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Does mandatory IFRS adoption improve information quality in low investor protection countries?

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ABSTRACT

We examine the effect of mandatory IFRS adoption on the information quality of financial reporting in France, Germany and Sweden. These three Western European civil law countries are characterized as low investor protection by the World Economic Forum's 2012/2013 Global Competitiveness Report. Using data for 2003 and 2011, we find significant improvement in both forecast accuracy and forecast dispersion following mandatory IFRS adoption in all three countries. Furthermore, the effect on information quality is greater the lower the strength of investor protection. These results suggest that mandatory IFRS adoption in low investor protection countries leads to an improvement in information quality. A tentative implication of the results is that standard setters should not delay IFRS adoption pending regulators implementing a high investor protection.

1. Introduction

The International Accounting Standards Board[1] (IASB) develops International Financial Reporting Standards (IFRS) with the aim of unifying capital markets under one common reporting language (Ball, 2006). With implementation of International Accounting Standards (IASs) and more recently, IFRS, the IASB seeks uniform high quality financial reporting across the world (Ball, 2006). This study examines the effects of IFRS adoption[2] on information quality in France, Germany and Sweden.

Daske, Hail, Leuz, & Verdi (2008) find that mandatory IFRS adoption has a positive effect on capital markets, but only in countries with relatively high investor protection. These results are supported by Jiao, Koning, Mertens, and Roosenboom (2012) and Horton, Serafeim, and Serafeim (2013). The meta-study by Ahmed, Chalmers, and Khlif (2013) finds an overall positive effect from IFRS adoption. In contrast, Ahmed, Neel, and Wang (2013) find that accounting quality decreases with adoption of principle-based IFRS, as opposed to more common rule-based domestic GAAPs. Jeanjean and Stolowy (2008) find little effect on Australian and United Kingdom firms, but discover increased earnings management in French firms.

We reexamine the effect of mandatory IFRS adoption in low investor protection countries. We use data from France, Germany and Sweden as these countries are characterized as low investor protection countries by the World Economic Forum's 2012/13 Global Competitiveness Report (GCR), and in studies by La Porta, Lopez-de-Silanes, Shleifer, and Vishny

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[1] The International Accounting Standards Board (IASB) was formerly known as the International Accounting Standards Committee (IASC). For simplicity, in this report we use only the name 'IASB' in reference to both organizations during their respective periods of governance.

[2] Prior to 2001, standards created by the IASB were called International Accounting Standards. IFRS incorporates all IASs. For simplicity, we use the term 'IFRS' throughout the text.

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(1998), Daske et al. (2008) and Jaggi and Low (2009). These countries are characterized as low investor protection primarily due to their civil law[3] legal origins (La Porta et al., 1998).

As in Jiao et al. (2012) and Horton et al. (2013), we use analysts' forecast errors and forecast dispersion to gauge the effect of IFRS on the information environment. We find significant improvement in both forecast accuracy and forecast dispersion following mandatory IFRS adoption. Furthermore, the effect on information quality is greater the lower the strength of investor protection. We control for industry and country effects and our results are robust to increasing the sample size, matched sample, and removing financial companies from the primary sample.

Daske et al. (2008) examines only 2005, the year of mandatory adoption, and Ahmed, Neel, et al. (2013) incorporate only two years of post-adoption data. However, the effects of IFRS adoption may not be seen until later years (Ball, 2006). Ball (2006) suggests that IFRS creates a one-time cost for analysts to learn the new standards, thus analysts are left without a significant frame of reference or history of IFRS statements for at least a few years. Therefore, although analyst forecast accuracy and forecast dispersion may improve in the long run due to IFRS adoption, they are likely to display little change in the years immediately following adoption. Our data covers the period 2003–2011. Therefore, we utilize the most recent and complete available data to avoid bias in forecast accuracy created by a lack of IFRS history.

Our study makes several important contributions to existing literature. First, our study is concerned only with mandatory IFRS adoption, thus excluding voluntary adoption. In contrast, Ahmed, Chalmers, et al. (2013) examine the effects of both mandatory and voluntary adoption. Second, our study includes only low investor protection countries. In contrast, Daske et al. (2008) and Ahmed, Neel, et al. (2013) include both high and low investor protection countries. Finally, we examine three countries from three different civil law backgrounds. As the level of investor protection in a country is primarily characterized by its legal system, this allows us to examine the relative effects of mandatory IFRS adoption in each of the three main civil law traditions, German, French and Scandinavian (La Porta et al., 1998).

The rest of this paper is organized as follows: Section 2 reviews previous literature, and provides a background for the direction of this study. Section 3 develops hypotheses. Section 4 illustrates and explains the research design. Section 5 presents empirical results and Section 6 concludes our study.

2. Background and literature review

2.1. IFRS

With over 120 countries worldwide either requiring or permitting the use of IFRS for financial reporting, there has been a significant global shift from traditional cost-based accounting towards fair-value accounting (Horton et al., 2013; IFRS Foundation, 2013a; Reisloh, 2011). With China having substantially converged its national standards to IFRS, Canada having adopted IFRS for all listed entities in 2011, and India committing to convergence, IFRS is gaining a global stronghold (IFRS Foundation, 2013a, 2013b).

Advocates of IFRS argue that these standards provide more relevant information for investment decisions, as they allow for measurement and recognition of transactions that better represent the economic reality of a firm (Barth, Landsman, & Lang, 2008; Firth, Gounopoulos, & Pulm, 2012). Furthermore, IFRS provides international comparability in financial reporting, which proponents argue improves analysts' forecast accuracy and improves the basis for investment decisions (Barth et al., 2008; Daske et al., 2008; Firth et al., 2012; Horton et al., 2013; Yeng & Henry, 2013).

