross-sectional absolute discretionary accruals
Previous studies frequently used discretionary accruals to measure the extent of earnings management. Discretionary (abnormal) accruals are defined as total accruals minus estimated normal (non-discretionary) accruals, where the estimated normal accruals can be derived from a number of discretionary accruals models widely used in previous studies (Dechow et al., 1995, 2003; Larcker and Richardson, 2004; Kothari et al., 2005; Jones et al., 2008).[9]

Because earnings management can involve either income-increasing accruals or income-decreasing accruals to meet earnings targets, consistent with previous studies (e.g., Warfield et al., 1995; Reynolds and Francis, 2000; Klein, 2002; van Tendeloo and Vanstraelen, 2005; Wang, 2006; Bowen et al., 2008), the magnitude of absolute discretionary accruals is used in this study to assess the extent of earnings management. A higher magnitude of absolute discretionary accruals corresponds to a greater level of earnings management, or lower accounting quality, and vice versa. More specifically, discretionary accruals are estimated as the residuals of the following four cross-sectional discretionary accruals models.[10]

1. Cross-sectional modified Jones model

Dechow et al. (1995) argue that an implicit assumption in the Jones model is that revenues are non-discretionary. If earnings are managed through discretionary revenues, the discretionary accruals estimated from the Jones model will inevitably have measurement errors. Thus, Dechow et al. (1995) add the change in accounts receivables to modify the Jones model so that it may eliminate measurement errors of discretionary accruals when discretion is exercised over revenues. Discretionary accruals of the cross-sectional modified Jones model equal total accruals minus estimated non-discretionary accruals. The estimated non-discretionary accruals of the cross-sectional modified Jones model

are estimated as follows:

$$NDA_{i,t} = a_1(1/Assets_{i,t-1}) + a_2(\Delta REV_{i,t} - \Delta REC_{i,t}) + a_3 PPE_{i,t} \quad (4)$$

where $NDA_{i,t}$ is estimated non-discretionary accruals scaled by lagged total assets for firm i year t; $Assets_{i,t-1}$ is total assets in U.S. dollars for firm i year $t-1$;[11] $\Delta REV_{i,t}$ is the change in sales scaled by lagged total assets for firm i year t; $\Delta REC_{i,t}$ is the change in accounts receivable scaled by lagged total assets for firm i year t; $PPE_{i,t}$ is the gross amount of properties, plants, and equipment scaled by lagged total assets for firm i year t; and a_1, a_2, and a_3 are industry-specific parameters generated from the regression expressed in equation (5) for each two-digit SIC-year grouping. Consistent with previous studies (e.g., Francis et al., 2005), we require at least 20 observations in each two-digit SIC-year grouping.[12]

$$TA_{i,t} = \alpha_1(1/Assets_{i,t-1}) + \alpha_2 \Delta REV_{i,t} + \alpha_3 PPE_{i,t} + \varepsilon_{i,t} \quad (5)$$

where[13] $TA_{i,t}$ is total accruals scaled by lagged total assets for firm i year t, while total accruals equal net income before extraordinary items minus cash flow from operations. α_1, α_2, and α_3 denote the ordinary least square (OLS) estimates of the coefficients in the equation. Consistent with previous studies (e.g., Francis et al., 2005), we winsorize the extreme values of the distribution to the 1st and 99th percentiles. The same procedures were performed for other cross-sectional non-discretionary accruals models.

2. Cross-sectional adapted Jones model

Identification of discretionary accruals in modified Jones model has encountered some criticism from academics (e.g., Bernard and Skinner, 1996; Dechow et al., 2003; Francis et al., 2005). For example, Dechow et al. (2003) argue that the modified Jones model assumes all credit revenues in each period are discretionary and induces a positive correlation between discretionary accruals and current sales growth. Thus, they modify the modified Jones model by including only the unexpected portion of the change in accounts receivables in discretionary accruals. This modification of the modified Jones model is called the adapted Jones model (Dechow et al., 2003). Because discretionary accruals equal total accruals minus estimated non-discretionary accruals, the estimated non-discretionary accruals of the cross-sectional adapted Jones model

are estimated as follows:[14]

$$NDA_{i,t} = a_1(1/Assets_{i,t-1}) + a_2((1+k)\Delta REV_{i,t} - \Delta REC_{i,t}) + a_3 PPE_{i,t} \quad (6)$$

where the slope coefficient (k) is estimated from the regression for each two-digit SIC-year grouping expressed in equation (7) that captures the expected change in accounts receivables for a given change in sales. The definitions of variables are the same as for equation (4)

$$\Delta REC_{i,t} = \alpha + k\Delta REV_{i,t} + \varepsilon_{i,t} \quad (7)$$

The estimates of the industry-specific parameters a_1, a_2, and a_3 in each two-digit SIC-year grouping are those obtained from the original Jones model as expressed in equation (5).

3. Cross-sectional modified Jones model with book-to-market ratio and cash flow from operations

Larcker and Richardson (2004) added the book-to-market ratio (BM) and cash flow from operations (CFO) to the modified Jones model to mitigate measurement errors associated with discretionary accruals. BM controls for expected growth in operation, while CFO controls for current operating performance. Larcker and Richardson (2004) argue that their model outperforms the modified Jones model. Because discretionary accruals equal total accruals minus estimated non-discretionary accruals, the estimated non-discretionary accruals of the cross-sectional modified Jones model with book-to-market ratio and cash flow from operations are estimated as follows:

$$NDA_{i,t} = a_1(1/Assets_{i,t-1}) + a_2(\Delta REV_{i,t} - \Delta REC_{i,t}) + a_3 PPE_{i,t} + a_4 BM_{i,t} + a_5 CFO_{i,t} \quad (8)$$

where $BM_{i,t}$ is the book-to-market ratio for firm i year t, and it equals the book value to the market value of the common equity; while $CFO_{i,t}$ is the cash flow from operations scaled by lagged total assets for firm i year t. The definitions of other variables are the same as for equation (4). The estimates of the industry-specific parameters a_1, a_2, a_3, a_4, and a_5 are generated from the following model for each two-digit SIC-year grouping:

$$TA_{i,t} = \alpha_1(1/Assets_{i,t-1}) + \alpha_2\Delta REV_{i,t} + \alpha_3 PPE_{i,t} + \alpha_4 BM_{i,t} + \alpha_5 CFO_{i,t} + \varepsilon_{i,t} \quad (9)$$

4. Cross-sectional modified Jones model with current-year ROA

Kothari et al. (2005) argue that the accruals of firms that have experienced unusual performance are expected to be systematically non-zero, and thus firm performance is correlated with accruals. Kothari et al. (2005) added current-year ROA and previous-year ROA to the modified Jones model as additional controls for performance and especially extreme performance, respectively. Following Kothari et al. (2005), Jones et al. (2008) used the modified Jones model with ROA to detect the association between discretionary accruals and fraudulent and restated earnings. Thus, the non-discretionary accruals of the cross-sectional modified Jones model with current-year ROA are estimated as follows:

$$NDA_{i,t} = a_1(1/Assets_{i,t-1}) + a_2(\Delta REV_{i,t} - \Delta REC_{i,t}) + a_3 PPE_{i,t} + a_4 ROA_{i,t} \quad (10)$$

where $ROA_{i,t}$ is the return on assets for firm i year t, and the definitions of other variables are the same as for equation (4). The estimates of the industry-specific parameters a_1, a_2, a_3, and a_4 are generated using the following model for each two-digit SIC-year grouping:

$$TA_{i,t} = \alpha_1(1/Assets_{i,t-1}) + \alpha_2 \Delta REV_{i,t} + \alpha_3 PPE_{i,t} + \alpha_4 ROA_{i,t} + \varepsilon_{i,t} \quad (11)$$

4.2.1.4. Accruals quality

Dechow and Dichev (2002) argue that accruals shift or adjust the recognition of cash flow over time, so that the adjusted numbers (earnings) are a better measure of firm performance. Consistent with this notion, they developed a new measure of accruals quality, which is based on the past, current, and future cash flow from operations. The original DD model is a firm-level time-series regression model that requires that each firm has at least 8 years of data in estimating firm-specific parameters. However, since our sample period is from 2000 to 2007, we do not have a long enough period of time-series data to meet this data requirement. Thus, consistent with Francis et al. (2005), we use the cross-sectional DD model (equation (12)), which is estimated for each two-digit SIC-year grouping with at least 20 observations in year t:[15]

$$TCA_{i,t} = \alpha_{0,i} + \alpha_{1,i} CFO_{i,t-1} + \alpha_{2,i} CFO_{i,t} + \alpha_{3,i} CFO_{i,t+1} + \varepsilon_{i,t} \quad (12)$$

where $TCA_{i,t}$ is the total current accruals scaled by lagged total assets for firm i year t, while the total current accruals are calculated from equation

(13) (Francis et al., 2005):

$$TCA_{i,t} = (\Delta CA_{i,t} - \Delta CL_{i,t} - \Delta Cash_{i,t} + \Delta STDEBT_{i,t})/Assets_{i,t-1} \quad (13)$$

where $\Delta CA_{i,t}$ is the change in current assets for firm i year t, $\Delta CL_{i,t}$ is the change in current liabilities for firm i year t, $\Delta Cash_{i,t}$ is the change in cash for firm i year t, $\Delta STDEBT_{i,t}$ is the change in short-term debt in current liabilities for firm i year t, $Assets_{i,t-1}$ is the total assets for firm i year $t-1$, and $CFO_{i,t+\tau}$ is the cash flow from operations scaled by lagged total assets for firm i year $t+\tau$ ($\tau = -1, 0, 1$). Consistent with Francis et al. (2005), accruals quality is measured by the metric $AQ_{i,t} = \sigma(\varepsilon_i)_t$, which is the standard deviation of firm *i*s residuals $\varepsilon_{i,t}$ calculated over years $t-4$ through t. A larger standard deviations of residuals indicate poorer accruals quality.

In summary, this study calculates earnings smoothing, the magnitude of cross-sectional absolute discretionary accruals, and standard deviations of residuals as the proxies for earnings management and accruals quality. Based on these measures, we use *t*-test and Wilcoxon rank sum test to examine whether firms engage in less earnings management or have higher accruals quality in the adoption period than they did in the pre-adoption period. That is, less earnings smoothing, or a lower magnitude of cross-sectional absolute discretionary accruals or smaller standard deviations of residuals would indicate that firms engage in less earnings management or have higher accruals quality in the adoption period, which will imply a higher accounting quality after IFRS adoption.

4.2.2. Timely loss recognition. Previous studies suggest that the timely recognition of large losses is a sign of higher accounting quality (Ball et al., 2000; Ball and Shivakumar, 2005, 2006; Lang et al., 2006; Barth et al., 2007, 2008). Barth et al. (2008) find that firms that voluntarily adopt IFRS exhibit a more timely recognition of losses (after controlling for potential incentives of voluntary IFRS adoption). However, as noted earlier, different from Barth et al. (2008), we investigate whether firms have a more timely recognition of large losses after full IFRS adoption in the EU. Based on previous research (e.g., Ball et al., 2000; Ball and Shivakumar, 2005, 2006; Barth et al., 2008), we controlled for potential incentives for the timely recognition of large losses without the incentives of voluntary IFRS adoption. More specifically, we run the logistic regression expressed in equation (14) to investigate whether firms in the 15 EU member states have a more timely recognition of large losses

after IFRS adoption:

$$\begin{aligned} LNEG_{i,t} = {} & \alpha_0 + \alpha_1 POST_{i,t} + \beta_1 SIZE_{i,t} + \beta_2 GROWTH_{i,t} \\ & + \beta_3 EISSUE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 DISSUE_{i,t} \\ & + \beta_6 TURN_{i,t} + \beta_7 CFO_{i,t} + \beta_8 AUD_{i,t} \\ & + \beta_9 NUMEX_{i,t} + \beta_{10} XLIST_{i,t} + \beta_{11} CLOSE_{i,t} \\ & + \sum_{k=1}^{14} \beta_{k+11} Country_i + \sum_{j=1}^{42} \beta_{j+25} Industry_i + \varepsilon_{i,t} \end{aligned} \tag{14}$$

where $LNEG_{i,t}$ is an indicator variable that equals 1 for observations of firms with annual net income scaled by lagged total assets < -0.20, and 0 otherwise, for firm i year t. The definitions of other variables are the same as for equations (1) to (4).

