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ABSTRACT   Motivated by the European Union (EU) decision to mandate application of the International Financial Reporting Standards (IFRS) to the consolidated financial statements of all EU listed firms (Regulation (EC) 1606/2002), starting in December 2005, we compare the value relevance of accounting information in 14 European countries in the year prior to and the year of the mandatory adoption of the IFRS. We focus on three accounting information items for which measurements under IFRS are likely to differ considerably from measurements under domestic accounting practices across the EU countries prior to the introduction of the international standards: goodwill, research and development expenses (R&D), and asset revaluation. These three items, selected on an a priori basis, have been shown in previous research to differ in the effect of uncertainty on their future benefits. We use valuation models that include these three variables and in addition the book value of equity and earnings. Overall, our study suggests that the adoption of the IFRS has increased the value relevance of the three accounting numbers for investors in equity securities in the EU. Association tests support our two hypotheses: (1) in the year prior to the mandatory adoption of the IFRS, the incremental value relevance to investors of the three domestic GAAP-based accounting items was greater in countries where the respective domestic standards were more compatible with the IFRS; and (2) the higher the deviation of the three domestic GAAP-based accounting items from their corresponding IFRS values, the greater the incremental value relevance to investors from the switch to IFRS. These

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associations prevail when considering cross-country differences in the institutional environments, which tend to provide complementary effects.

1.   Introduction

This study is motivated by the release of Regulation (EC) 1606/2002, requiring all European Union (EU) publicly traded firms to prepare consolidated financial statements based on the International Financial Reporting Standards (IFRS) beginning at fiscal year-end December 2005. This is a major regulatory financial reporting change in the history of accounting reporting and in the convergence of national accounting systems (Larson and Street, 2004; Schipper, 2005; Whittington, 2005) that has inspired research into the effects of IFRS on the capital markets and financial reporting in Europe (e.g. Armstrong *et al.*, 2007; Callao *et al.*, 2007; Hung and Subramanyam, 2007; Agostino *et al.*, 2008; Gjerde *et al.*, 2008; Beneish *et al.*, 2009; Devalle *et al.*, 2009; Horton and Serafeim, 2009). Despite the fact that IFRS adoption is mandatory for all EU countries, only a relatively small number of studies analyze its value-relevance effects, and these are often limited to a single EU country or just a few EU countries.[1] Overall, there has been limited research comparing the value-relevance effects of mandatory IFRS adoption across EU countries.

Our paper investigates the impact of the IFRS adoption in 14 European countries by comparing the price and return-based value-relevance models to assess how switching from domestic standards affects the informativeness of accounting numbers to investors. Unlike the few country-specific studies, our study is, to the best of our knowledge, the first to analyze the likely value-relevance effects around the introduction of mandatory IFRS reporting by listed companies for a large number of EU countries.[2] From investors' perspectives, we provide an *ex post* assessment of the effects of implementing IFRS on the valuation of publicly listed common stocks in the EU.

The primary objective of our study is to compare the value relevance of three particular accounting information items – goodwill, research and development expenses (R&D) and revaluation of property, plant and equipment (PPE), in 14 European countries, measured alternatively under local GAAP in the year before and under IFRS immediately after their mandatory adoption. Most prior value-relevance studies examine the value relevance of earnings and book value of equity, which we also include in our models. In particular, we focus on the question whether differences in value relevance exist and if so, to what extent they are driven by the disparity between local GAAP and IFRS for these five accounting items. A separate analysis of only earnings and book value of equity is discussed in the additional analyses section. Following previous studies we define value relevance of accounting measures as the association between accounting information and equity market values (Francis and Schipper, 1999; Barth *et al.*, 2001).

We focus on the three information items – goodwill, R&D and PPE revaluation – for which measurements under IFRS are likely to differ considerably from measurements under domestic accounting practices across the EU countries prior to the mandatory introduction of the international standards. Their future benefits and the effects on uncertainty also differ (Wyatt, 2008).[3] We chose them because they may be considered as representative of the substantial fair-value orientation of the IFRS and potentially have considerable implications for the value relevance of accounting information. Addressing the issue of which individual differences in accounting practices are value relevant may provide insights about the value relevance of alternative measurement and recognition practices.