Proponents further suggest that with improved comparability of firms across markets, IFRS makes it easier and less costly for investors to compare firms in which they may consider investing (Armstrong, Barth, Jagolinzer, & Riedl, 2010; Covrig, DeFond, & Hung, 2007; Daske et al., 2008). Increased comparability is primarily the result of a decrease in discretionary accounting rules included in IFRS (Barth et al., 2008; Bissessur & Hodgson, 2012; Ding, Jeanjean, & Stolowy, 2009). The effect of adoption on firms domiciled in countries with traditional standards similar to that of IFRS is expected to be small (Ashbaugh & Pincus, 2001; Byard, Li and Yu, 2011; Horton et al., 2013; Yeng and Henry, 2013). However, even though improvements in the quality of financial information reported after IFRS adoption may be negligible or non-existent, increased comparability may lead to greater cross-country information for investors and thus increased investment (Daske et al., 2008).

Recent studies suggest that the role of accounting standards in financial reporting is limited, and that firms' incentives are a much greater determinant of the quality of reporting (Ball & Shivkumar, 2005; Ball, Kothari, & Robin, 2000; Ball, Robin, & Wu, 2003; Burgstahler, Hail, & Leuz, 2006; Christensen, Lee, & Walker, 2008; Daske et al., 2008; Jeanjean & Stolowy, 2008; Leuz, 2003). Many argue that the application of financial reporting standards involves considerable judgement, regardless of the standards applied (Daske et al., 2008; Jeanjean & Stolowy, 2008). Further, IFRS is based on the concept of fair-value accounting, leading to greater discretion and subjective judgement by accountants than in the traditional GAAP of most countries (IFRS Foundation, 2013a). Therefore, prior research suggests that the quality of financial reporting is directly correlated to firms' incentives to report opportunistically (Daske et al., 2008).

Daske et al. (2008; p. 1094) suggest that, ceteris paribus, countries with "stricter enforcement regimes and institutional structures that provide strong reporting incentives are more likely to exhibit discernible capital-market effects around

[3] The term 'civil law', used by La Porta et al. (1998) is interchangeable with the term 'code law' which (put most simply) refers to the greater emphasis of a country on codified law, as opposed to precedent law. For simplicity, in line with La Porta et al. (1998), we use the term 'civil law' throughout this paper.

the introduction of IFRS reporting." That is, stricter enforcement leads to discernible benefits from IFRS adoption. Through empirical examination of 26 countries mandatorily adopting IFRS, Daske et al. (2008) find that the benefits of IFRS adoption are only observed in capital-markets of countries with strict enforcement (i.e. strong investor protection).

Often upon adopting IFRS, countries will alter their "enforcement, auditing and governance regimes" (Daske et al., 2008; p. 1090). Therefore, it cannot be said with certainty that the effects observed empirically from IFRS adoption is in fact due to the adoption of IFRS. The effects observed between countries and even between firms may be comparable at face value, but be due to entirely different factors below the surface (Daske et al., 2008). Also, depending on the corporate governance environment, countries and firms may have the opportunity to adopt IFRS in name only, which would question any findings based around the actual adoption of the standards (Nobes, 2011).

The results found by Jeanjean and Stolowy (2008) and Ahmed, Chalmers, et al. (2013) support the critics of IFRS who argue that principles-based standards provide greater discretion and that at present there is a lack of adequate implementation guidance. However, we expect that while principles-based standards seem more liberal than their rules-based counterparts, in practice principles-based standards are more difficult to evade, as they incorporate a broader range of transactions. Nobes (2011) finds that the ideal set of financial reporting standards in each country is determined according to their history, culture, and system of law.

2.2. Legal traditions and investor protection

Scholars typically classify legal systems into two broad traditions: civil law and common law (La Porta et al., 1998; Gaio, 2010). Common law, shaped by precedents from judicial decisions (or stare decisis – 'to stand by things decided'), is prevalent in countries with a strong British historical influence, such as the United States, Australia and Canada, and covers approximately one-third (2.3 billion people) of the world's population (Central Intelligence Agency, 2013; Daske et al., 2008; La Porta et al., 1998). In contrast, civil law is based on codification, in which legal codes are continually updated to specify all matters capable of being brought before a court, the appropriate procedure for addressing the issue, and the punishment to be administered should guilt be found on the part of the defendant (Central Intelligence Agency, 2013).

Legal scholars further classify civil law traditions into three common families: French, German and Scandinavian (La Porta et al., 1998). The French Commercial Code, written in 1807, had a more pronounced effect, particularly in nearby European countries (such as Italy and Spain), but also as far abroad as Indochina (Southeast Asia) and Oceania. The German Commercial Code was written much later in 1897, following Otto von Bismarck's unification of Germany and the signing of the Treaty of Versailles (in 1871), and had a large bearing on neighbouring countries, such as Austria and Switzerland (La Porta et al., 1998). Found primarily in the five Nordic countries of Northern Europe, Scandinavian civil law, although similar in some respects to both French and German civil law, has many significant distinctions (La Porta et al., 1998).

Scholars have established that common law countries generally provide better investor protection and corporate governance than civil law countries (Gaio, 2010; La Porta et al., 1998). La Porta et al. (1998) illustrate this distinction, both between common and civil law countries, and within different civil law traditions, through calculation of "antidirector rights" (La Porta et al., 1998; p. 1127) for each legal tradition (common law; German, French and Scandinavian civil law). They find common law countries have the best shareholder protection, with an average score of 4.0 out of 6.0, while French and German civil law countries have the worst, with an average score of 2.3. Scandinavian civil law countries have an average score of 3.0. In this study, we use one country from each of these three main branches of civil law (French: France; German: Germany; and Scandinavian: Sweden), allowing us to examine the effects of IFRS on information quality in low investor protection countries, as well as observing the effects on each individual civil law system.