A significant positive coefficient on *POST* (i.e., $\alpha_1 > 0$) reveals that firms recognize large losses in a timely manner more frequently in the adoption period than they did in the pre-adoption period, indicating a higher accounting quality in the adoption period.

4.3. Empirical Models

For regression models are applied to test our hypothesis. Equation (3) is employed to examine whether firms engage in managing earnings toward targets less after IFRS adoption in the EU. Equation (14) is applied to test whether firms recognize large losses in a timely manner after IFRS adoption in the EU. In addition, As previous studies document that firms' discretionary accruals are affected by factors such as firm size, financial leverage, sales growth, cash flow from operations, auditors, reported negative earnings, and cross-listing in the United States (e.g., Becker et al., 1998; Reynolds and Francis, 2000; Bartov et al., 2001; Klein, 2002; Lang et al., 2003, 2006; Cheng and Warfield, 2005; van Tendeloo and Vanstraelen, 2005; Wang, 2006; Bowen et al., 2008), we construct the multiple regression model expressed in equation (15) to explore the relationship between the effects of IFRS adoption and cross-sectional absolute discretionary accruals:

$$\begin{aligned} \left|DA_{i,t}\right| = {} & \alpha_0 + \alpha_1 POST_{i,t} + \beta_1 SIZE_{i,t} + \beta_2 LEV_{i,t} \\ & + \beta_3 GROWTH_{i,t} + \beta_4 CFO_{i,t} + \beta_5 AUD_{i,t} \\ & + \beta_6 LOSS_{i,t} + \beta_7 XLIST_{i,t} + \sum_{k=1}^{14} \beta_{k+7} Country_i + \varepsilon_{i,t} \end{aligned} \tag{15}$$

where $|DA_{i,t}|$ is the magnitude of cross-sectional absolute discretionary accruals for firm i year t. We use four cross-sectional absolute discretionary accruals that are estimated from the four discretionary accruals models for each two-digit SIC-year grouping as proxies for dependent variables, respectively. That is, $|DA_{i,t}|_{\mathrm{MJM}}$ is the magnitude of the absolute discretionary accruals estimated by the cross-sectional modified Jones model for firm i year t. $|DA_{i,t}|_{\mathrm{AJM}}$ is the magnitude of the absolute discretionary accruals estimated by the cross-sectional adapted Jones model for firm i year t. $|DA_{i,t}|_{\mathrm{MJM+BMCFO}}$ is the magnitude of the absolute discretionary accruals estimated by the cross-sectional modified Jones model with book-to-market ratio and cash flow from operations for firm i year t. $|DA_{i,t}|_{\mathrm{MJM+CROA}}$ is the magnitude of the absolute discretionary accruals estimated by the cross-sectional modified Jones model with current-year ROA for firm i year t. $LOSS_{i,t}$ is an indicator variable that equals 1 for observations of firms with annual net income <0, and 0 otherwise for firm i year t. The definitions of $POST_{i,t}$, $SIZE_{i,t}$, $LEV_{i,t}$, $GROWTH_{i,t}$, $CFO_{i,t}$, $AUD_{i,t}$, $XLIST_{i,t}$, and *Country* are the same as for equations (1) and (3).

A significant negative coefficient on $POST_{i,t}$ (i.e., $\alpha_1<0$) indicates that firms have lower cross-sectional absolute discretionary accruals in the adoption period than they do in the pre-adoption period. That is, firms engage in less earnings management in the adoption period, which should indicate higher accounting quality in the adoption period.

Previous studies also suggest the following five innate factors may affect accruals quality: firm size, the magnitude of cash flow from operations volatility, the magnitude of sales volatility, the length of the operating cycle, and the incidence of reporting negative earnings (Dechow and Dichev, 2002; Francis et al., 2005). Therefore, we construct the multiple regression model expressed in equation (16) to explore the association between IFRS adoption and accruals quality:

$$AQ_{i,t} = \alpha_0 + \alpha_1 POST_{i,t} + \beta_1 SIZE_{i,t} + \beta_2 \sigma(CFO)_{i,t} + \beta_3 \sigma(Sales)_{i,t} + \beta_4 OperCycle_{i,t} + \beta_5 NegEarn_{i,t} + \sum_{k=1}^{14} \beta_{k+5} Country_i + \varepsilon_{i,t} \quad (16)$$

where $AQ_{i,t}$ is the standard deviation of the residual for firm i year t, calculated over past 5 years (i.e., years $t-4$ through t), and a firm's residuals are estimated by the cross-sectional DD model for each two-digit SIC-year grouping. Greater AQ means a wider deviation of residuals and a lower quality of accruals. $\sigma(CFO)_{i,t}$ is the standard

deviation of cash flow from operations for firm i year t, calculated over past 10 years. $\sigma(Sales)_{i,t}$ is the standard deviation of sales for firm i year t, calculated over past 10 years. Consistent with Francis et al. (2005), we require at least five observations in each rolling 10-year window when we calculate $\sigma(CFO)_{i,t}$ and $\sigma(Sales)_{i,t}$. $OperCycle_{i,t}$ is the natural logarithm of a firm's operating cycle for firm i year t, where the operating cycle equals the sum of turnover days for accounts receivables and inventories. $NegEarn_{i,t}$ is the incidence of negative earnings over past 10 years for firm i year t. $POST_{i,t}$, $SIZE_{i,t}$, and *Country* are as defined before.

A significant negative coefficient on $POST_{i,t}$ (i.e., $\alpha_1 < 0$) indicates that firms have a lower standard deviation of residuals in the adoption period than they do in the pre-adoption period, which indicates higher accruals quality in the adoption period.

5. Empirical Results

5.1. Distribution of Firm-Year Observations and Summary Statistics

Table 1 presents the distribution of firm-year observations by country and year, which based on the magnitude of cross-sectional absolute discretionary accruals estimated by the cross-sectional modified Jones model for each two-digit SIC-year grouping.[16] There are 21,707 total firm-year observations in the 15 EU member states from 2000 to 2007. In particular, there are 12,678 (58.41 per cent) in the pre-adoption period (2000–2004) and 9,029 (41.59 per cent) in the adoption period (2005–2007). Table 1 also shows that the total firm-year observations per country range from 124 observations for Luxembourg to 6,588 (30.35 per cent) observations for the United Kingdom. The firm-year observations in France and Germany are 3,634 (16.74 per cent) and 3,245 (14.95 per cent), respectively.[17]

Table 2 presents descriptive statistics for related variables. Panel A of Table 2 shows the test and control variables on earnings smoothing, managing earnings toward targets, and timely loss recognition. Regarding test variables, there is a significant difference in the change in net incomes (ΔNI) between the pre-adoption period and the adoption period (both mean and median are different at 1 per cent significance level). The change is significantly larger in the adoption period, which could be a sign of a higher growth in profits. However, the change in cash flow from operations (ΔCFO) is not significantly different. Firms manage earnings toward small positive amounts (*SPOS*) less frequently in the adoption

Table 1. *Distribution of firm-year observations by country and year*

Country	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*Total*
Austria	35	40	41	46	48	55	55	60	380
Belgium	52	53	63	70	66	76	83	76	539
Denmark	78	78	94	102	90	87	85	82	696
Finland	84	95	108	114	111	109	108	103	832
France	390	441	488	503	493	486	469	364	3,634
Germany	261	301	403	426	436	467	482	469	3,245
Greece	23	66	58	68	71	184	197	200	867
Ireland	25	28	31	32	34	39	38	42	269
Italy	111	126	154	151	163	176	182	179	1,242
Luxembourg	9	13	14	18	16	18	18	18	124
The Netherlands	125	122	131	133	136	134	127	115	1,023
Portugal	27	32	43	48	44	40	41	36	311
Spain	1	4	11	12	14	87	88	86	303
Sweden	132	147	227	229	237	234	233	215	1,654
The United Kingdom	721	795	835	817	834	873	926	787	6,588
Total	2,074	2,341	2,701	2,769	2,793	3,065	3,132	2,832	21,707

Notes: Annual financial statement data of publicly listed firms of the 15 European Union (EU) member states from 2000 to 2007 are obtained from the Worldscope dataset. The firm-year observations by country and year are based on the magnitude of cross-sectional absolute discretionary accruals being estimated by the cross-sectional modified Jones model for each two-digit SIC-year grouping. The firm-year observations by country and year are different based on different magnitudes of cross-sectional absolute discretionary accruals, and the same as when calculating the accounting quality indicators of earnings smoothing, managing earnings toward targets, and timely loss recognition. We just use the magnitude of cross-sectional absolute discretionary accruals estimated by the cross-sectional modified Jones model for each two-digit SIC-year grouping as an example.

period than they do in the pre-adoption period (both mean and median are different at 5 per cent significance level), indicating that firms engage in managing earnings toward targets less during the adoption period. This result supports our hypothesis. However, firms recognized large losses (*LNEG*) in a timely manner less frequently in the adoption period than they did in the pre-adoption period (both mean and median are different at 1 per cent significance level), which is not consistent with the hypothesis. Regarding control variables, the results reveal that firms have larger sizes (*SIZE*); greater sales growth (*GROWTH*) and debt issues (*DISSUE*); less equity issuing (*EISSUE*), asset turnover rates (*TURN*), cash flow from operations (*CFO*), and shares held closely by insiders (*CLOSE*) in the adoption period than they do in the pre-adoption period. There is no significant difference in financial leverage (*LEV*), Big 4/5 auditors (*AUD*), number of exchanges listing the firm (*NUMEX*), and cross-listing in the United States (*XLIST*) between the pre-adoption period and the adoption period.

Table 2. *Descriptive statistics*

Panel A: Variables used in tests on earnings smoothing, managing earnings toward targets, and timely loss recognition

	Pre-adoption period (N = 8,110)					*Adoption period (N = 4,866)*				
	Mean	*Median*	*Standard deviation*	*Q1*	*Q3*	*Mean*	*Median*	*Standard deviation*	*Q1*	*Q3*
Test variables										
ΔNI	0.003	0.003	0.100	−0.015	0.020	0.012***	0.008***	0.074	−0.005	0.029
ΔCFO	0.005	0.004	0.086	−0.030	0.040	0.006	0.004	0.073	−0.024	0.035
SPOS	0.097	0.000	0.296	0.000	0.000	0.085**	0.000**	0.279	0.000	0.000
LNEG	0.036	0.000	0.187	0.000	0.000	0.019***	0.000***	0.138	0.000	0.000
Control variables										
SIZE	5.470	5.400	2.044	4.061	6.835	5.886***	5.826***	2.042	4.488	7.289
GROWTH	11.816	5.531	38.756	−3.199	17.628	12.401	8.816***	26.634	1.802	18.018
EISSUE	0.071	0.000	0.453	0.000	0.008	0.053***	0.000**	0.335	0.000	0.010
LEV	0.556	0.574	0.218	0.412	0.706	0.552	0.572	0.219	0.409	0.700
DISSUE	0.134	0.030	0.517	−0.083	0.188	0.172***	0.066***	0.516	−0.046	0.236
TURN	1.040	0.991	0.699	0.524	1.438	1.012**	0.965**	0.669	0.540	1.397
CFO	0.065	0.066	0.089	0.018	0.115	0.061**	0.063**	0.090	0.017	0.107
AUD	0.709	1.000	0.454	0.000	1.000	0.710	1.000	0.454	0.000	1.000
NUMEX	1.311	1.000	0.827	1.000	1.000	1.311	1.000	0.828	1.000	1.000
XLIST	0.009	0.000	0.095	0.000	0.000	0.009	0.000	0.094	0.000	0.000
CLOSE[(a)]	39.340	37.709	26.268	16.505	60.000	38.028**	36.000***	26.732	14.344	58.016

Panel B: Variables used in the calculation of the magnitude of cross-sectional absolute discretionary accruals

	Pre-adoption period						*Adoption period*					
	N	*Mean*	*Median*	*Standard deviation*	*Q1*	*Q3*	*N*	*Mean*	*Median*	*Standard deviation*	*Q1*	*Q3*
TA	12,678	−0.059	−0.054	0.118	−0.103	−0.008	9,029	−0.032***	−0.031***	0.109	−0.076	0.012
1/Assets	12,678	0.000	0.000	0.000	0.000	0.000	9,029	0.000	0.000***	0.000	0.000	0.000
ΔREV	12,678	0.101	0.050	0.313	−0.036	0.182	9,029	0.150***	0.086***	0.315	0.004	0.230
ΔREC	12,678	0.021	0.005	0.102	−0.022	0.044	9,029	0.043***	0.019***	0.109	−0.006	0.065
PPE	12,678	0.567	0.464	0.437	0.210	0.833	9,029	0.554**	0.438***	0.445	0.190	0.822
BM	11,545	0.741	0.603	0.571	0.350	1.002	8,257	0.577***	0.466***	0.448	0.287	0.750
CFO	11,545	0.054	0.070	0.125	0.010	0.123	8,257	0.057**	0.070	0.125	0.010	0.125
ROA	12,238	−0.019	0.025	0.180	−0.027	0.061	8,833	0.012***	0.038***	0.143	0.002	0.073