Prior literature examines the complexity of the financial reporting of one or more of our three information items and their effects on equity security prices using domestic standards (e.g. Lev and Sougiannis, 1996; Aboody and Lev, 1998; Barth and Clinch, 1998; Zhao, 2002; Ballester *et al.*, 2003; Cazavan-Jeny and Jeanjean, 2006; Oswald, 2008). We examine whether their value relevance is affected by switching from domestic standards to IFRS.[4]

Our research focuses on the fiscal year 2005, the year of mandatory adoption of IFRS in the EU. Our final sample of 2,298 publicly listed firms from 14 EU countries is restricted to firms reporting IFRS-based financial statements for the first time for the year of mandatory adoption, t (December 2005 or the fiscal year ended between January 2006 and November 2006), and comparative data for the prior year, $t-1$, as well as domestic GAAP-based financial statements for the year $t-1$ and $t-2$.[5]

We compare the value relevance of accounting information disclosed in the consolidated financial statements of our sample of firms, in the year prior to and the year of the mandatory adoption of the IFRS. Our empirical tests of association provide evidence of the benefit of mandatory endorsement of the IFRS in the EU to investors in equity securities.

We examine two research expectations regarding the three accounting information items on which we focus – goodwill, R&D expenses and revaluation of PPE. First, we expect that in the pre-IFRS adoption year, the incremental value relevance to investors of the three domestic GAAP-based accounting items is greater in countries where the respective domestic standards are more compatible with the IFRS. Second, consistent with Daske *et al.* (2008), we expect that the higher the deviation of the three domestic GAAP-based accounting items from their corresponding IFRS, the greater the incremental value relevance to investors from accounting information resulting from the switch to IFRS.[6] Our results support the two research expectations.

We assume no changes in market efficiency and that investors react to new information without an extended price drift. Specifically, we assume no change in market efficiency in our sample period and no differences therein among the 14 European countries studied.[7] Our research design also draws from the requirements of IFRS 1 ('First-Time Adoption of International Financial Reporting Standards', 2003) which determines the procedures that an entity must follow

when it adopts IFRS for the first time. Among other things, it emphasizes the importance of comparability between IFRS-based and the previous domestic GAAP-based financial statements. In the first year of mandatory IFRS adoption, the entity must also disclose comparative IFRS-based accounting information of the prior year. However, since these specific IFRS financial statement data were not available to investors in the pre-IFRS adoption year, in our comparison we use the domestic GAAP-based accounting figures reported in the year prior to IFRS adoption and the IFRS-based accounting figures reported in the year of adoption. For the comparison, we use price and return valuation models that include our three accounting items of interest, which are our main focus, in addition to book value of equity and earnings, separately for each of the 14 European countries included in our sample.

To assess the extent of the difference between the domestic GAAP-based accounting data and the IFRS-based accounting data, we calculate for each firm, in each of the 14 European countries, an overall comparability index of accounting outcomes[8] in the year prior to its mandatory transition to the IFRS. The index is calculated using both local GAAP-based and IFRS-based earnings and book value of equity data.[9] Then, the median value of the index for the sample firms, for each country, is used as a proxy for the respective country's overall comparability index. The closer the overall index to zero, the higher the ranking of the respective EU country in terms of the comparability of IFRS-based accounting data to the domestic GAAP-based accounting data in the year prior to mandatory IFRS adoption $(t - 1)$.

Consistent with the firms' reporting incentives literature (e.g. Ball *et al.*, 2000; Ball and Shivakumar, 2005; Burgstahler *et al.*, 2006), we consider that countries' institutional environments may play a pivotal role in reporting outcomes. Prior cross-sectional studies identify and analyze the effects that differences in the strength of the legal and regulatory enforcement regime may have in value-relevance levels across countries. Daske *et al.* (2008) provide evidence that the capital market effects for mandatory IFRS adopters are stronger in countries that have larger differences between local GAAP and IFRS and that these capital market effects occur only in countries with relatively strong legal and enforcement regimes and in countries where the institutional environment provides strong incentives for transparent reporting. In our empirical analysis we also examine whether our evidence is consistent with the findings of Daske *et al.* (2008).