3. Hypothesis development

Financial analysts are among the major and most intensive users of firms' financial reports, as they are required to predict a firm's fundamental value (Barron, Byard, Kile, & Riedl, 2002; Cheong, Kim, & Zurbruegg, 2010; Tan, Wang, & Welker, 2011). Furthermore, analysts use firms' previous financial reports, particularly earnings information, to predict future earnings (Barker & Imam, 2008; Jiao et al., 2012). Therefore, the accuracy of analysts' forecasts is directly correlated to the quality of financial reports and the information environment (Horton et al., 2013; Jiao et al., 2012).

Bae, Tan, and Welker (2008) and Tan et al. (2011) suggest that differences in accounting standards dissuade analysts from following firms from different countries, and negatively impact forecasts for foreign firms they do follow. IFRS seek to improve comparability and understandability both domestically and internationally. Prior studies show that IFRS adoption creates more accurate and informative financial reports, and thus improves analysts' forecast accuracy and reduces forecast errors, as well as encouraging analysts to follow foreign firms (Ashbaugh & Pincus, 2001; Bae et al., 2008; Ernstberger, Krotter, & Stadler, 2008; Glaum, Baetge, Grothe, & Oberdoerster, 2011; Hodgdon, Tondkar, Harless, & Adhikari, 2008; Ionascu & Ionascu, 2012; Tan et al., 2011; Yeng & Henry, 2013).

Horton et al. (2013) find that mandatory IFRS adopters benefit significantly more than voluntary or non-adopters, and that the information environment and forecast accuracy greatly improve. In addition, Horton et al. (2013), Byard et al. (2011) and Yeng and Henry (2013) find that forecast accuracy shows the greatest improvement following IRFS adoption for firms operating in an environment of strong enforcement whose traditional GAAP differs most from IFRS. These findings illustrate the direct effect of IFRS on comparability and forecast accuracy in countries adopting IFRS (Horton et al., 2013).

Overall, prior studies suggest mandatory IFRS adoption should have a positive effect on analysts' forecast accuracy. Therefore, our first hypothesis is:

Hypothesis 1. Analysts' forecasts exhibit greater accuracy following mandatory IFRS adoption in France, Germany and Sweden.

Tan et al. (2011) suggest that mandatory IFRS adoption may reduce the costs of acquiring and processing firm information when applied universally, as accounting standards are no longer an impediment to understanding foreign accounting information. Such cost reduction allows a greater body of analysts to follow each individual firm where IFRS is adopted, likely leading to an improved information environment. However, Tan et al. (2011) also suggest that foreign analyst following may be impeded by the unique accounting issues, history and culture of each individual country, as reflected as the findings of Nobes (2011).

Coffee's (2002) bonding theory, as interpreted by Hope, Jin, and Kang (2006; p. 4) states that "[b]y adopting IFRS, issuers expose their accounting information to international scrutiny of reputational intermediaries such as brokerage analysts, auditors and credit-rating agencies". Further, Houqe, Monem, and Ahmed (2012) suggest that, according to bonding theory, countries with relatively weak investor protection may adopt IFRS in order to improve comparability of financial information. Improved comparability is expected to improve forecast accuracy and forecast dispersion, as analysts are better able to justify and examine their findings in accordance with other analyses, both past and present. Of course, as France, Germany and Sweden are all members of the European Union, IFRS was not an option, but rather was mandated for all member states (IFRS Foundation, 2013a).

Kim and Schroeder (1990) suggest that forecast accuracy is positively influenced by analysts' ability to incorporate information other than that included in firms' financial reports. According to Cheong and Masum (2010), when more analysts closely scrutinize a firm, more information exists about the firm. Jiao et al. (2012) find less analyst forecast dispersion following mandatory adoption and suggest that analysts base their earnings forecasts on both public and private information. With the adoption of IFRS, financial report information is expected to increase in quality and quantity, reducing the influence of private information on analysts' forecasts (Jiao et al., 2012; Lang & Lundholm, 1996). Therefore, following IRFS adoption, analysts' forecasts should show less dispersion (Cheong & Masum, 2010; Jiao et al., 2012).

However, greater analyst following also creates more potential for differing opinions amongst analysts, thus greater forecast dispersion. Daske (2005) discovers a higher forecast dispersion for German firms reporting according to IAS as opposed to German GAAP. Cuijpers and Buijink (2005) similarly find increased forecast dispersion among EU firms using US GAAP or IAS as opposed to local GAAP but acknowledge that their finding may be due to self-selection bias. Byard et al. (2011) find mixed results of mandatory IFRS adoption on analysts' forecast dispersion. Evidence on changes to analysts' forecast dispersion following IFRS adoption is limited and the results are mixed. However, given that the aim of IFRS is to improve financial statement quality and comparability, it would seem counterintuitive for forecast dispersion to increase (Jiao et al., 2012). Therefore, our second hypothesis is:

Hypothesis 2. Analysts' forecasts exhibit less dispersion following mandatory IFRS adoption in France, Germany and Sweden.

4. Research design

4.1. Data and methodology

Our sample consists of company and analyst data for all publicly listed firms for 2003 and 2011. We exclude data from 2004 to 2005, as these are years of transition to IFRS. We exclude data from 2006 to 2010, and instead use the most recent year with full data available to avoid the effects of a lack of IFRS history and knowledge on which analysts can draw, in line with the suggestion of Ball (2006). By utilizing data from 2003 to 2011, we hope that bias from IFRS transition effects can be avoided, thus giving a clearer indication of the true effect of IFRS on information quality and comparability.

All data required for our analysis is acquired from Bloomberg. We utilize data from 67 industries, based on two-digit SIC codes, for France, Germany and Sweden. Similar to previous research (Ashbaugh & Pincus, 2001; Jiao et al., 2012), we use the reverse of forecast accuracy, forecast error, to gauge accuracy of forecasts both before and after mandatory IFRS adoption. Forecast error equals the absolute value of consensus earnings forecast, less actual earnings per share, scaled by actual earnings per share. Consensus earnings forecast is defined as "the average of available earnings forecasts at any time" (Jiao et al., 2012; p. 58). The following formula illustrates analysts' forecast accuracy:

$$ForecastError_{t,i} = \frac{\left|ConsensusForecastEPS_{t,i} - ActualEPS_{t,i}\right|}{|ActualEPS_{t,i}|}$$

Following previous research (Jiao et al., 2012), when testing for analyst forecast dispersion, we exclude all firm observations with only one analyst following, as the result will be zero by definition. Forecast dispersion equals the absolute

Table 1
Sample selection process.