Panel C: Variables used in the calculation of accruals quality

	Pre-adoption period (N = 5,484)					*Adoption period (N = 3,266)*				
	Mean	*Median*	*Standard deviation*	*Q1*	*Q3*	*Mean*	*Median*	*Standard deviation*	*Q1*	*Q3*
TCA	0.003	0.000	0.090	−0.035	0.037	0.012***	0.009***	0.112	−0.034	0.054
CFO_{t-1}	0.079	0.082	0.091	0.035	0.126	0.078	0.082	0.101	0.033	0.132
CFO_t	0.078	0.082	0.081	0.037	0.124	0.076	0.080	0.092	0.030	0.126
CFO_{t+1}	0.080	0.083	0.090	0.038	0.127	0.069***	0.073***	0.105	0.024	0.123

Panel D: Variables used in the multiple regression of International Financial Reporting Standards (IFRS) adoption on cross-sectional absolute discretionary accruals

	Pre-adoption period						*Adoption period*					
	N	*Mean*	*Median*	*Standard deviation*	*Q1*	*Q3*	*N*	*Mean*	*Median*	*Standard deviation*	*Q1*	*Q3*
Test variables												
$\|DA\|_{MJM}$	12,678	0.077	0.048	0.089	0.021	0.096	9,029	0.069***	0.043***	0.080	0.019	0.088
$\|DA\|_{AJM}$	12,678	0.077	0.048	0.089	0.021	0.097	9,029	0.069***	0.044***	0.080	0.019	0.087
$\|DA\|_{MJM+BMCFO}$	11,545	0.082	0.058	0.085	0.027	0.106	8,257	0.071***	0.048***	0.075	0.022	0.093
$\|DA\|_{MJM+CROA}$	12,238	0.074	0.048	0.084	0.021	0.093	8,833	0.068***	0.044***	0.078	0.019	0.087
Control variables												
SIZE	12,678	5.060	4.976	2.030	3.632	6.454	9,029	5.176***	5.130***	2.063	3.734	6.597
LEV	12,678	0.560	0.571	0.220	0.414	0.701	9,029	0.547***	0.559***	0.214	0.399	0.691
GROWTH	12,678	13.555	5.923	38.228	−3.898	19.987	9,029	19.209***	10.308***	39.429	1.876	23.885
CFO	12,678	0.053	0.069	0.134	0.008	0.124	9,029	0.056*	0.069	0.141	0.008	0.126
AUD	12,678	0.620	1.000	0.485	0.000	1.000	9,029	0.566***	1.000***	0.496	0.000	1.000
LOSS	12,678	0.322	0.000	0.467	0.000	1.000	9,029	0.236***	0.000***	0.425	0.000	0.000
XLIST	12,678	0.008	0.000	0.088	0.000	0.000	9,029	0.009	0.000	0.093	0.000	0.000

Panel E: Variables used in the multiple regression of IFRS adoption on accruals quality

	Non-adoption period (N = 5,496)					*Adoption period (N = 3,187)*				
	Mean	*Median*	*Standard deviation*	*Q1*	*Q3*	*Mean*	*Median*	*Standard deviation*	*Q1*	*Q3*
Test variables										
AQ	0.085	0.065	0.069	0.042	0.104	0.082**	0.062**	0.066	0.041	0.099
Control variables										
SIZE	5.934	5.835	1.925	4.570	7.248	5.787***	5.673***	1.921	4.416	7.069

Panel E: Variables used in the multiple regression of IFRS adoption on accruals quality

	Non-adoption period (N = 5,496)					*Adoption period (N = 3,187)*				
	Mean	*Median*	*Standard deviation*	*Q1*	*Q3*	*Mean*	*Median*	*Standard deviation*	*Q1*	*Q3*
$\sigma(CFO)$	0.082	0.064	0.065	0.046	0.093	0.096***	0.065	0.095	0.042	0.110
$\sigma(Sales)$	0.328	0.233	0.297	0.137	0.414	0.340*	0.237	0.313	0.137	0.425
OperCycle	4.921	4.943	0.541	4.593	5.236	4.907	4.910	0.548	4.583	5.225
NegEarn	0.253	0.000	0.435	0.000	1.000	0.197***	0.000***	0.398	0.000	0.000

Notes: *t*-test (Wilcoxon rank sum test) is used to test mean (median) difference between pre-adoption period (2000–2004) and adoption period (2005–2007, to 2006 for accruals quality). Q1 is 25 percentile, Q3 is 75 percentile. *N* is firm-year observations. All variables are winsorized at the 1st and 99th percentile except for indicator variables.

Panel A:

ΔNI is the change in net income before extraordinary items scaled by lagged total assets. ΔCFO is the change in cash flow from operations scaled by lagged total assets. *SPOS* is an indicator variable that equals one for observations with annual net income scaled by lagged total assets between 0 and 0.01, and 0 otherwise. *LNEG* is an indicator variable that equals 1 for observations with annual net income scaled by lagged total assets < -0.20, and 0 otherwise. *SIZE* is the natural logarithm of sales in millions of U.S. dollars. *GROWTH* is the annual percentage change in sales. *EISSUE* is the annual percentage change in common stock. *LEV* is the end of year total liabilities divided by end of year total assets. *DISSUE* is the annual percentage change in total liabilities. *TURN* is the sales divided by end of year total assets. *CFO* is the annual net cash flow from operations scaled by lagged total assets. *AUD* is an indicator variable that equals 1 if the firm's auditor is from Big 4/5 auditors and 0 otherwise. *NUMEX* is the number of exchanges on which a firm's stock is listed. *XLIST* is an indicator variable that equals 1 if the firm is listed on any U.S. stock exchange, and 0 otherwise. *CLOSE* is the percentage of closely held shares as reported by the Worldscope.

Panel B:

TA is the total accruals scaled by lagged total assets, where total accruals equal net income before extraordinary items minus cash flow from operations. *1/Assets* is the reciprocal of lagged total assets in U.S. dollars. ΔREV is the change in sales scaled by lagged total assets. ΔREC is the change in accounts receivables scaled by lagged total assets. *PPE* is gross properties, plants and equipments scaled by lagged total assets. *BM* is the book value of common equity divided by the market value of common equity. *CFO* is as defined in panel A. *ROA* is net income before extraordinary items scaled by lagged total assets. The descriptive statistics of *TA*, *1/Assets*, ΔREV, ΔREC, and *PPE* are based on the cross-sectional modified Jones model. The descriptive statistics of *BM* and *CFO* are based on the cross-sectional modified Jones model with book-to-market ratio and cash flows from operations. The descriptive statistics of *ROA* is based on the cross-sectional modified Jones model with current-year ROA.

Panel C:
TCA is the total current accruals scaled by lagged total assets, where total current accrual = Δtotal current assets − Δtotal current liabilities − Δcash + Δ short-term debt. CFO_{t-1}, CFO_t, and CFO_{t+1} are the cash flows from operations in year $t+\tau$ ($\tau = -1, 0, 1$) scaled by total assets in year $t+\tau-1$, respectively.
Panel D:
The values of $|DA|$are the magnitudes of absolute discretionary accruals that are derived from the four estimation models as explained in Section 4. *POST* is an indicator variable that equals 1 for observations in the adoption period (2005–2007), and 0 otherwise. *LOSS* is an indicator variable that equals 1 for observations with annual net income <0, and 0 otherwise. *SIZE*, *LEV*, *GROWTH*, *CFO*, *AUD*, and *XLIST* are as defined before. The descriptive statistics of test variable (i.e., *POST*) and control variables (i.e., *SIZE*, *LEV*, *GROWTH*, *CFO*, *AUD*, *LOSS*, and *XLIST*) are based on the magnitude of absolute discretionary accruals that are estimated by the cross-sectional modified Jones model for each two-digit SIC-year grouping.
Panel E:
AQ is the standard deviation of firm's residuals, calculated over past 5 years, where firm's residuals are estimated by the cross-sectional DD model for each two-digit SIC-year grouping. *POST* and *SIZE* are as defined before. $\sigma(CFO)$ is the standard deviation of firm's cash flows from operations, calculated over past 10 years. $\sigma(Sales)$ is the standard deviation of firm's sales, calculated over the past 10 years. Consistent with Francis et al. (2005), we require at least five observations in each rolling 10-year windows to calculate $\sigma(CFO)$ and $\sigma(Sales)$. *OperCycle* is the natural logarithm of firm's operating cycle, where operating cycle equals the sum of turnover days for accounts receivables and inventories. *NegEarn* is the incidence of negative earnings over the past 10 years.
[a]*CLOSE* data in some firms are not available in the Worldscope. Thus, number observations of *CLOSE* are 6,909 and 4,247 in the pre-adoption and adoption period, respectively.
*, **, ***Significant at 0.10, 0.05, and 0.01 level, respectively (two-tailed).

Panel B of Table 2 presents the variables used in estimating the magnitude of the cross-sectional absolute discretionary accruals. The results show that total accruals (TA), changes in sales (ΔREV), changes in accounts receivables (ΔREC), cash flow from operations (CFO), and current-year profitability (ROA) are all significantly higher in the adoption period than in the pre-adoption period, while lagged total assets ($1/Assets$); gross properties, plants, and equipments (PPE); and book-to-market ratios (BM) are significantly lower in the adoption period than in the pre-adoption period.

Panel C of Table 2 reports the variables used in the calculation of accruals quality. The results show that total current accruals (TCA) is significantly higher while future cash flow from operations (CFO_{t+1}) is lower in the adoption period than in the pre-adoption period. There is no significant difference in past cash flow from operations (CFO_{t-1}) and current cash flow from operations (CFO_t) between the pre- and post-adoption period.

Panel D of Table 2 shows the descriptive statistics of the test and control variables for the estimates of cross-sectional absolute discretionary accruals in respect of IFRS adoption. The four different magnitudes of cross-sectional absolute discretionary accruals ($|DA|$) are all significantly lower in the adoption period than in the pre-adoption period (both mean and median are different at 1 per cent significance level), suggesting that firms engage in earnings management less during the adoption period. This result is consistent with our hypothesis. Regarding control variables, firms have larger sizes ($SIZE$), lower financial leverage (LEV), more Big 4/5 auditors (AUD) and negative reported earnings ($LOSS$), higher sales growth ($GROWTH$), and greater cash flow from operations (CFO) in the adoption period than in the pre-adoption period. There is no significant difference in cross-listings in the United States ($XLIST$) between the pre- and post-adoption period.

Panel E of Table 2 presents the descriptive statistics of the test and control variables of IFRS adoption on accruals quality. It shows that the standard deviation of firms' residuals (AQ) is significantly lower in the adoption period than in the pre-adoption period (both mean and median are different at 5 per cent significance level), indicating that firms have a higher accruals quality in the adoption period. This result supports the hypothesis. Regarding control variables, firms have smaller sizes ($SIZE$), higher cash flow from operations volatility ($\sigma(CFO)$) and sales volatility ($\sigma(Sales)$), and lower incidence of negative earnings realizations ($NegEarn$) in the adoption period than in the pre-adoption period. There

is no significant difference in operating cycle length (*OperCycle*) between the adoption period and the pre-adoption period.

5.2. Univariate Analysis

Table 3 presents a correlation matrix between IFRS adoption and the test (explanatory) and control variables used in our analyses. The upper (lower) triangle reports the Pearson (Spearman) correlation coefficients. Panel A of Table 3 illustrates the correlation matrix between IFRS adoption and earnings smoothing, managing earnings toward targets, and timely loss recognition. Regarding the change in net incomes (ΔNI), as expected, a statistically significant positive association between ΔCFO and ΔNI is found ($p = .000$). *POST* is positively and significantly related to ΔNI ($p = .000$), which indicates that the change in net income is significantly larger in the adoption period. In respect of the change in cash flow from operations (ΔCFO), there is no significant relation between *POST* and ΔCFO. Regarding managing earnings toward small positive amounts (*SPOS*), as expected, a statistically significant negative association between *SPOS* and *POST* is found ($p = .021$), suggesting that firms engage in managing earnings toward targets less during the adoption period. This result is consistent with the hypothesis. Regarding timely loss recognition (*LNEG*), contrary to the prediction, a statistically significant negative association between *LNEG* and *POST* ($p = .000$) is found, indicating that firms recognize large losses in a timely manner less frequently during the adoption period. This result is not consistent with the hypothesis.