The contribution of this study is fourfold. First, it examines the value-relevance effects of mandatory IFRS adoption by listed companies throughout the 14 major EU countries. Second, we focus on three specific information items – goodwill, R&D expenses and PPE revaluation – for which measurements under IFRS differ considerably from measurements under domestic accounting practices across the EU countries prior to the introduction of the international standards. Addressing the issue of which individual differences in accounting practices are value relevant provides insights about the value relevance of alternative measurement

and recognition practices. Third, we find that IFRS reporting for specific accounting items has greater incremental value relevance to investors in countries where the IFRS deviate from domestic GAAP than in countries where the two sets of standards tend to be similar. Further, we show that the incremental value relevance across countries is associated with the overall comparability index of accounting outcomes that we calculate and is complemented by differences in cross-country institutional environment factors. Although value-relevance tests on their own cannot be used to unambiguously determine regulatory decisions or rank the preference of equity investors for different accounting regimes, the findings are of interest to regulators and policy makers as well as to capital market participants in the EU. Fourth, future researchers may find our methodology and analysis useful in assessing the expected incremental value relevance of financial reports in countries that are currently implementing the international standards or considering substituting them for their domestic accounting standards.

The remainder of the paper is organized as follows. In Section 2, we briefly discuss the IFRS for goodwill, R&D and revaluation of PPE across EU countries, cross-country dissimilarities in domestic accounting practices for these variables, and differences between domestic accounting practices and IFRS. Section 3 discusses prior research and develops hypotheses. In Section 4 we present the data and in Section 5 we discuss the methodology and analyze the results. Section 6 provides additional robustness tests and Section 7 provides a conclusion.

2. IFRS versus Domestic Accounting Practices for Goodwill, R&D and Revaluation of PPE

Prior literature discusses the convergence to IFRS in the EU.[10] Our study focuses on value-relevance issues related to IAS 16, IAS 40, IFRS 3 and IAS 38, which have been endorsed by the EU. IAS 16 ('Property, Plant and Equipment') provides guidelines for revaluation of PPE with some additions for investment property provided in IAS 40 ('Investment Property'). IAS 38 ('Intangible Assets') provides guidelines for R&D expenditure.[11] IFRS 3 ('Business Combinations') provides the recent guidelines for goodwill and its impairment. The domestic accounting practices for each of these three accounting items differed considerably across EU countries and even within countries in the pre-mandatory IFRS era. For instance, prior to 2005, goodwill could be capitalized as an intangible asset and annually amortized in some EU countries (e.g. Italy, Germany and Finland), and it could be capitalized assuming an indefinite useful life in a few others.[12] IFRS 3 requires capitalization with annual impairment reviews.

Similarly, in some countries (e.g. Germany), all R&D expenditure had to be expensed immediately, whereas in others (e.g. the UK) expenditure on research had to be expensed immediately while development expenditure might be capitalized and periodically amortized if certain preconditions were fulfilled, in conformity with IAS 38. In other countries the R&D rules were different. For

example, in Italy, *basic* research had to be expensed, whereas *applied* research might be capitalized if five specified preconditions were fulfilled, and development expenditure might also be capitalized if five specified preconditions were fulfilled. In Finland, research expenditure could be capitalized as 'other long-term expenditure', 'exercising prudence' and amortized over a period up to five years, and development expenditure might be capitalized if four specified preconditions were fulfilled. Finally, whereas IAS 16 permits revaluation of PPE, local GAAP pertaining to this issue varied in our sample EU countries in the pre-mandatory IFRS era. For example, in Germany PPE revaluation was not permitted whereas in the UK it was, and in Italy revaluation was not permitted unless a special regulation allowed it under certain exceptional circumstances such as the presence of high inflation; in Finland, land and water areas could be revalued if the prevailing selling prices were perceived to be permanently and essentially greater than the original acquisition prices.

Finally, local accounting standards in several EU countries were driven by tax considerations and a broad-stakeholder orientation and were found to deviate from the IAS.[13] In other countries, where accounting practices included a mix of shareholder and stakeholder considerations (e.g. Denmark and the Netherlands), the domestic standards tended to resemble the IAS more closely.