Country	Mandatory adoption for FYE	Forecast error sample			Dispersion sample		
		2003	2011	Total	2003	2011	Total
France	31 December 2005	78	152	230	76	144	220
Germany	31 December 2005	82	142	224	78	121	199
Sweden	31 December 2005	48	76	124	42	72	114
Total		**208**	**370**	**578**	**196**	**337**	**533**

This table shows mandatory IFRS announcement dates and number of observations in each country – year included in the sample.

difference between the highest estimate and the lowest estimate contained in consensus forecasts scaled by the stock price at the end of year $t-1$. The following formula illustrates analysts' forecast dispersion:

$$Dispersion_{t,i} = \frac{\left|Forecast_{H,t,i} - Forecast_{L,t,i}\right|}{|P_{t-1,i}|}$$

4.2. Regression models

The following multivariate regression analyses focuses on the relationship between forecast accuracy and forecast dispersion, and mandatory IFRS adoption in France, Germany and Sweden. We use the following regression models to examine these relationships:

$$ForecastError_{t,i} = \beta_0 + \beta_1 IFRS_t + \beta_2 Ln_{Mkt_{Cap_{t-1}}} + \beta_3 N_{Estimate_{t,i}} + \beta_4 Std_{ROE_{t-1,i}} + \text{fixed effects}$$

$$Dispersion_{t,i} = \alpha_0 + \alpha_1 IFRS_t + \alpha_2 Ln_{Mkt_{Cap_{t-1}}} + \alpha_3 N_{Estimate_{t,i}} + \alpha_4 Std_{ROE_{t-1,i}} + \text{fixed effects}$$

In both regression models, *IFRS* is the variable of interest, as it illustrates changes in financial reporting quality following mandatory IFRS adoption in France, Germany and Sweden. *IFRS*, an indicator variable, takes the value of one for 2011 data and zero for 2003 data (post- and pre-IFRS years, respectively). We also include various control variables expected to influence analyst forecast accuracy and dispersion (Jiao et al., 2012). We detail these control variables below.

Previous literature suggests that analysts' forecast behaviour varies with firm size. Lang and Lundholm (1996) argue that large firms generally exhibit higher levels of disclosure, leading to more accurate and less dispersed forecasts. Furthermore, in previous studies such as Hope (2003), firm size is used as a control variable for factors such as management incentives, for which empirical studies produce mixed results. Similar to Ashbaugh and Pincus (2001) and Jiao et al. (2012), we incorporate a firm size control variable (*Ln_Mkt_Cap*), defined as the natural logarithm of a firm's market capitalization at the end of year $(t-1)$.

Another factor directly associated with analysts' forecast accuracy and forecast dispersion is analyst following. Lys and Soo (1995) find a positive relationship between the number of analysts following a firm and analysts' forecast accuracy. They argue that this is due to greater competition to forecast accurately, created amongst analysts when there is greater following. On the other hand, Jiao et al. (2012) predict analyst following to have a negative impact on dispersion, as more analysts create a greater potential for more diverse forecasts. We control for these factors by including the variable *N_Estimate*, which is the number of analyst forecasts included in the Bloomberg database.

Jiao et al. (2012) suggest that a firm's performance volatility is negatively related to forecast accuracy. As volatility increases, the informativeness of firm reports decreases, thus decreasing analysts' forecast accuracy. Jiao et al. (2012) state that forecast dispersion is positively related to performance volatility, as analysts must judge firms based on a wide array of information, thus producing quite different forecasts. We include the variable *Std_ROE*, the standard deviation of return on earnings for five years prior to *t*, as the measure of volatility in firm performance. We also control for fixed effects within the regression, which are unobservable factors associated with countries and industries within our sample.

5. Empirical results

5.1. Descriptive statistics

Table 1 displays mandatory IFRS announcement dates and the number of observations in each country-year included in the sample. Table 2 provides descriptive statistics and Table 3 displays univariate correlations for the forecast accuracy sample (Panels A) and the forecast dispersion sample (Panels B). We observe average forecast error of 7.65 and average forecast dispersion of 9.04, with values ranging from 1 (2 for forecast dispersion), to 46. Similar to previous studies (Bae et al., 2008; Jiao et al., 2012), we find that on average, earnings forecast accuracy and dispersion are about 2% of actual earnings per share and stock prices, respectively, with exact values of 1.86% and 1.98%.

Table 2
Descriptive statistics.

Variable	Observations	Mean	Median	SD	Minimum	Maximum
Panel A: Forecast accuracy sample (*N* = 578)						
ForecastError	578	0.0186	0.0055	0.0410	0.0000	0.1751
IFRS	578	0.6401	1.0000	0.5210	0	1
Ln_Mkt_Cap	578	8.4142	7.2124	6.8548	5.2231	13.1541
N_Estimate	578	7.6512	5.0000	7.3293	1.00000	46.0000
Std_ROE	578	0.3110	0.0866	0.8471	0.0029	8.3450
Panel B: Forecast dispersion sample (*N* = 533)						
Dispersion	533	0.0198	0.0116	0.0232	0.0000	0.1755
IFRS	533	0.6322	1.0000	0.5204	0	1
Ln_Mkt_Cap	533	8.7840	7.3320	6.9541	5.2145	13.1541
N_Estimate	533	9.0491	6.0000	7.2853	2.0000	46.0000
Std_ROE	533	0.2850	0.0831	0.7695	0.0027	8.3631

ForecastError is the error in analyst's consensus forecasts. It is the absolute difference between the consensus forecast of EPS and actual EPS scaled by actual EPS. *Dispersion* is the dispersion of analysts' consensus forecast for EPS. It is the absolute difference between the highest estimate and lowest estimate contained in consensus forecasts scaled by the stock price at the end of year $t-1$. *IFRS* is a dummy variable takes value 1 for years after 2005 and 0 otherwise. *Ln_Mkt_Cap* is natural logarithm of market capitalization of firm at the end of year $t-1$. *N_Estimate* is the number of estimation contained in consensus forecasts. *Std_ROE* is the standard deviation of ROE based on the five years before year *t*.