Turning to managing earnings toward targets (*SPOS*) and control variables, we find that firms with higher asset turnover rates (*TURN*) and more cash flow from operations (*CFO*) engage in managing earnings toward targets less frequently, while firms with larger sizes (*SIZE*) and higher financial leverage (*LEV*), and firms cross listed in more stock exchanges (*NUMEX*) engage in managing earnings toward targets more frequently. We do not find a significant relation between sales growth (*GROWTH*), equity issues (*EISSUE*), debt issues (*DISSUE*), Big 4/5 auditors (*AUD*), cross-listing in the United States (*XLIST*), equity shares closely held by insiders (*CLOSE*) and *SPOS*.

Regarding timely loss recognition (*LNEG*) and control variables, we find that firms with larger sizes (*SIZE*), greater sales growth (*GROWTH*), more debt issuing (*DISSUE*), cash flow from operations (*CFO*), and Big 4/5 auditors (*AUD*) are negatively and significantly

Table 3. *Correlations coefficients*

Panel A: Correlations coefficients among International Financial Reporting Standards (IFRS) adoption and earnings smoothing, managing earnings toward targets, and timely loss recognition (N = 12,976[a])

	ΔNI	ΔCFO	SPOS	LNEG	POST	SIZE	GROWTH	EISSUE	LEV	DISSUE	TURN	CFO	AUD	NUMEX	XLIST	CLOSE
ΔNI	1.000	0.232**	−0.010	−0.316**	0.045**	0.002	0.062**	−0.012	−0.007	−0.039**	0.036**	0.112**	0.000	0.001	0.000	0.000
		(0.000)	(0.255)	(0.000)	(0.000)	(0.797)	(0.000)	(0.185)	(0.446)	(0.000)	(0.000)	(0.000)	(0.970)	(0.909)	(0.989)	(0.971)
ΔCFO	0.265**	1.000	−0.017	−0.048**	0.001	0.007	0.097**	−0.010	−0.001	0.027**	0.032**	0.440**	−0.001	−0.002	0.007	0.011
	(0.000)		(0.054)	(0.000)	(0.896)	(0.421)	(0.000)	(0.239)	(0.933)	(0.002)	(0.000)	(0.000)	(0.889)	(0.845)	(0.418)	(0.227)
SPOS	−0.089**	−0.021*	1.000	−0.056**	**−0.020***	0.044**	−0.015	0.002	0.153**	0.004	−0.160**	−0.099**	0.015	0.020*	−0.017	0.017
	(0.000)	(0.015)		(0.000)	**(0.021)**	(0.000)	(0.088)	(0.813)	(0.000)	(0.664)	(0.000)	(0.000)	(0.077)	(0.023)	(0.057)	(0.076)
LNEG	−0.164**	−0.038**	−0.056**	1.000	**−0.048****	−0.159**	−0.034**	0.049**	0.008	−0.030**	0.016	−0.299**	−0.062**	−0.011	−0.012	−0.003
	(0.000)	(0.000)	(0.000)		**(0.000)**	(0.000)	(0.000)	(0.000)	(0.373)	(0.001)	(0.062)	(0.000)	(0.000)	(0.191)	(0.167)	(0.779)
POST	0.109**	0.001	**−0.020***	**−0.048****	1.000	0.098**	0.008	−0.021*	−0.010	0.035**	−0.020*	−0.021*	0.001	0.000	−0.001	−0.024*
	(0.000)	(0.869)	**(0.021)**	**(0.000)**		(0.000)	(0.348)	(0.016)	(0.252)	(0.000)	(0.021)	(0.014)	(0.902)	(0.989)	(0.905)	(0.011)
SIZE	0.027**	0.022**	0.050**	−0.157**	0.095**	1.000	−0.013	−0.008	0.476**	−0.038**	0.191**	0.224**	0.336**	0.240**	0.041**	−0.068**
	(0.002)	(0.010)	(0.000)	(0.000)	(0.000)		(0.132)	(0.363)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GROWTH	0.237**	0.166**	−0.034**	−0.114**	0.105**	0.061**	1.000	0.134**	−0.014	0.439**	−0.042**	−0.029**	−0.004	−0.024**	0.003	−0.004
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.099)	(0.000)	(0.000)	(0.001)	(0.674)	(0.006)	(0.695)	(0.697)
EISSUE	0.049**	0.025**	−0.027**	0.029**	0.020*	0.089**	0.202**	1.000	−0.002	0.131**	−0.028**	−0.054**	0.003	−0.008	0.008	−0.007
	(0.000)	(0.004)	(0.002)	(0.001)	(0.025)	(0.000)	(0.000)		(0.825)	(0.000)	(0.001)	(0.000)	(0.705)	(0.334)	(0.368)	(0.462)
LEV	−0.032**	−0.004	0.156**	0.000	−0.010	0.455**	0.020*	0.070**	1.000	0.033**	0.200**	−0.002	0.075**	0.071**	−0.023**	0.112**
	(0.000)	(0.607)	(0.000)	(0.983)	(0.268)	(0.000)	(0.023)	(0.000)		(0.000)	(0.000)	(0.823)	(0.000)	(0.000)	(0.007)	(0.000)
DISSUE	0.001	0.016	0.003	−0.080**	0.082**	0.046**	0.458**	0.132**	0.116**	1.000	−0.107**	−0.050**	−0.014	−0.021*	0.007	−0.012
	(0.905)	(0.071)	(0.696)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.106)	(0.018)	(0.395)	(0.194)
TURN	0.091**	0.040**	−0.170**	0.014	−0.018*	0.182**	−0.004	0.034**	0.179**	−0.089**	1.000	0.234**	−0.063**	−0.008	−0.007	0.077**
	(0.000)	(0.000)	(0.000)	(0.109)	(0.040)	(0.000)	(0.648)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.336)	(0.421)	(0.000)

Table 3. (Continued.)

Panel A: Correlations coefficients among International Financial Reporting Standards (IFRS) adoption and earnings smoothing, managing earnings toward targets, and timely loss recognition (N = 12,976[a])

	ΔNI	*ΔCFO*	***SPOS***	***LNEG***	***POST***	*SIZE*	*GROWTH*	*EISSUE*	*LEV*	*DISSUE*	*TURN*	*CFO*	*AUD*	*NUMEX*	*XLIST*	*CLOSE*
CFO	0.186**	0.444**	−0.157**	−0.176**	−0.022*	0.226**	0.046**	−0.029**	−0.050**	−0.062**	0.307**	1.000	0.079**	0.017*	0.031**	0.017
	(0.000)	(0.000)	(0.000)	(0.000)	(0.012)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)		(0.000)	(0.046)	(0.000)	(0.071)
AUD	−0.004	−0.001	0.015	−0.062**	0.001	0.342**	0.017	0.051**	0.074**	0.020*	−0.074**	0.067**	1.000	0.052**	0.057**	−0.180**
	(0.641)	(0.866)	(0.077)	(0.000)	(0.902)	(0.000)	(0.051)	(0.000)	(0.000)	(0.020)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
NUMEX	0.006	0.003	0.025**	0.001	−0.001	0.196**	−0.024**	−0.020*	0.075**	−0.026**	0.010	0.030**	0.025**	1.000	0.072**	0.028**
	(0.527)	(0.700)	(0.004)	(0.898)	(0.940)	(0.000)	(0.005)	(0.021)	(0.000)	(0.003)	(0.230)	(0.001)	(0.004)		(0.000)	(0.003)
XLIST	0.009	0.007	−0.017	−0.012	−0.001	0.043**	0.011	−0.002	−0.024**	0.007	−0.009	0.035**	0.057**	0.138**	1.000	−0.049**
	(0.313)	(0.400)	(0.057)	(0.167)	(0.905)	(0.000)	(0.194)	(0.854)	(0.006)	(0.411)	(0.279)	(0.000)	(0.000)	(0.000)		(0.000)
CLOSE	0.005	0.022*	0.011	−0.003	−0.027**	−0.086**	−0.026**	−0.104**	0.101**	−0.030**	0.101**	0.033**	−0.184**	0.082**	−0.049**	1.000
	(0.591)	(0.018)	(0.250)	(0.781)	(0.005)	(0.000)	(0.006)	(0.000)	(0.000)	(0.002)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	

Panel B: Correlations coefficients among IFRS adoption and cross-sectional absolute discretionary accruals (N = 21,707[b])

	$\|DA\|_{MJM}$	$\|DA\|_{AJM}$	$\|DA\|_{MJM+BMCFO}$	$\|DA\|_{MJM+CROA}$	***POST***	*SIZE*	*LEV*	*GROWTH*	*CFO*	*AUD*	*LOSS*	*XLIST*
$\|DA\|_{MJM}$	1.000	0.999**	0.920**	0.972**	**−0.043****	−0.267**	0.013	0.113**	−0.223**	−0.114**	0.248**	−0.010
		(0.000)	(0.000)	(0.000)	**(0.000)**	(0.000)	(0.055)	(0.000)	(0.000)	(0.000)	(0.000)	(0.138)
$\|DA\|_{AJM}$	0.996**	1.000	0.920**	0.969**	**−0.042****	−0.266**	0.014*	0.113**	−0.219**	−0.113**	0.247**	−0.010
	(0.000)		(0.000)	(0.000)	**(0.000)**	(0.000)	(0.041)	(0.000)	(0.000)	(0.000)	(0.000)	(0.129)
$\|DA\|_{MJM+BMCFO}$	0.758**	0.759**	1.000	0.892**	**−0.070****	−0.222**	0.009	0.100**	−0.171**	−0.092**	0.259**	−0.012
	(0.000)	(0.000)		(0.000)	**(0.000)**	(0.000)	(0.231)	(0.000)	(0.000)	(0.000)	(0.000)	(0.102)
$\|DA\|_{MJM+CROA}$	0.918**	0.910**	0.706**	1.000	**−0.037****	−0.270**	0.008	0.114**	−0.230**	−0.118**	0.263**	−0.011
	(0.000)	(0.000)	(0.000)		**(0.000)**	(0.000)	(0.221)	(0.000)	(0.000)	(0.000)	(0.000)	(0.104)

Panel B: Correlations coefficients among IFRS adoption and cross-sectional absolute discretionary accruals (N = 21,707[(b)])

	$\|DA\|_{MJM}$	$\|DA\|_{AJM}$	$\|DA\|_{MJM+BMCFO}$	$\|DA\|_{MJM+CROA}$	***POST***	*SIZE*	*LEV*	*GROWTH*	*CFO*	*AUD*	*LOSS*	*XLIST*
POST	**−0.042****	**−0.041****	**−0.079****	**−0.036****	1.000	0.028**	−0.030**	0.072**	0.011	−0.054**	−0.094**	0.005
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**		(0.000)	(0.000)	(0.000)	(0.095)	(0.000)	(0.000)	(0.489)
SIZE	−0.266**	−0.264**	−0.186**	−0.264**	0.029**	1.000	0.316**	−0.124**	0.343**	0.420**	−0.334**	0.045**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LEV	−0.007	−0.005	0.013	−0.010	−0.028**	0.333**	1.000	−0.099**	0.015*	0.033**	0.048**	0.000
	(0.306)	(0.455)	(0.069)	(0.137)	(0.000)	(0.000)		(0.000)	(0.030)	(0.000)	(0.000)	(0.948)
GROWTH	0.059**	0.061**	0.045**	0.048**	0.133**	−0.016*	−0.069**	1.000	−0.083**	−0.022**	−0.018**	0.006
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.021)	(0.000)		(0.000)	(0.001)	(0.009)	(0.366)
CFO	−0.154**	−0.151**	−0.018**	−0.169**	0.011	0.285**	−0.048**	0.110**	1.000	0.134**	−0.482**	0.027**
	(0.000)	(0.000)	(0.010)	(0.000)	(0.114)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
AUD	−0.113**	−0.112**	−0.082**	−0.112**	−0.054**	0.428**	0.041**	0.013*	0.146**	1.000	−0.109**	0.061**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.050)	(0.000)		(0.000)	(0.000)
LOSS	0.225**	0.224**	0.222**	0.230**	−0.094**	−0.328**	0.041**	−0.183**	−0.490**	−0.109**	1.000	−0.021**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.002)
XLIST	−0.009	−0.009	−0.011	−0.008	0.005	0.048**	−0.001	0.009	0.028**	0.061**	−0.021**	1.000
	(0.198)	(0.195)	(0.121)	(0.259)	(0.489)	(0.000)	(0.922)	(0.195)	(0.000)	(0.000)	(0.002)	