3.   Prior Research and Hypotheses Development

Accounting Standards versus the Incentives Literature

The capital market effects around the adoption of mandatory IFRS reporting are not obvious.[14] A dominant stream in the literature claims that standards are merely paper and that without fitting and vigilant institutional oversight they will not amount to much (e.g. Ball *et al.*, 2000; Ball and Shivakumar, 2005; Burgstahler *et al.*, 2006). If there are no differences between local GAAP and IFRS, all accounting items will be equal across regimes and the value relevance of these items is unlikely to be different. In this respect, there are reasons to suggest that positive or negative capital market effects around the adoption of mandatory IFRS reporting may be significant as well as reasons to suggest they may be insignificant.

Reasons supporting the view that adoption of mandatory IFRS reporting may yield significant capital market benefits are that IFRS reporting increases transparency and improves the quality of financial reporting (e.g. EC Regulation No. 1606/2002); IFRS are more fair-value oriented and more comprehensive, especially with respect to disclosures, than most local GAAP. For example, using comprehensive comparisons of 21 accounting standards in effect in 2001, Bae *et al.* (2008) provide evidence that IFRS differ from local GAAP in most countries. Daske and Gebhardt (2006) provide evidence that the perception of disclosure quality increases around voluntary IAS adoptions, and Barth *et al.* (2008) report an increase in earnings quality for a sample of firms that adopted IFRS voluntarily. Another argument in favor of mandatory IFRS reporting is

that the global movement towards IFRS reporting creates a common set of accounting standards across borders making it less costly for international investors to compare firms across capital markets (e.g. Covrig *et al.*, 2007).

In contrast, mandating the use of IFRS per se, even if the standards themselves mandate superior accounting practices and require more disclosures, may not make corporate reporting more comparable or more informative. This view suggests that the capital market effects of IFRS adoption could be small or even negligible. Several recent studies indicate that accounting standards alone play a limited role in determining observed reporting quality; rather, firms' reporting incentives are pivotal in this respect (e.g. Ball *et al.*, 2000; Ball and Shivakumar, 2005; Burgstahler *et al.*, 2006). Consequently, changing the standards alone is not sufficient to improve the informativeness of the reported accounting numbers. For example, Ball (2006) and Daske *et al.* (2007) suggest that firms opposing the transition to IFRS or towards more transparency are unlikely to make material changes to their reporting policies. The reason is that the use of accounting standards requires substantial judgment and the application of private information, providing firms with considerable discretion. Firms' reporting incentives are likely to affect the way they use this discretion. Firms' reporting incentives, to a large extent, are shaped by the extent to which countries' legal regimes enforce the rules of law and regulations. As the different views outlined above all have merit, the capital market effects of the mandatory adoption of IFRS reporting are ultimately an empirical issue.[15]

The Value Relevance of Specific Accounting Items

Using the framework suggested by Barth *et al.* (2001), we examine how useful the accounting numbers are to investors in equity securities in the EU.[16] Several country-specific studies have examined the value relevance of specific accounting items. For example, Aboody and Lev (1998) examine the value relevance of software capitalization in the USA, and Barth and Clinch (1998) examine whether the informativeness of asset revaluation items reported by Australian firms differs across various types of assets.[17] The reporting of intangible assets has also been the subject of much controversy and interest in recent years.[18] For example, using a sample of French firms, Cazavan-Jeny and Jeanjean (2006) show that capitalized R&D was not associated with higher prices and was related to lower returns.

Devalle *et al.* (2009) examine whether the value relevance of accounting information increased following the introduction of IFRS for listed companies in five EU countries (Germany, Spain, France, the UK and Italy) for the period starting in 2002. For all companies in their sample they report an increase in the value relevance of earnings and a decrease in the value relevance of book value of equity. Further, for individual countries Devalle *et al.* (2009) present mixed results as to the effect of IFRS adoption. For Germany and France the results are consistent with what they report for the entire sample; for Spain and Italy

the value relevance of both earnings and book value of equity decreased; and for the UK the value relevance of both earnings and book value of equity increased. Agostino *et al.* (2008) find that the introduction of IFRS in the EU enhances the value relevance of earnings and book value only for the more transparent banks. Armstrong *et al.* (2007) find positive (negative) market reactions to events that increase (decrease) the likelihood of IFRS adoption in the EU, which indicates that European equity investors perceive net benefits in the adoption of IFRS. These studies neither examine the effects of the adoption of IFRS on the value relevance of goodwill, R&D expenses and PPE revaluation across EU countries nor analyze or compare which country-specific investors benefit most from the adoption. We selected these three specific accounting items on an a priori basis, as the focus of our empirical examination of these research questions.[19] Our results complement the recent studies and the findings tend to be generally consistent with and supplementary to the prior evidence.