Table 3
Correlation matrix.

Panel A: Forecast accuracy sample (*N* = 578)

	Forecast Error	IFRS	Ln_Mkt_Cap	N_Estimate	Std_ROE
ForecastError	1				
IFRS	−0.0968***	1			
	(0.0000)				
Ln_Mkt_Cap	−0.0753**	0.0231	1		
	(0.0183)	(0.5412)			
N_Estimate	−0.2322**	0.0315	0.2431***	1	
	(0.0000)	(0.3124)	(0.0001)		
Std_ROE	0.0724**	0.0438	−0.0529*	−0.0814***	1
	(0.0104)	(0.5241)	(0.0501)	(0.0001)	

Panel B: Forecast dispersion sample (*N* = 533)

	Dispersion	IFRS	Ln_Mkt_Cap	N_Estimate	Std_ROE
Dispersion	1				
IFRS	−0.0716*(0.0400)	1			
Ln_Mkt_Cap	0.0454 (0.2114)	0.0224(0.4526)	1		
N_Estimate	0.1614*** (0.0000)	0.0215(0.2564)	0.4256*** (0.0000)	1	
Std_ROE	0.0502 (0.1912)	0.0427(0.8214)	−0.0519*(0.0563)	−0.05921**(0.0241)	1

Note: Coefficient *p*-values applied two-tail.
ForecastError is the error in analyst's consensus forecasts. It is the absolute difference between the consensus forecast of EPS and actual EPS scaled by actual EPS. *Dispersion* is the dispersion of analysts' consensus forecast for EPS. It is the absolute difference between the highest estimate and lowest estimate contained in consensus forecasts scaled by the stock price at the end of year $t-1$. *IFRS* is a dummy variable takes value 1 for years after 2005 and 0 otherwise. *Ln_Mkt_Cap* is natural logarithm of market capitalization of firm at the end of year $t-$. *N_Estimate* is the number of estimation contained in consensus forecasts. *Std_ROE* is the standard deviation of ROE based on the five years before year *t*.
*Significant at the 0.10 level. **Significant at the 0.05 level. ***Significant at the 0.01 level.

Table 3 presents simple correlations among the variables. Correlations among the independent variables are relatively low (with 0.4256 the highest), indicating that multicollinearity is unlikely to be an issue in the multivariate regression analyses. Table 3 also presents correlations between dependent and independent variables. Panel A shows that *ForecastError* is negatively correlated with *IFRS*, indicating that forecasts are more accurate following mandatory IFRS adoption. *ForecastError* is negatively correlated with *Ln_Mkt_Cap* (firm size) and *N_Estimate* (number of analyst forecasts), indicating that forecast accuracy is highest for larger firms and for firms with greater analyst following, in line with prior research by Lys and Soo (1995), Lang and Lundholm (1996) and Jiao et al. (2012). *Std_ROE* is positively correlated with forecast error, indicating that analysts' forecasts are more accurate when firm performance is less volatile. Panel B shows that *Dispersion* is negatively correlated to *IFRS*, thus decreasing as a result of mandatory IFRS adoption. *Dispersion* is positively associated with *N_Estimate* (number of analyst forecasts), supporting the assumption that an increased number of forecasts generates a greater forecast range.

Table 4
Paired *T*-test.

Variable	#Observations	Mean	SD	[95% conf. interval]	
Panel A: Forecast accuracy sample (*N* = 198)					
Panel A: Forecast Error					
Forecast Error of 2011	198	0.0139	0.0399	0.0106	0.0172
Forecast Error of 2003	198	0.0219	0.0508	0.0176	0.0261
Diff	198	−0.0080	0.0618	−0.0131	−0.0028
Mean (diff) = mean (accuracy 2011 − accuracy 2003)					
$t = -2.987$					
p-Value = 0.000***					
Panel B: Forecast dispersion sample (*N* = 192)					
Panel A: Forecast Error					
Dispersion of 2011	192	0.0161	0.0234	0.0142	0.0180
Dispersion of 2003	192	0.0177	0.0227	0.0158	0.0195
Diff	192	−0.0016	0.0277	−0.0039	0.0006
Mean (diff) = mean (dispersion 2011 − dispersion 2003)					
$t = -1.596$					
p-Value = 0.078*					

ForecastError is the error of 2003 and 2011 in analyst's consensus forecasts. It is the absolute difference between the consensus forecast of EPS and actual EPS scaled by actual EPS. *Dispersion* is the dispersion of 2003 and 2011 analysts' consensus forecast for EPS. It is the absolute difference between the highest estimate and lowest estimate contained in consensus forecasts scaled by the stock price at the end of year $t-1$. *IFRS* is a dummy variable takes value 1 for years after 2005 and 0 otherwise. *Ln_Mkt_Cap* is natural logarithm of market capitalization of firm at the end of year $t-1$. *N_Estimate* is the number of estimation contained in consensus forecasts. *Std_ROE* is the standard deviation of ROE based on the five years before year *t*.

Table 5
Regression analysis of information environment and mandatory IFRS adoption.