Panel C: Correlations coefficients among IFRS adoption and accruals quality (N = 8,683)

	AQ	***POST***	*SIZE*	*σ(CFO)*	*σ(Sales)*	*OperCycle*	*NegEarn*
AQ	1.000	**−0.022***	−0.231**	0.306**	0.271**	0.061**	0.155**
		(0.039)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
POST	**−0.026***	1.000	−0.037**	0.090**	0.019	−0.013	−0.064**
	(0.016)		(0.001)	(0.000)	(0.073)	(0.241)	(0.000)
SIZE	−0.243**	−0.039**	1.000	−0.271**	−0.164**	−0.097**	−0.236**
	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)
σ(CFO)	0.385**	0.017	−0.383**	1.000	0.326**	−0.014	0.138**
	(0.000)	(0.105)	(0.000)		(0.000)	(0.178)	(0.000)
σ(Sales)	0.298**	0.009	−0.181**	0.414**	1.000	−0.185**	0.116**
	(0.000)	(0.381)	(0.000)	(0.000)		(0.000)	(0.000)
OperCycle	0.074**	−0.016	−0.102**	−0.040**	−0.186**	1.000	0.065**
	(0.000)	(0.132)	(0.000)	(0.000)	(0.000)		(0.000)
NegEarn	0.167**	−0.064**	−0.236**	0.180**	0.122**	0.067**	1.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	

Notes: p-values are in parentheses. Pearson (Spearman) correlation coefficients are reported in the upper (lower) triangle.
All variables are as defined before.
[(a)]The number observations of *CLOSE* is 11,156 because some firms' *CLOSE* data are not available in the Worldscope dataset.
[(b)]The number observations of $|DA|_{MJM}$, $|DA|_{AJM}$, $|DA|_{MJM+BMCFO}$, and $|DA|_{MJM+CROA}$ are 21,707, 21,707, 19,789, and 21,068, respectively. The number observations of test variable (i.e., *POST*) and control variables (i.e., *SIZE*, *LEV*, *GROWTH*, *CFO*, *AUD*, *LOSS*, and *XLIST*) are all 21,707.
*,**Correlation is significant at 0.05 and 0.01 level, respectively (two-tailed).
Bold values emphasize the significance of test variables.

correlated to *LENG* (panel A, Table 3). The results suggest that those firms are either less likely to recognize losses in a timely manner or that they are not likely to report losses because of having positive earnings. The results also indicate that firms with more equity issuing (*EISSUE*) are more likely to recognize losses in a timely manner. However, we do not find a significant association between financial leverage (*LEV*), asset turnover rates (*TURN*), number of exchange listings (*NUMEX*), cross-listing in the United States (*XLIST*), equity shares closely held by insiders (*CLOSE*) and *LNEG*.

Panel B of Table 3 presents the correlation matrix between IFRS adoption and cross-sectional absolute discretionary accruals. It shows that four different magnitudes of cross-sectional absolute discretionary accruals ($|DA|$) are highly correlated (i.e., most of the Pearson correlation coefficients are >0.90). As expected, we find that the correlations between the four different magnitudes of cross-sectional absolute discretionary accruals ($|DA|$) and *POST* are all significantly negative at 1 per cent level, indicating firms engage in earnings management less frequently during the adoption period. These results are consistent with our hypothesis. Regarding cross-sectional absolute discretionary accruals ($|DA|$) and control variables, all $|DA|$ are negatively and significantly related to firm size (*SIZE*), cash flow from operations (*CFO*), and Big 4/5 auditors (*AUD*) at 1 per cent level. The values of the four $|DA|$ measures are positively and significantly related to financial leverage (*LEV*) at 5 per cent or 10 per cent level. All $|DA|$ measures are positively and significantly related to sales growth (*GROWTH*) and negative reported earnings (*LOSS*) at 1 per cent level. This means that firms with larger size, higher cash flow from operations, and being audited by Big 4/5 auditors engage in earnings management to a less extent, while firms with higher financial leverage, sales growth, and negative reported earnings engage in earnings management to a greater extent.

Panel C of Table 3 presents the correlation matrix between IFRS adoption and accruals quality. As expected, we find that the association between the standard deviation of a firm's residuals (*AQ*) and *POST* is significantly negative ($p = .039$), indicating that firms have higher accruals quality in the adoption period. This result is consistent with our hypothesis. Regarding the standard deviation of a firm's residuals (*AQ*) and control variables, as expected, *AQ* is negatively and significantly related to firm size (*SIZE*) at the 1 per cent level. All *AQ* values are positively and significantly related to cash flow from operations volatility ($\sigma(CFO)$), sales volatility ($\sigma(Sales)$), the length of operating cycles

(*OperCycle*), and the incidence of negative earnings realizations (*NegEarn*) at the 1 per cent level. The results demonstrate that larger firms have higher accruals quality, while firms with higher volatility of cash flow from operations and sales, longer operating cycles, and more frequently reported negative earnings have lower accruals quality.

5.3. Empirical Results

5.3.1. Univariate results. Table 4 presents the univariate analysis results of IFRS adoption on accounting quality. Panel A shows the univariate results of IFRS adoption and earnings smoothing. Contrary to the prediction, there is a significant decrease in the variability of change in net incomes (ΔNI^*) in the adoption period (both mean and median are different at 1 per cent significance level), implying that earnings smoothing increases after IFRS adoption, i.e., a lower accounting quality. After controlling for the variability driven by cash flows from operations, the mean difference of the variability of change in net incomes (ΔNI^*) over the variability of change in cash flow from operations (ΔCFO^*) between the pre- and post-adoption period is not significant. However, the median difference is significantly negative at 1 per cent level (Z-value = -4.67). Overall, the results of the two earnings smoothing measures suggest that accounting quality is not improved after IFRS adoption, which is not consistent with the hypothesis.

Panel B of Table 4 provides the univariate results of IFRS adoption and the magnitude of cross-sectional absolute discretionary accruals. As expected, the four different magnitudes of cross-sectional absolute discretionary accruals are all statistically significantly lower in the adoption period than in the pre-adoption period (both mean and median are different at 1 per cent significance level), indicating that firms' earnings management is reduced in the adoption period. These results are consistent with the hypothesis.

Panel C of Table 4 reports the univariate results of IFRS adoption and accruals quality. As predicted, the standard deviation of firms' residuals as estimated by the cross-sectional DD model is lower in the adoption period than in the pre-adoption period (the median difference is significant at 10 per cent level; the mean difference is negative as predicted but it is not significant), which suggests that firms have higher accruals quality in the adoption period. This result is consistent with the hypothesis.

Table 4. *Univariate results of International Financial Reporting Standards (IFRS) adoption on accounting quality*

Panel A: IFRS adoption and earnings smoothing

		N		*Minimum*		*Maximum*		*Mean (median) of earnings smoothing*		*Mean (median) difference*	*t-test (Wilcoxon rank sum test)*
Measure	*Prediction*	*Pre-*	*Post-*	*Pre-*	*Post-*	*Pre-*	*Post-*	*Pre-*	*Post-*		
Variability of ΔNI^*	Post > Pre	1,622	1,622	0.0000	0.0000	0.1730	0.1172	0.0091	0.0046	−0.0045	−7.02***
								(0.0011)	(0.0006)	(−0.0005)	(−6.78***)
Variability of ΔNI^* over ΔCFO^*	Post > Pre	1,622	1,622	0.0085	0.0017	85.28	55.80	3.3752	3.0739	−0.3013	−1.07
								(0.6061)	(0.4628)	(−0.1433)	(−4.67***)

Panel B: IFRS adoption and cross-sectional absolute discretionary accruals

		N		*Minimum*		*Maximum*		*Mean (median) of |DA|*		*Mean (median) difference*	*t-test (Wilcoxon rank sum test)*
Measure	*Prediction*	*Pre-*	*Post-*	*Pre-*	*Post-*	*Pre-*	*Post-*	*Pre-*	*Post-*		
$\|DA\|_{MJM}$	Post < Pre	13,736	9,939	0.0000	0.0000	0.7900	0.7612	0.0821	0.0749	−0.0072	−5.88***
								(0.0502)	(0.0456)	(−0.0046)	(−5.93***)
$\|DA\|_{AJM}$	Post < Pre	13,736	9,939	0.0000	0.0000	0.8162	0.7611	0.0821	0.0750	−0.0071	−5.82***
								(0.0502)	(0.0459)	(−0.0043)	(−5.80***)
$\|DA\|_{MJM+BMCFO}$	Post < Pre	12,491	9,081	0.0000	0.0000	0.7398	0.7276	0.0866	0.0756	−0.0110	−9.23***
								(0.0590)	(0.0497)	(−0.0093)	(−10.81***)
$\|DA\|_{MJM+CROA}$	Post < Pre	13,243	9,686	0.0000	0.0000	0.7523	0.7418	0.0798	0.0735	−0.0063	−5.28***
								(0.0493)	(0.0456)	(−0.0037)	(−5.14***)

Panel C: IFRS adoption and accruals quality

		N		*Minimum*		*Maximum*		*Mean (median) of AQ*		*Mean (median) difference*	*t-test (Wilcoxon rank sum test)*
Measure	*Prediction*	*Pre-*	*Post-*	*Pre-*	*Post-*	*Pre-*	*Post-*	*Pre-*	*Post-*		
AQ_{DD}	Post < Pre	6,304	3,950	0.0037	0.0038	0.5746	0.6835	0.0893 (0.0673)	0.0874 (0.0658)	−0.0019 (−0.0015)	−1.24 (−1.80*)

Notes: *t*-test (Wilcoxon rank sum test) is used to test mean (median) difference between pre-adoption period (2000–2004) and adoption period (2005–2007, to 2006 for accruals quality).

ΔNI^{*} (ΔCFO^{*}) is defined as the variance of residuals from a regression of ΔNI (ΔCFO) on control variables. The variability of ΔNI^{*}over ΔCFO^{*} is the ratio of the variability of ΔNI^{*} divided by the variability of ΔCFO^{*}. ΔNI, ΔCFO, and AQ are as defined before. The regressions are formally expressed in equations (1) and (2).

The magnitudes of absolute discretionary accruals ($|DA|$) are derived from the four estimation models as explained in Section 4.

*, **, ***Significant at 0.10, 0.05, and 0.01 level, respectively (two-tailed).

5.3.2. Multiple regression analysis. Following previous studies (Lang et al., 2006; Barth et al., 2007, 2008), in the multiple regression analysis of managing earnings toward targets and timely loss recognition, we report OLS estimation results rather than logistic estimation results because Greene (1993) reports that logistic models are extremely sensitive to the effects of heteroskedasticity.

1. IFRS adoption and managing earnings toward targets

Table 5 presents the OLS regression results of IFRS adoption on managing earnings toward targets. We control for industry and country fixed effects in all models, but for the sake of brevity, the results of industry and country dummies are not reported. As expected, we find a significantly negative association between managing earnings toward small positive amounts (*SPOS*) and IFRS adoption (*POST*) in both time-series data ($t = -3.03$, $p < .01$, two-tailed) and cross-sectional data ($t = -4.79$, $p < .01$).[18] The results indicate that firms engage in managing earnings toward targets to a less extent during the adoption period, which is consistent with our hypothesis.

Regarding control variables, firm size (*SIZE*) is significantly positively associated with *SPOS*, suggesting that larger firms engage in managing earnings toward targets to a greater extent. The association between growth (*GROWTH*) and *SPOS* is significantly negative at the 10 per cent and 1 per cent level for time-series and cross-sectional data, respectively. The association between financial leverage (*LEV*) and *SPOS* is significantly positive, while that between asset turnover rates (*TURN*) and *SPOS* is negative, both as predicted. *SPOS* is positively and significantly related to debt issuing (*DISSUE*) at 1 per cent level (time-series data is not significant). *SPOS* is negatively and significantly related to cash flow from operations (*CFO*) at 1 per cent level. *SPOS* is negatively and significantly related to the number of exchange listings (*NUMEX*) at 1 per cent level (cross-sectional data is not significant). *SPOS* is negatively and significantly related to the cross-listing in the United States (*XLIST*) at the 1 per cent level (time-series data is not significant). We do not find a significant relation between equity issues (*EISSUE*), Big 4/5 auditors (*AUD*) and *SPOS*.