A few recent studies focus on the value relevance of certain EU country-specific accounting items. Hung and Subramanyam (2007) examine the value relevance of the two aggregate accounting numbers, book value of equity and net income, in Germany from 1998 through 2002. They find that book value (net income) has a greater (smaller) impact on valuation under IAS than under German GAAP and suggest that their findings are consistent with a higher fair-value orientation and lower income persistence under IFRS.[20] In contrast, Horton and Serafeim (2009) report results in the opposite direction in the UK, namely, that the IFRS earnings valuation coefficient is significantly higher than the UK GAAP earnings valuation coefficient, thereby indicating that the level of value relevance increases post-IFRS. They also report that the IFRS book value of the equity valuation coefficient is negative, though not statistically significant, suggesting that IFRS and UK GAAP book value of equity have similar effects.[21] Horton and Serafeim (2009) also investigate whether six specific accounting measurement differences between UK GAAP and IFRS are perceived by investors as value relevant.[22] Examining a sample of 145 Norwegian firms, Gjerde *et al.* (2008) find only marginal evidence of increased value relevance of both earnings and book value of equity after adopting IFRS. Our results complement these recent country-specific studies and the findings extend the analyses across the major EU countries.

The Value Relevance of IFRS Reporting and the Strength of the Legal and Regulatory Enforcement Regime

Prior cross-sectional studies identify and analyze country characteristics such as disclosure policies, shareholder protection laws, enforcement regimes and corporate transparency that may cause differences in value-relevance levels across countries (e.g. Hung, 2001; Zhao, 2002; Bushman *et al.*, 2004).[23] Other studies show that various accounting items exhibit high value relevance in common law countries, which have effective judicial systems, better investor protection

laws (La Porta *et al.*, 1998, 2002), and a higher quality of accounting practices (including more transparent reporting) and auditing systems than civil law countries (Hung, 2001; Francis *et al.*, 2003; Horton and Serafeim, 2009).

Daske *et al.* (2008) examine 26 countries and provide evidence that mandatory adopters of IFRS experience statistically significant increases in market liquidity and equity valuation after IFRS reporting becomes mandatory. They also report that the capital market effects for mandatory adopters are stronger in countries with larger differences between local GAAP and IFRS and that these capital market effects (around mandatory IFRS adoption) occur only in countries with relatively strong legal and enforcement regimes and in countries where the institutional environment provides strong incentives for transparent reporting. In the other IFRS adoption countries, market liquidity and firm value remain largely unchanged around the mandate. Among others, Daske *et al.* (2008) also report that the observed capital market effects are stronger for the EU countries in their sample. They suggest that this evidence may reflect EU countries' contemporaneous efforts to enhance corporate governance and regulatory enforcement (Hail and Leuz, 2007). Thus, strength of enforcement regimes and firms' reporting incentives play a major role in determining their results. These studies specifically motivate our investigation and our research hypotheses.

Hypotheses

The need for international standards has become a focal issue of recent research (e.g. Whittington, 2005). In addition to providing implementations, these studies also discuss the implications of the adoption of the IFRS by the EU and the effects of standards versus incentives, as determinants of financial reporting outcomes, on international convergence (Schipper, 2005),[24] while previous studies focus on the cost or potential problems and private benefits associated with the adoption of the IAS by the EU and other countries (Flower, 1997; Stolowy and Jeny-Cazavan, 2001; Haller, 2002; Bradshaw and Miller, 2003; Cuijpers and Buijink, 2005; Renders and Gaeremynck, 2007; Hail *et al.*, 2009).[25] [26]

Our study focuses on whether mandatory adoption enhances the value relevance of accounting information. In particular, we assess whether there are potential benefits to investors from adopting the international standards in terms of higher value relevance of reported information pertaining to goodwill, R&D expenses and fixed assets revaluation in addition to earnings and book value of equity. To this end, we examine whether the deviation of the domestic accounting practices from the international standards across EU countries is related to our measures of value relevance. Finally, we also examine whether these associations are complemented by institutional environment differences across the EU countries.