$\text{Forecast Error}_{t,i} = \beta_0 + \beta_1 \text{IFRS}_t + \beta_2 \text{Ln\_Mkt\_Cap}_{t-1} + \beta_3 \text{Ln\_Estimate}_{t,i} + \beta_4 \text{Std\_ROE}_{t-1,i} + \text{fixed effects.}$
$\text{Dispersion}_{t,i} = \alpha_0 + \alpha_1 \text{IFRS}_t + \alpha_2 \text{Ln\_Mkt\_Cap}_{t-1} + \alpha_3 \text{Ln\_Estimate}_{t,i} + \alpha_4 \text{Std\_ROE}_{t-1,i} + \text{fixed effects}$

Independent variables	Model 1	Model 2	Model 3	Model 4
Panel A: Forecast error				
IFRS		−0.0069***	−0.0067***	−0.0075***
		(0.0000)	(0.0000)	(0.0000)
Ln_Mkt_Cap	−0.0009***	−0.0008***	−0.0010***	−0.0008***
	(0.0006)	(0.0004)	(0.0008)	(0.0009)
N_Estimate	−0.0146***	−0.0118***	−0.0115***	−0.0127***
	(0.0000)	(0.0012)	(0.0011)	(0.0000)
Std_ROE	0.0023	0.0021	0.0020	0.0020
	(0.1512)	(0.1600)	(0.1624)	(0.1654)
Intercept	0.0554***	0.0498***	0.0336***	0.0093
	(0.0000)	(0.0002)	(0.0068)	(0.2510)
Industry effects	No	No	Yes	Yes
Country effects	No	No	No	Yes
Adjusted R^2	0.0824	0.0897	0.1214	0.1411
N	578	578	578	578
Panel B: Dispersion				
IFRS		−0.0034***	−0.0035***	−0.0046***
		(0.0000)	(0.0000)	(0.0000)
Ln_Mkt_Cap	−0.0016***	−0.0015***	−0.0014***	−0.0006***
	(0.0005)	(0.0002)	(0.0002)	(0.0007)
N_Estimate	0.0080***	0.0075***	0.0069***	0.0036***
	(0.0001)	(0.0001)	(0.0000)	(0.0013)
Std_ROE	0.0013	0.0013	0.0010	0.0012
	(0.1760)	(0.1821)	(0.3245)	(0.2124)
Intercept	0.0180***	0.0186***	0.0104*	0.0062
	(0.0030)	(0.0029)	(0.0912)	(0.2810)
Industry effects	No	No	Yes	Yes
Country effects	No	No	No	Yes
Adjusted R^2	0.0425	0.0498	0.1210	0.1912
N	533	533	533	533

Note: coefficient *p*-values applied two-tail and based on asymptotic *Z*-statistics robust to heteroscedasticity using the method in Rogers (1993). *ForecastError* is the error of 2003 and 2011 in analyst's consensus forecasts. It is the absolute difference between the consensus forecast of EPS and actual EPS scaled by actual EPS. *Dispersion* is the dispersion of 2003 and 2011 analysts' consensus forecast for EPS. It is the absolute difference between the highest estimate and lowest estimate contained in consensus forecasts scaled by the stock price at the end of year $t-1$. *IFRS* is a dummy variable takes value 1 for years after 2005 and 0 otherwise. *Ln_Mkt_Cap* is natural logarithm of market capitalization of firm at the end of year $t-1$. *N_Estimate* is the number of estimation contained in consensus forecasts. *Std_ROE* is the standard deviation of ROE based on the five years before year *t*.
* Significant at the 0.10 level. **Significant at the 0.05 level. ***Significant at the 0.01 level.

Table 6
Regression analysis of information environment and mandatory IFRS adoption (country wise).

$\text{Forecast Error}_{t,i} = \beta_0 + \beta_1 \text{IFRS}_t + \beta_2 \text{Ln\_Mkt\_Cap}_{t-1} + \beta_3 \text{Ln\_Estimate}_{t,i} + \beta_4 \text{Std\_ROE}_{t-1,i} + \text{fixed effects}$
$\text{Dispersion}_{t,i} = \alpha_0 + \alpha_1 \text{IFRS}_t + \alpha_2 \text{Ln\_Mkt\_Cap}_{t-1} + \alpha_3 \text{Ln\_Estimate}_{t,i} + \alpha_4 \text{Std\_ROE}_{t-1,i} + \text{fixed effects}$

Independent variables	France	Germany	Sweden
Panel A: Forecast error			
IFRS	−0.0047***	−0.0049***	−0.0042***
	(0.0000)	(0.0000)	(0.0000)
Ln_Mkt_Cap	−0.0009***	−0.0009***	−0.0006***
	(0.0006)	(0.0005)	(0.0040)
N_Estimate	−0.0246***	−0.0265***	−0.0180***
	(0.0000)	(0.0000)	(0.0000)
Std_ROE	0.0001	0.0002	0.0002
	(0.8702)	(0.8210)	(0.6645)
Intercept	1.0120***	1.1015***	1.1828***
	(0.0000)	(0.0000)	(0.0001)
Industry effects	Yes	Yes	Yes
Adjusted R^2	0.0954	0.1014	0.0845
N	230	224	124
Panel D: Dispersion			
IFRS	−0.00045***	−0.0046***	−0.0040***
	(0.0000)	(0.0000)	(0.0000)
Ln_Mkt_Cap	−0.0014***	−0.0015***	−0.0015***
	(0.00050)	(0.0000)	(0.0000)
N_Estimate	0.0095***	0.0094***	0.0092***
	(0.0000)	(0.0010)	(0.0001)
Std_ROE	0.0019***	0.0019***	0.0018***
	(0.0000)	(0.000)	(0.0000)
Intercept	1.1351***	1.1413***	1.2588***
	(0.0009)	(0.0000)	(0.0000)
Industry effects	Yes	Yes	Yes
Adjusted R^2	0.0900	0.0912	0.0887
N	220	199	114