2. IFRS adoption and cross-sectional absolute discretionary accruals

Table 6 presents the OLS regression results of IFRS adoption on cross-sectional absolute discretionary accruals. After controlling for potential factors of discretionary accruals, as expected, we find that all four different magnitudes of cross-sectional absolute discretionary accruals ($|DA|$) and *POST* are significantly negative at the 1 per cent level, which

Table 5. *Regression results of International Financial Reporting Standards (IFRS) adoption on managing earnings toward targets*

$$SPOS_{i,t} = \alpha_0 + \alpha_1 POST_{i,t} + \beta_1 SIZE_{i,t} + \beta_2 GROWTH_{i,t} + \beta_3 EISSUE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 DISSUE_{i,t} + \beta_6 TURN_{i,t} + \beta_7 CFO_{i,t} + \beta_8 AUD_{i,t} + \beta_9 NUMEX_{i,t} + \beta_{10} XLIST_{i,t} + \sum_{k=1}^{14} \beta_{k+10} Country_i + \sum_{j=1}^{42} \beta_{j+24} Industry_i + \varepsilon_{k,t} \quad (3)$$

	Predicted sign	*Time-series data*	*Cross-sectional data*
Intercept	?	0.2532***	0.1376***
		(6.81)	(6.32)
POST	–	**– 0.0148*****	**– 0.0151*****
		(– 3.03)	**(– 4.79)**
SIZE	–	0.0034**	0.0060***
		(1.99)	(6.03)
GROWTH	–	– 0.0001*	– 0.0001***
		(– 1.94)	(– 3.25)
EISSUE	–	0.0007	– 0.0008
		(0.12)	(– 0.44)
LEV	+	0.1223***	0.0042***
		(8.34)	(9.31)
DISSUE	+	– 0.0002	0.0090***
		(– 0.03)	(3.32)
TURN	–	– 0.0285***	– 0.0308***
		(– 6.26)	(– 12.08)
CFO	–	– 0.1452***	– 0.0365***
		(– 6.42)	(– 4.14)
AUD	–	– 0.0054	– 0.0037
		(– 0.89)	(– 0.99)
NUMEX	–	– 0.0088***	– 0.0006
		(– 2.77)	(– 0.22)
XLIST	–	0.0054	– 0.0396***
		(0.26)	(– 2.84)
Country fixed effects	?	Yes	Yes
Industry fixed effects	?	Yes	Yes
R^2		0.1478	0.1013
F-value		17.95***	27.24***
N		12,976	32,870

Notes: The table reports ordinary least square (OLS) coefficient estimates and *t*-statistics based on heteroskedasticity-consistent standard errors (in parentheses).
SPOS is an indicator variable that equals one for observations with annual net income scaled by lagged total assets between 0 and 0.01, and 0 otherwise. All other variables are as defined before.
*, **, ***Significant at 0.10, 0.05, and 0.01 level, respectively (two-tailed).
Bold values emphasize the significance of test variables.

Table 6. *Regression results of International Financial Reporting Standards (IFRS) adoption on cross-sectional absolute discretionary accruals*

$$|DA_{i,t}| = \alpha_0 + \alpha_1 POST_{i,t} + \beta_1 SIZE_{i,t} + \beta_2 LEV_{i,t} + \beta_3 GROWTH_{i,t} + \beta_4 CFO_{i,t} + \beta_5 AUD_{i,t} + \beta_6 LOSS_{i,t} + \beta_7 XLIST_{i,t} + \sum_{k=1}^{14} \beta_{k+7} Country_i + \varepsilon_{i,t} \quad (15)$$

	Predicted sign	Dependent variable: cross-sectional absolute discretionary accruals ($\|DA\|$)			
		$\|DA\|_{MJM}$	$\|DA\|_{AJM}$	$\|DA\|_{MJM+BMCFO}$	$\|DA\|_{MJM+CROA}$
Intercept	?	0.0887***	0.0883***	0.0867***	0.0885***
		(20.68)	(20.59)	(20.66)	(20.11)
POST	−	**−0.0049*** **	**−0.0048*** **	**−0.0085*** **	**−0.0040*** **
		(−4.38)	**(−4.32)**	**(−7.64)**	**(−3.75)**
SIZE	−	−0.0085***	−0.0085***	−0.0065***	−0.0080***
		(−23.45)	(−23.47)	(−17.87)	(−23.27)
LEV	+	0.0348***	0.0351***	0.0313***	0.0327***
		(9.88)	(9.98)	(8.90)	(9.58)
GROWTH	+	0.0002***	0.0002***	0.0002***	0.0002***
		(9.36)	(9.41)	(9.32)	(9.46)
CFO	−	−0.0509***	−0.0474***	−0.0105	−0.0494***
		(−6.09)	(−5.69)	(−1.18)	(−5.93)
AUD	−	−0.0020	−0.0019	−0.0020	−0.0023*
		(−1.52)	(−1.40)	(−1.48)	(−1.77)
LOSS	+	0.0246***	0.0250***	0.0338***	0.0271***
		(12.44)	(12.65)	(17.07)	(13.95)
XLIST	−	0.0019	0.0016	−0.0026	0.0003
		(0.36)	(0.31)	(−0.48)	(0.07)

Table 6. (Continued.)

$$|DA_{i,t}| = \alpha_0 + \alpha_1 POST_{i,t} + \beta_1 SIZE_{i,t} + \beta_2 LEV_{i,t} + \beta_3 GROWTH_{i,t} + \beta_4 CFO_{i,t} + \beta_5 AUD_{i,t} + \beta_6 LOSS_{i,t} + \beta_7 XLIST_{i,t} + \sum_{k=1}^{14} \beta_{k+7} Country_i + \varepsilon_{i,t} \quad (15)$$

	Predicted sign	*Dependent variable: cross-sectional absolute discretionary accruals (|DA|)*			
		$\|DA\|_{MJM}$	$\|DA\|_{AJM}$	$\|DA\|_{MJM+BMCFO}$	$\|DA\|_{MJM+CROA}$
Country fixed effects	?	Yes	Yes	Yes	Yes
R^2		0.1248	0.1236	0.1079	0.1314
*F*value		85.72***	84.93***	67.57***	88.30***
N		21,707	21,707	19,802	21,071

Notes: The table reports ordinary least square (OLS) coefficient estimates and *t*-statistics based on heteroskedasticity-consistent standard errors (in parentheses).
All variables are as defined before.
*, **, ***Significant at 0.10, 0.05, and 0.01 level, respectively (two-tailed).
Bold values emphasize the significance of test variables.

indicates that firms engage in earnings management to a less extent in the adoption period. These results are consistent with the hypothesis.

Regarding control variables, all $|DA|$ measures are negatively and significantly related to firm size (*SIZE*) and cash flow from operations (*CFO*) (with the exception of $|DA|_{\mathrm{MJM+BMCFO}}$) at 1 per cent level, which indicates that firms with larger size and greater cash flow from operations have lower cross-sectional absolute discretionary accruals or less earnings management. All $|DA|$ measures are positively and significantly related to financial leverage (*LEV*), sales growth (*GROWTH*), and negative reported earnings (*LOSS*) at 1 per cent level, suggesting that firms with more financial leverage, greater sales growth, and more negative reported earnings would have higher cross-sectional absolute discretionary accruals or more earnings management. A negative relation between $|DA|$ and Big 4/5 auditors (*AUD*) is found, but it is not statistically significant (with the exception of $|DA|_{\mathrm{MJM+BMCFO}}$), suggesting that clients of Big 4/5 auditors have lower cross-sectional absolute discretionary accruals to a certain extent.

3. IFRS adoption and accruals quality

Table 7 presents the OLS regression results of IFRS adoption on accruals quality. After controlling for innate factors of accruals quality, as expected, we find a significantly negative association between the standard deviations of a firm's residuals (*AQ*) and IFRS adoption (*POST*) ($t = -6.17$, $p < .01$). This result indicates that firms have higher accruals quality in the adoption period, which is consistent with our hypothesis. Regarding control variables, as expected, *AQ* is negatively and significantly related to firm size (*SIZE*) at 1 per cent level. All *AQ* measures are positively and significantly related to cash flow from operations volatility ($\sigma(CFO)$), sales volatility ($\sigma(Sales)$), the length of operating cycles (*OperCycle*), and the incidence of negative earnings realizations (*NegEarn*) at 1 per cent level. These results suggest higher accruals quality for firms with larger size, lower cash flow from operations volatility and sales volatility, shorter operating cycles, and less reported negative earnings.

4. IFRS adoption and timely loss recognition

Table 8 presents the OLS regression results of IFRS adoption on timely loss recognition. After controlling for potential factors of timely loss recognition, contrary to the prediction, we find a significantly negative association between timely loss recognition (*LNEG*) and IFRS adoption (*POST*) in both time-series data ($t = -4.58$, $p < .01$) and cross-sectional data ($t = -8.74$, $p < .01$). The results indicate that firms

Table 7. *Regression results of International Financial Reporting Standards (IFRS) adoption on accruals quality*

$$AQ_{i,t} = \alpha_0 + \alpha_1 POST_{i,t} + \beta_1 SIZE_{i,t} + \beta_2 \sigma(CFO)_{i,t} + \beta_3 \sigma(Sales)_{i,t} + \beta_4 OperCycle_{i,t} + \beta_5 NegEarn_{i,t} + \sum_{k=1}^{14} \beta_{k+5} Country_i + \varepsilon_{k,t} \quad (16)$$

	Predicted sign	*Coefficients estimates*	*t-statistics*
Intercept	?	0.0259***	2.98
POST	–	**– 0.0084*****	**– 6.17**
SIZE	–	– 0.0039***	– 10.16
$\sigma(CFO)$	+	0.2429***	14.69
$\sigma(Sales)$	+	0.0371***	10.86
OperCycle	+	0.0109***	7.80
NegEarn	+	0.0108***	6.02
Country fixed effects	?	Yes	
R^2		0.1850	
F-value		56.03***	
N		8,683	

Notes: The table reports ordinary least square (OLS) coefficient estimates and *t*-statistics based on heteroskedasticity-consistent standard errors.
All variables are as defined before.
*, **, ***Significant at 0.10, 0.05, and 0.01 level, respectively (two-tailed).
Bold values emphasize the significance of test variables.

recognize large losses in a timely manner less frequently during the adoption period, which is not consistent with our hypothesis.

Regarding control variables, firm size (*SIZE*) is significantly negatively related to *LNEG*, suggesting that larger firms less frequently recognize large losses in a timely manner. The association between sales growth (*GROWTH*) and *LNEG* is significantly negative at the 5 per cent level (cross-sectional data is not significant). *LNEG* is positively and significantly related to equity issuing (*EISSUE*) at 5 per cent level (time-series data is not significant). *LNEG* is positively and significantly related to financial leverage (*LEV*) at 1 per cent level. *LNEG* is negatively and significantly related to debt issuing (*DISSUE*) and cash flow from operations (*CFO*) at 1 per cent level. *LNEG* is positively and significantly related to asset turnover rates (*TURN*) at 10 per cent level (time-series data is not significant). The association between the number of exchange listings (*NUMEX*) and *LNEG* is significantly positive, as predicted. We do not find a significant relation between Big 4/5 auditors (*AUD*), cross-listing in the United States (*XLIST*) and *LNEG*.

Table 8. *Regression results of International Financial Reporting Standards (IFRS) adoption on timely loss recognition*

$$LNEG_{i,t} = \alpha_0 + \alpha_1 POST_{i,t} + \beta_1 SIZE_{i,t} + \beta_2 GROWTH_{i,t} + \beta_3 EISSUE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 DISSUE_{i,t} + \beta_6 TURN_{i,t} + \beta_7 CFO_{i,t} + \beta_8 AUD_{i,t} + \beta_9 NUMEX_{i,t} + \beta_{10} XLIST_{i,t} + \sum_{k=i}^{14} \beta_{k+10} Country_i + \sum_{j=i}^{42} \beta_{j+24} Industry_i + \varepsilon_{k,t} \quad (14)$$

	Predicted sign	*Time-series data*	*Cross-sectional data*
Intercept	?	0.0665***	0.1144***
		(5.56)	(9.67)
POST	+	**−0.0123*** **	**−0.0225*** **
		(−4.58)	**(−8.74)**
SIZE	+	−0.0128***	−0.0213***
		(−12.48)	(−25.53)
GROWTH	−	−0.0002**	0.0000
		(−2.32)	(0.34)
EISSUE	−	0.0130**	−0.0001
		(2.23)	(−0.03)
LEV	−	0.0669***	0.1167***
		(5.37)	(13.37)
DISSUE	−	−0.0140***	−0.0113***
		(−3.32)	(−4.899)
TURN	−	0.0053	0.0049*
		(1.63)	(1.81)
CFO	−	−0.5538***	−0.8675***
		(−16.03)	(−54.24)
AUD	+	0.0032	0.0047
		(0.85)	(1.47)
NUMEX	+	0.0028**	0.0064***
		(2.08)	(4.53)
XLIST	+	−0.0044	0.0013
		(−0.43)	(0.11)
Country fixed effects	?	Yes	Yes
Industry fixed effects	?	Yes	Yes
R^2		0.1524	0.3027
F-value		7.41***	85.98***
N		12,976	32,870

Notes: The table reports ordinary least square (OLS) coefficient estimates and *t*-statistics based on heteroskedasticity-consistent standard errors (in parentheses).
All variables are as defined before.
*, **, ***Significant at 0.10, 0.05, and 0.01 level, respectively (two-tailed).
Bold values emphasize the significance of test variables.

In summary, the empirical results of this study reveal that the majority of accounting quality indicators improved after IFRS adoption in the 15 EU states. That is, there is fewer incidence of managing earnings toward a target, a lower magnitude of cross-sectional absolute discretionary accruals, and higher accruals quality. However, our study results also indicate that firms engage in earnings smoothing to a greater extent and recognize large losses in a less timely fashion in the adoption period.

5.4. Robustness Tests

We run a number of robustness tests to address some concerns and questions that are raised in relevant previous studies, such as (1) Does larger sample size by relaxing at least 20 observations to 10 observations in each two-digit SIC-year grouping to calculate accounting quality indicators affect our results (Dechow et al., 2003)? (2) Will our results change when an intercept is included in the discretionary accruals model as an additional control for heteroskedasticity (Kothari et al., 2005; Jones et al., 2008)? (3) Are our results sensitive to some other alternative discretionary accruals models that have not been used in our main tests (Jones, 1991; DeFond and Jiambalvo, 1994; Dechow et al., 2003; Kothari et al., 2005; Jones et al., 2008)? (4) Would our inferences be altered if only the publicly listed companies from the United Kingdom, France, and Germany are used in regressions as the firms of these three countries account for 62.04 per cent (i.e., 13,467/21,707) of the total firm-year observations in this study? (5) What would happen in the results if we use symmetric periods (i.e., 2002–2004 versus 2005–2007) to represent the pre- and post-adoption period? (6) Will the exclusion of voluntary IFRS or U.S. GAAP adopters in the pre-adoption period (2000–2004) change our results? And (7) although our main test follow Francis et al. (2005) to use a balance sheet approach to measure total current accruals (i.e., equation (13)), will we obtain the same results if the cash flow statement approach developed by Hribar and Collins (2002) is adopted to calculate total current accruals? Overall, the robustness testing results and inferences are virtually unchanged. For the sake of brevity, these robust test results are not presented.

6. Changes in Country-Level Institutional Factors

It is generally understood that other country-level institutional factors may also affect financial reporting quality. These institutional factors

construct a financial reporting environment that could directly or indirectly affect managerial incentives to produce high-quality financial information. Thus, we have also considered several institutional factors and their potential effects in our analysis of the role of IFRS in improving financial reporting quality in the EU during the test period.

6.1. Change in Confidence in the Quality of Business Regulation in a Country

First, we consider the effect of quality of business regulation on financial reporting. Because accounting standards are part of overall business regulations, management incentives to implement the accounting standards are influenced by the extent of business regulation in a country. A change in the enforcement quality of business regulations in general might change the management incentives, therefore, influence the financial reporting quality. We use the regulatory quality index (*RQI*) to measure the quality of business regulation, which reflects the perceptions of a government's ability to formulate and implement sound policies and regulations that permit and promote private sector development (Kaufmann et al., 2008). *RQI* increases in regulatory quality. If we observe significant change between the pre- and post-IFRS periods, our findings might be driven by the quality of business regulation, rather than accounting standards.

6.2. Change in Confidence in the Quality of Contract Enforcement

Management is under contractual obligation to faithfully report firm's financial conditions and operating results to shareholders. The quality of contract enforcement might affect the willingness of managers to fulfill their contractual responsibility of financial reporting to shareholders and other stakeholders. There is a positive association between the quality of contract enforcement and financial reporting quality. We thus further test whether there is significant increase or decrease in the quality of contract enforcement in our sample countries during the test periods. We use the rule of law index (*RLI*) to proxy for quality of contract enforcement, which measures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence (Kaufmann et al., 2008).

6.3. Change in Control of Fraud in Financial Reporting

If a country has a stronger disciplinary mechanism for fraud in general, there is more pressure for managers to provide true and fair financial reports. If there is a significant increase in effective discipline for fraud, the change can have an effect on financial reporting practices. This is because managers would have less incentive to manipulate earnings and produce fraudulent financial reports. We consider this factor by testing the mean value of the proxy for discipline of fraud in a country during the pre- and post-adoption periods, i.e., the control of corruption index (*CCI*), which measures the perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests (Kaufmann et al., 2008).

6.4. Change in the Degree of Freedom of Information

We posit that financial reporting quality, particularly transparency, is a function of national system for freedom of information in general. If a country has a higher degree of freedom of expression, freedom of association, and a free media, it is more likely the country has more transparent information, including financial information. In such a country, managers may have more incentives to produce transparent accounting information. So an increase in the degree of freedom of information in a country would have a positive impact on accounting quality. We use the voice and accountability index (*VAI*) to proxy for degree of transparency of financial information in a country, which measures the perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media (Kaufmann et al., 2008). We compare the mean (median) value of *VAI* between the pre- and post-IFRS periods. A significant change in *VAI* in the testing period may indicate that the improvement of financial reporting quality is driven by this environmental factor, rather than accounting standards.

6.5. Change in Political Stability

It is argued that an unstable political environment would have negative impact on the reliability and quality of financial reporting. We adopt the political stability and absence of violence index (*PVI*) to proxy for

political and business environment stability, which measures the perceptions of the likelihood that a government will be destabilized or overthrown by unconstitutional or violent means, including politically motivated violence and terrorism (Kaufmann et al., 2008).

6.6. Change in Managers' Confidence in Government Effectiveness

It can also be argued that managerial incentives to produce high-quality of financial reports are associated with manager's confidence in government effectiveness and credibility. We use the government effectiveness index (*GEI*) to proxy for manager and investor confidence in the quality of public and civil service by government, which measures the perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies (Kaufmann et al., 2008).

6.7. Change in Overall Financial Reporting Environment

We develop the worldwide governance indicators (*WGI*) to measure overall change in financial reporting environment in a country, which is measured by the mean value of the above six indices (i.e., *RQI*, *RLI*, *CCI*, *VAI*, *PVI*, and *GEI*). In general, the six indices and *WGI* increase in financial reporting environment.

An improved financial reporting environment is associated with managers' incentives to provide better financial statements. In order to test whether the improved accounting quality in the EU member states is driven by change in accounting standards or by change in managerial incentives, we test whether there is significant difference between the proxies for financial reporting environment over the pre- and post-adoption period.

The results are summarized in Table 9. As indicated, there are no statistically significant differences between the mean (median) values of most of these institutional variables, except for *PVI* and *GEI*. However, as *PVI* and *GEI* decrease in the adoption period, they should have negative effect on financial reporting quality. Therefore, the results suggest that those institutional variables cannot explain the improved financial reporting quality after full adoption of IFRS in the 15 EU countries.

Table 9. *Descriptive statistics of country-level institutional variables of 15 European Union (EU) countries*

	Pre-adoption period						*Adoption period*					
	N[(a)]	*Mean*	*Median*	*Standard deviation*	*Q1*	*Q3*	*N*	*Mean*	*Median*	*Standard deviation*	*Q1*	*Q3*
RQI	60	1.49	1.57	0.33	1.20	1.77	45	1.45	1.54	0.35	1.15	1.75
RLI	60	1.53	1.70	0.38	1.28	1.83	45	1.48	1.73	0.47	1.12	1.85
CCI	60	1.72	1.92	0.53	1.42	2.15	45	1.65	1.84	0.64	1.32	2.06
VAI	60	1.38	1.40	0.22	1.26	1.54	45	1.39	1.42	0.20	1.27	1.54
PVI	60	1.02	1.05	0.38	0.70	1.28	45	0.85**	0.83**	0.39	0.50	1.15
GEI	60	1.70	1.85	0.44	1.49	2.07	45	1.52*	1.66**	0.53	1.30	1.89
WGI	60	1.47	1.55	0.35	1.24	1.77	45	1.39	1.54	0.40	1.14	1.69

Notes: *t*-test (Wilcoxon rank sum test) is used to test mean (median) difference between pre-adoption period (2000–2004) and adoption period (2005–2007). Q1 is 25 percentile, Q3 is 75 percentile. *N* is country-year observations.

RQI is the regulatory quality index, which measures perceptions of the ability of government to formulate and implement sound policies and regulations that permit and promote private sector development. *RLI* is the rule of law index, which measures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. *CCI* is the control of corruption index, which measures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. *VAI* is the voice and accountability index, which measures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media. *PVI* is the political stability and absence of violence index, which measures perceptions of the likelihood that a government is destabilized or overthrown by unconstitutional or violent means, including politically motivated violence and terrorism. *GEI* is the government effectiveness index, which measures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. *WGI* is the worldwide governance indicators, which is measured by the mean value of the above six governance indices. *RQI*, *RLI*, *CCI*, *VAI*, *PVI*, *GEI*, and *WGI* all range from -3 to $+3$, which is derived from Kaufmann et al. (2008). The higher six governance indices and *WGI* indicate higher governance, and vice versa.

[(a)]Kaufmann et al. (2008) calculate 1996, 1998, 2000, and annually from 2002 to 2007 *RQI*, *RLI*, *CCI*, *VAI*, *PVI*, *GEI*, and *WGI*.

*, **, ***Significant at 0.10, 0.05, and 0.01 level, respectively (two-tailed).

6.8. Change in Political Incentives for Earnings Management

Some researchers suggest managers may have political incentives to manage earnings. These studies provide evidence that managers with political incentives tend to reduce volatility of reporting income (Watts and Zimmerman, 1978). Following previous literature, we use the firm size as a proxy for political incentives. We compare the percentage of large firms in total firms between the pre- and post-IFRS periods. We define large firms as the firms with sales above the mean value of all sample firms. We found no significant difference in percentage of large firms between the pre- versus post-adoption periods (i.e., 48.36 per cent versus 49.04 per cent, not tabulated). Thus our results are unlikely to be driven by political incentives.

6.9. DAS before Adoption of IFRS in the EU

Firms in the EU 15 member countries adopted DAS before 2005. The quality of DAS varies among the member countries. This may lead to a different level of incremental improvement on accounting quality after IFRS adoption. It can be argued that countries with larger differences between DAS and IFRS have stronger improvement in accounting quality than countries with smaller difference. We adopt the absence index developed by Ding et al. (2007) to measure the gap between DAS of the 14 EU member countries and IFRS.[19] The absence index measures the extent to which the rules regarding certain accounting issues are missing in DAS but are required by IFRS (Ding et al., 2007). The absence index increases in the difference between DAS and IFRS. Table 10 reports the absence index of 14 EU countries. It shows that the absence index varies among the sample countries considerably. Ireland and the United Kingdom both have the smallest absence index (i.e., 0), implying there is no difference in the rules of certain accounting issues between DAS of the two countries and IFRS. Greece has the largest absence index (i.e., 40). The mean and median value of absence index for our sample countries is 20.86 and 22, respectively.