Note: coefficient *p*-values applied two-tail and based on asymptotic *Z*-statistics robust to heteroscedasticity using the method in Rogers (1993). *ForecastError* is the error of 2003 and 2011 in analyst's consensus forecasts. It is the absolute difference between the consensus forecast of EPS and actual EPS scaled by actual EPS. *Dispersion* is the dispersion of 2003 and 2011 analysts' consensus forecast for EPS. It is the absolute difference between the highest estimate and lowest estimate contained in consensus forecasts scaled by the stock price at the end of year $t-1$. *IFRS* is a dummy variable takes value 1 for years after 2005 and 0 otherwise. *Ln_Mkt_Cap* is natural logarithm of market capitalization of firm at the end of year $t-1$. *N_Estimate* is the number of estimation contained in consensus forecasts. *Std_ROE* is the standard deviation of ROE based on the five years before year *t*.
*Significant at the 0.10 level. **Significant at the 0.05 level. ***Significant at the 0.01 level.

5.2. Empirical regression results

Table 4 presents the results of a paired mean comparison of forecast accuracy and forecast dispersion for 2003 and 2011. As shown in Panel A, analyst forecast accuracy improves by 0.80% following mandatory IFRS adoption in 2005. Panel B also indicates that analysts' forecast dispersion is 0.16% lower following mandatory IFRS adoption.

The results of regression analysis for forecast error and forecast dispersion are presented in Table 5, with Model 1 illustrating the base models for forecast error (Panel A) and dispersion (Panel B). Although firm size (*Mkt_Cap*) and firms performance volatility (*Std_ROE*) have little effect on analysts' forecast accuracy, Model 1 (Panel A) indicates that the number of analysts following a firm (*N_Estimate*) has a significant negative effect on forecast error (−0.0146, $p < 0.001$). Similarly, Model 1 (Panel B) indicates a positive effect on forecast dispersion of number of analysts following a firm, in line with our prediction (0.0080, $p < 0.001$).

The regression results for Model 2 in Panels A and B show the effect of including the IFRS dummy variable. Model 2, Panel A indicates that the *IFRS* variable has a significant negative effect on analyst forecast error (−0.0069, $p < 0.001$). These results indicate that on average, analyst forecast accuracy increases by 0.69% of the actual earnings per share following mandatory IFRS adoption. Model 2, Panel B indicates that the IFRS dummy variable also has a negative and significant effect on forecast dispersion. On average analyst forecast dispersion decreases by 0.34% of the stock price for firms included in our sample.

Model 3 controls for the effects of industry variables, while Model 4 controls for the effects of industry and country variables. Results for these models show that for the *IFRS* dummy variable and the control variables, magnitude and significance remain qualitatively similar. Overall, these results suggest that mandatory IFRS adoption improved both forecast accuracy and forecast dispersion in France, Germany and Sweden.

5.3. Robustness tests

To ensure the robustness of our results we analyze all data for 2003 to 2011 but excluding 2004–2005. In untabulated results, the effects of *IFRS* on forecast error are qualitatively similar to the results reported in Table 5. We also test whether

Table 7
Regression analysis of information environment and mandatory IFRS adoption (matched sample).

$\text{Forecast Error}_{t,i} = \beta_0 + \beta_1 \text{IFRS}_t + \beta_2 \text{Ln\_Mkt\_Cap}_{t-1} + \beta_3 \text{Ln\_Estimate}_{t,i} + \beta_4 \text{Std\_ROE}_{t-1,i} + \text{fixed effects}$
$\text{Dispersion}_{t,i} = \alpha_0 + \alpha_1 \text{IFRS}_t + \alpha_2 \text{Ln\_Mkt\_Cap}_{t-1} + \alpha_3 \text{Ln\_Estimate}_{t,i} + \alpha_4 \text{Std\_ROE}_{t-1,i} + \text{fixed effects}$

Independent variables	Model 1	Model 2	Model 3	Model 4
Panel A: Forecast error				
IFRS		−0.0085***	−0.0087***	−0.0089***
		(0.0000)	(0.0000)	(0.0000)
Ln_Mkt_Cap	−0.0014***	−0.0014***	−0.0015***	−0.0015***
	(0.0000)	(0.0000)	(0.0010)	(0.0010)
N_Estimate	−0.0194***	−0.0204***	−0.0213***	−0.0224***
	(0.0010)	(0.0000)	(0.0000)	(0.0000)
Std_ROE	0.0047	0.0049*	0.0048*	0.0046
	(0.1012)	(0.0900)	(0.0915)	(0.1123)
Intercept	0.0512***	0.0524***	0.0443***	0.0581***
	(0.0001)	(0.0000)	(0.0010)	(0.0000)
Industry effects	No	No	Yes	Yes
Country effects	No	No	No	Yes
Adjusted R^2	0.1324	0.1625	0.1989	0.2078
N	198	198	198	198
Panel B: Dispersion				
IFRS		−0.0044***	−0.0045***	−0.0159***
		(0.0000)	(0.0000)	(0.0000)
Ln_Mkt_Cap	−0.0023***	−0.0016***	−0.0015***	−0.0014***
	(0.0000)	(0.0008)	(0.0008)	(0.0009)
N_Estimate	0.0085***	0.0093***	0.0094***	0.0095***
	(0.0006)	(0.0000)	(0.0000)	(0.0000)
Std_ROE	0.0029***	0.0023***	0.0022***	0.0023***
	(0.0009)	(0.0000)	(0.0000)	(0.0000)
Intercept	0.0314***	0.0422***	0.0524***	0.0452***
	(0.0005)	(0.0001)	(0.0000)	(0.0004)
Industry effects	No	No	Yes	Yes
Country effects	No	No	No	Yes
Adjusted R^2	0.0924	0.1214	0.1418	0.1851
N	192	192	192	192