All sample countries are further divided into two subgroups, i.e., the small-gap versus large-gap countries based on their absence index below or above the overall mean value (between DAS and IFRS). We expect large-gap countries have bigger improvement in accounting quality than small gap countries, in respect of the three indicators of accounting quality that have improved after IFRS adoption, i.e., the magnitude of

Table 10. *The absence index between domestic accounting standards (DAS) and International Financial Reporting Standards (IFRS)*

Country	*Absence index*
Austria	34
Belgium	22
Denmark	31
Finland	22
France	21
Germany	18
Greece	40
Ireland	0
Italy	27
The Netherlands	10
Portugal	29
Spain	28
Sweden	10
The United Kingdom	0
Minimum	0
Maximum	40
Mean	20.86
Median	22
Standard deviation	12.13

Notes: The absence index measures the extent to which the rules regarding certain accounting issues are missing in DAS but are covered in IFRS in 2001, ranging from 0 to 111 (Ding et al., 2007). The higher the absence index, the greater gap between DAS and IFRS, and the lower financial reporting quality in general.

absolute discretionary accruals ($|DA|$), managing earnings toward a target ($SPOS$), and accruals quality ($AQ\_{\rm DD}$). We first test the difference in the indicators between the pre- and post-adoption periods using *t*-statistics or Wilcoxon rank sum test. We then analyze the degree of improvement by comparing the absolute value of *t*-statistic (*Z*-statistic) from the *t*-test (Wilcoxon rank sum) of the two subgroups to test the above prediction. The results are summarized in Table 11.[20] We find evidence supporting our prediction in the magnitude of absolute discretionary accruals ($|DA|$). Panel A in Table 11 shows $|DA|$ gets better after IFRS adoption for both large- and small-gap group in all four different measures of the indicator, and the large-gap group has a greater improvement than small-gap group. For example, when the magnitude of absolute discretionary accruals is measured by $|DA|_{\rm MJM}$, large-(small-)gap group reduced (i.e., improved) mean value by -0.0104 (-0.0047). The absolute *t*-statistic of *t*-test is 6.42 for large-gap group versus 2.70 for small-gap group. The similar evidence is found when we apply the absolute *Z*-statistic of Wilcoxon rank sum test (5.82 versus 2.59). We found similar evidence when using other measures of discretionary

Table 11. *The effect of the difference between domestic accounting standards (DAS) and International Financial Reporting Standards (IFRS) on accounting quality*

Panel A: The effect of the difference between DAS and IFRS on cross-sectional absolute discretionary accruals

Measure	*Absence index*	*Prediction (|t-test (Wilcoxon rank sum)|)*	*N*		*Mean (median) of |DA|*		*Mean (median) difference*	*t-test (Wilcoxon rank sum test)*
			Pre-	*Post-*	*Pre-*	*Post-*		
$\|DA\|_{MJM}$	Large	Large > small	5,264	3,964	0.0715	0.0611	−0.0104	−6.42***
					(0.0446)	(0.0386)	(−0.0060)	(−5.82***)
	Small		8,396	5,915	0.0888	0.0841	−0.0047	−2.70***
					(0.0534)	(0.0509)	(−0.0025)	(−2.59***)
$\|DA\|_{AJM}$	Large	Large > small	5,264	3,964	0.0715	0.0612	−0.0103	−6.37***
					(0.0448)	(0.0392)	(−0.0056)	(−5.79***)
	Small		8,396	5,915	0.0887	0.0842	−0.0045	−2.66***
					(0.0534)	(0.0511)	(−0.0023)	(−2.46***)
$\|DA\|_{MJM+BMCFO}$	Large	Large > small	4,766	3,668	0.0764	0.0638	−0.0126	−8.12***
					(0.0544)	(0.0445)	(−0.0099)	(−8.79***)
	Small		7,663	5,357	0.0931	0.0837	−0.0094	−5.53***
					(0.0619)	(0.0537)	(−0.0082)	(−6.47***)
$\|DA\|_{MJM+CROA}$	Large	Large > small	5,150	3,886	0.0704	0.0607	−0.0097	−6.03***
					(0.0440)	(0.0391)	(−0.0049)	(−4.93***)
	Small		8,017	5,740	0.0859	0.0821	−0.0038	−2.28**
					(0.0527)	(0.0511)	(−0.0016)	(−2.39**)

Panel B: The effect of the difference between DAS and IFRS on managing earnings towards targets

Measure	Absence index	Prediction (|t-text (Wilcoxon rank sum)|)	N		Mean (median) of SPOS		Mean (median) difference	t-test (Wilcoxon rank sum test)
			Pre-	Post-	Pre-	Post-		
SPOS	Large	Large > Small	2,705	1,623	0.1043	0.0918	−0.0125	−1.34
					(0.0000)	(0.0000)	(−0.0000)	(−1.32)
	Small		5,515	3,309	0.0921	0.0804	−0.0117	−1.91*
					(0.0000)	(0.0000)	(−0.0000)	(−1.88*)

Panel C: The effect of the difference between DAS and IFRS on accruals quality

Measure	Absence index	Prediction (|t-text (Wilcoxon rank sum)|)	N		Mean (median) of AQ		Mean (median) difference	t-test (Wilcoxon rank sum test)
			Pre-	Post-	Pre-	Post-		
*AQ*_DD	Large	Large > Small	1,790	1,232	0.0790	0.0788	−0.0002	−0.09
					(0.0622)	(0.0635)	(0.0013)	(0.60)
	Small		3,704	1,954	0.0874	0.0833	−0.0041	−2.10**
					(0.0666)	(0.0618)	(−0.0048)	(−3.20***)

Notes: *t*-test (Wilcoxon rank sum test) is used to test mean (median) difference between pre-adoption period (2000–2004) and adoption period (2005–2007, to 2006 for accruals quality).
We define those with the value of absence index above the mean value as large gap country (Large) and those below the mean value as small gap country (Small).
All variables are as defined before.
*, **, ***Significant at 0.10, 0.05, and 0.01 level, respectively (two-tailed).

accruals. That is, large-gap group has greater reduced mean (median) value and higher absolute *t*-statistic (*Z*-statistic) after IFRS adoption. But in the case of managing earnings toward targets (*SPOS*) and accrual quality (AQ_{DD}), both large-gap and small-gap groups have improved indicators in the adoption period. However, the evidence is relatively weak as we found no evidence that large-gap group has better improvement relative to small-gap group (panels B and C, Table 11). A possible reason for the inconsistent evidence is that the difference between DAS and IFRS of the sample countries is more likely to impact on discretionary accrual rather than on managing earnings toward targets and accruals quality.

7. Concluding Remarks

Do accounting standards matter? This question can only be addressed when other institutional factors (which are associated with managerial incentives and business environment) are held constant. The unique EU setting provides us with a great opportunity to investigate the relationship between accounting quality and IFRS adoption. Our evidence suggests that accounting standards play a role in improving accounting quality beyond managerial incentives. IFRS can reduce earnings management by limiting opportunistic management discretions in determining accounting numbers. Our study contributes to the literature by showing the observed accounting quality improvement in the EU is attributable to IFRS, rather than changes in managerial incentives, or/and other business environmental factors.

We do not expect that IFRS adoption would generate accounting information with the same quality across countries, as other factors would affect accounting quality. However, we argue that, all else equal, accounting standards make a difference in accounting quality. Our results are consistent with the notion. The policy implication of our study is that the replacement of local standards (such as U.S. GAAP) with IFRS would have incremental effects on the quality of financial reporting.

Notes

1. For simplicity, this study uses the term IFRS to refer to both IFRS issued by the International Accounting Standards Board (IASB) and International Accounting Standards (IAS) issued by IASC (the predecessor of IASB).
2. Two types of publicly listed companies in the EU can prepare their financial reports under IFRS until 2007: firms with a domicile in the EU that do not publicly list on any EU

stock exchange and that use U.S. GAAP to prepare financial statements, and firms that have only publicly traded debt securities.

3. There were 27 member states in the EU as of 31 December 2008. However, this study uses only 15 EU member states to examine the effect of IFRS adoption on accounting quality. This is because 10 member states (Cyprus, Czech, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia) and 2 member states (Bulgaria and Romania) joined the EU on 1 May 2004 and 1 January 2007, respectively, and these 12 EU member states all belong to emerging capital markets (Bhattacharya and Daouk, 2002). The financial statement data in most of these countries are not available in the Worldscope dataset.

4. When calculating the accounting quality indicators of earnings smoothing, managing earnings toward targets, and timely loss recognition, consistent with Barth et al. (2008), this study includes financial institutions. In robustness tests, the results are quantitatively unchanged after excluding the financial institutions.

5. These four models were used rather individually in previous studies but they are all employed in our study in order to enhance testing power.

6. In the Worldscope dataset, there are nine U.S. stock exchanges, i.e., ASE, BSE, CIN, MSE, NAS, NYSE, OTC, PBW, and PCS.

7. In the Worldscope dataset, closely held shares of many firms are not available. To keep as many observations as possible, consistent with Barth et al. (2008), this study does not include this variable in the main test. In robustness tests, this variable is included in the regression model, and the results are virtually unchanged.

8. In robustness tests, the results are virtually unchanged when we use a two-digit SIC to classify an industry.

9. Dechow et al. (1995), Healy and Wahlen (1999), and McNichols (2000) have provided extensive earnings management literature reviews. According to the literature, the Healy model, the DeAngelo model, and the Industry model (Healy, 1985; DeAngelo, 1986) can also be applied to determine estimated normal accruals, although they are not widely used in earnings management studies. However, these models require time-series data to estimate non-discretionary accruals. Because a lack of a sufficiently long period for time-series data, the three time-series discretionary accruals models are excluded from this study.

10. Because the purpose of this study is to examine the effect of IFRS adoption on accounting quality in the EU, all 15 EU member countries are viewed as a single economy entity in the estimation of various non-discretionary accruals, so we do not separately use each EU member state to estimate non-discretionary accruals.

11. Our sample includes 15 EU member states from 2000 to 2007. Before the euro was circulated on 1 January 2002, each EU member state had its own local currency (Cohen, 1999). Even after 1 January 2002, of our sample countries, Denmark, Sweden, and the United Kingdom still used their own local currencies. To enhance comparability, this study uses total assets in U.S. dollars to scale the intercept rather than the euro or local currencies. However, in the other variables of various non-discretionary accruals estimated models, we still use total assets in local currencies to scale other variables since they are denominated in local currencies.

12. This is the same for the other cross-sectional non-discretionary accruals models used in this study. In robustness tests, following Dechow et al. (2003), where we require at least 10 observations in each SIC-year grouping, and the results are virtually unchanged.

13. Kothari et al. (2005) argue that using an intercept is an additional control for heteroskedasticity, and that discretionary accruals are more symmetric when using an intercept. In robustness tests, this study includes an intercept in the discretionary accruals model; the results are virtually unchanged comparing with the main tests.

14. Different from previous studies, Dechow et al. (2003) did not scale the intercept by lagged total assets. This is because they were interested in comparing the explanatory power of four discretionary accruals models (i.e., the modified Jones model, the adapted Jones model, the lagged model, and the forward-looking model) while not estimating non-discretionary accruals. Contrary to Dechow et al. (2003), this study is interested in the estimation of non-discretionary accruals rather than the explanatory power of the models. Consistent with the other non-discretionary accruals models (e.g., the modified Jones model), this study scales the intercept by lagged total assets in the adapted Jones model that was developed by Dechow et al. (2003).

15. In robustness tests, consistent with Dechow et al. (2003), we require at least 10 observations in each SIC-year grouping; the results are quantitatively unchanged.

16. Note that the firm-year observations by country and year are different based on different magnitudes of cross-sectional absolute discretionary accruals, and the same as when calculating the accounting quality indicators of earnings smoothing, managing earnings toward targets, and timely loss recognition. We just use the magnitude of cross-sectional absolute discretionary accruals estimated by the cross-sectional modified Jones model for each two-digit SIC-year grouping as an example.

17. We also calculated the distribution of firm-year observations by Fama and French (1997) industry classification. Shipbuilding, railroad equipment (Ships) has the smallest number of observations (i.e., 24 or 0.18 per cent), while business services (BusSv) has the largest number (i.e., 1,688 or 13.01 per cent). The industry classification data are not tabulated due to space limit.

18. As noted earlier, the equations (1) and (2) that are used to calculate earnings smoothing by nature are time-series regression model. This study uses time-series data to examine the association between IFRS adoption and managing earnings toward targets in order to keep consistent with the data that have been used in the calculation of earnings smoothing. However, the sample size of time-series data is relatively small and the survivorship bias inevitably exists. In order to obtain more generalizable result, this study also reports the result that is based on the cross-sectional data, which largely enhances the sample size and avoids the survivorship bias. This methodology is also applied to IFRS adoption and timely loss recognition.

19. Note that the absence index of Luxembourg is not available in Ding et al. (2007).

20. In robustness test, we also use the median value of the absence index to divide the sample countries into two subgroups (small-gap versus large-gap countries). The results are virtually unchanged.

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