Note: coefficient *p*-values applied two-tail and based on asymptotic *Z*-statistics robust to heteroscedasticity using the method in Rogers (1993). *ForecastError* is the error of 2003 and 2011 in analyst's consensus forecasts. It is the absolute difference between the consensus forecast of EPS and actual EPS scaled by actual EPS. *Dispersion* is the dispersion of 2003 and 2011 analysts' consensus forecast for EPS. It is the absolute difference between the highest estimate and lowest estimate contained in consensus forecasts scaled by the stock price at the end of year $t-1$. *IFRS* is a dummy variable takes value 1 for years after 2005 and 0 otherwise. *Ln_Mkt_Cap* is natural logarithm of market capitalization of firm at the end of year $t-1$. *N_Estimate* is the number of estimation contained in consensus forecasts. *Std_ROE* is the standard deviation of ROE based on the five years before year *t*.
*Significant at the 0.10 level. **Significant at the 0.05 level. ***Significant at the 0.01 level.

our regression results are robust to the removal of financial firms. IFRS adoption may have significantly different effects on financial institutions such as banks and finance and insurance companies, primarily due to the fact that IFRS requires certain financial assets to be recorded at fair value (Jiao et al., 2012). In untabulated results, the effects on forecast accuracy and forecast dispersion are qualitatively similar to the results reported in Table 5.

We analyze the information environment before and after the mandatory IFRS adoption for each country (France, Germany and Sweden) individually, and tabulate the results in Table 6. Panel A illustrates the effects of mandatory IFRS adoption on analyst forecast accuracy in each country while also controlling for industry effects, and Panel B illustrates the same regression design for forecast dispersion.

Germany shows the greatest improvement in forecast accuracy −0.0049 ($p < 0.001$) following mandatory IFRS adoption. France −0.0047 ($p < 0.001$) and Sweden −0.0042 ($p < 0.001$) also show significant improvement, as the original regression suggests. Germany also shows the greatest decrease in forecast dispersion −0.0046 ($p < 0.001$) with France −0.0045 ($p < 0.001$) and Sweden −0.0040 ($p < 0.001$).

These results contradict Daske et al.'s (2008) suggestion that the capital-market effects of IFRS adoption are confined to countries with strict enforcement regimes and high investor protection. In fact Germany and France, members of the legal families (German and French, respectively) which exhibited the lowest shareholder protection score (2.3) in La Porta et al.'s (1998) study, exhibited the greatest improvement in both forecast accuracy and forecast dispersion in our regression. Sweden (Scandinavian legal origin), which had a shareholder protection score of 3.0, showed marked improvement also, but not to the same degree as France and Germany. We believe this result may be due to the greater difference between French and German GAAP and IFRS, as compared with the difference between Swedish GAAP and IFRS. This difference requires French and German firms to go to greater lengths in order to comply with IFRS. Therefore, such lengths are likely to improve both forecast accuracy and forecast dispersion upon IFRS adoption comparably more for France and Germany (Bae et al., 2008).

We also test the robustness of the results through a matched sample test, to review the results of our regression analyses in Tables 5 and 6. We find very similar results. This suggests that mandatory IFRS adoption has the same effect on forecast error and dispersion at a country level as the effect on individual firms within that country. Further, we find a stronger relationship between forecast error and mandatory IFRS adoption for firms, through our matched sample test. The results of the matched sample test are reported Table 7.

6. Conclusion

In this paper we examine the effect of mandatory IFRS adoption on information quality, analyzing forecast accuracy and forecast dispersion before and after IFRS adoption in France, Germany and Sweden. We use these countries, as they are characterized as low investor protection, primarily due to their civil law legal systems (La Porta et al., 1998). Further, these countries are the three most important representatives of the French, German, and Scandinavian categories of civil law, allowing us to examine the effects of mandatory IFRS adoption on each separate category of civil law, low investor protection countries (La Porta et al., 1998).

In our regression analyses, we employ a sample of 578 firm years for forecast accuracy and 533 firm years for forecast dispersion. We find that both forecast accuracy and forecast dispersion show significant improvement following mandatory IFRS adoption, indicating an overall improvement in information quality. These results are robust to controlling for industry and country effects, as well as increasing the sample size and removing all financial companies. We also find that France and Germany, which are included in the civil law categories with the lowest investor protection (French and German civil law, respectively), show the greatest improvement in information quality. We therefore conclude that mandatory IFRS adoption has a positive effect on information quality in countries with low investor protection, having a greater effect on countries, the lower their strength of investor protection. We believe this result occurs as French and German firms must go to greater lengths to comply with IFRS.

Our study has important implications for the current body of literature, as these results disagree with the findings of earlier studies (for example Daske et al., 2008), which state that mandatory IFRS adoption only has a positive effect in countries with strict enforcement regimes and high investor protection. Daske et al. (2008) reason that countries with strict enforcement regimes receive this benefit, due to incentives to be transparent. The effect found by Daske et al. (2008) may be due to a time bias as the true effects of IFRS adoption on countries dispensing with old accounting standards, particularly those which differ most from IFRS (i.e. lenient enforcement regimes), may take time to become visible.

Our study has potential implications for standard setters and regulators. The earlier results of Daske et al. (2008), Jiao et al. (2012) and Horton et al. (2013) suggested that IFRS adoption by standard setters in any country would be without benefit unless securities regulators had implemented a high investor protection regime. In contrast, our results suggest that benefits flow from IFRS adoption irrespective of the existence of such a regime. In fact, the weaker the existing regulatory regimes the greater the benefit gained.

Our results should be interpreted with caution as we have examined only one representative country in each of the three categories of civil law and low investor protection countries. Future research could delve further into the differing effects of mandatory IFRS adoption on different categories of civil law (low investor protection) countries, in order to establish the robustness of our findings. Such research would involve the inclusion of several different countries from each civil law category, in order to truly distinguish the effects on each individual civil law legal tradition. Furthermore, future research could examine the robustness of our findings to potentially omitted variables as IFRS adoption may have effects beyond these examined in our study.

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