The prior discussions led to our two research hypotheses about the incremental value relevance of the three accounting items (goodwill, research and development expenses and revaluation of PPE):

H_1:   All else equal, in the pre-IFRS mandatory adoption year, the incremental value relevance to investors of the three domestic GAAP-based accounting items was greater in countries where the respective accounting outcomes of domestic standards were more compatible with IFRS-based accounting outcomes.

H_2:   All else equal, the higher the deviation of the three domestic GAAP-based accounting items from their corresponding IFRS, the greater the incremental value relevance to investors resulting from mandatory switching to IFRS.

4.   Data and Sample

We obtained financial accounting and market data from Compustat Global Vantage (GV) files, which provide an index indicating the type of accounting standards used by each firm. The data were supplemented using annual reports, corporate websites and Form 20-F for firms also listed in the USA. We include in the final sample only companies that have identifiable GAAP reporting and complete data for all variables used in our models. The final sample is restricted to firms reporting IFRS-based financial statements for the first time for the year of mandatory adoption, t (December 2005–November 2006), and for the prior year, $t - 1$, as well as domestic GAAP-based financial statements for the years $t - 1$ and $t - 2$.

Table 1 details the sample construction of publicly listed firms, in 14 EU countries, mandatorily adopting IFRS for the first time in 2005. Panel A presents the distribution of all EU publicly listed firms with some data available from 2003 through 2006 (column 2) and our final sample with complete data (column 3), by law regimes and country groups.[27] As shown, our database includes 3,910 companies from 14 EU countries and the final sample consists of 2,298 companies with complete data reporting IFRS-based financial statements for the first time in the year of mandatory adoption (year t: ending December 2005 for calendar year reporting firms and up to November 2006 for fiscal year reporting firms)[28] and comparative IFRS-based statements for the previous year (year $t - 1$) as required by IFRS 1, as well as domestic GAAP-based financial statements for years $t - 1$ and $t - 2$.[29] As of December 2003, eight EU countries did not permit early adoption (Deloitte Touche Tohmatsu, 2003, 2005).

Panel B summarizes the sample selection process, showing for each step the number of observations excluded from the initial sample, and the resulting final sample. Of an initial database of 3,910 firms, 659 financial institutions are also excluded, resulting in a sample of 3,251 non-financial firms. Then, early IFRS adopters, partial adopters, firms unclassified by GAAP-based reporting on Compustat or firm-specific reports (generally classified on Compustat as Domestic Adjusted standards, 'DA',[30] or lack of classification by either GAAP-based reporting on Compustat or GAAP-based financial statements data on annual reports, corporate websites and Form 20-F)[31] are excluded, resulting in a final sample of 2,298 firms across 14 EU countries.

Table 1. Sample construction of publicly listed firms, in 14 EU countries mandatorily adopting IFRS for the first time in 2005

Panel A: sample distribution by law regimes and country groups

Country (1)	No. of firms in the data[a] (2)	No. of mandatory adopters in the final sample[b] (3)
Common law regime		
UK	1,107	810
Ireland	48	26
Total common law regime	1,155	836
Civil law regime		
Netherlands[c]	166	92
Belgium[c]	125	72
France	605	415
Italy	219	118
Spain	127	77
Portugal	39	22
Total French countries	1,281	796
Denmark[c]	165	83
Finland[c]	116	79
Norway	133	83
Sweden	265	174
Total Scandinavian countries	779	419
Austria[c]	77	23
Germany[c]	618	224
Total German countries	695	247
Total civil law regime	2,755	1,462
Total number of firms	**3,910**	**2,298**

Panel B: number of firms in the final sample

Firms with data	**3,910**
Less: financial institutions	659
Non-financial firms	3,251
Less: early IFRS adopters, partial adopters, unclassified by GAAP-based reporting[d] and firms with other missing values	953
Final sample of mandatory adopters	**2,298**

[a]Companies with some data available from 2003 through 2006. Early adopters prior to December 2005 are also included in the initial data of 3,910 companies.
[b]Companies with complete data reporting IFRS-based financial statements for the first time in the year of mandatory adoption (year t: ending December 2005 for calendar year reporting firms and up to November 2006 for other fiscal year-end reporting firms) and comparative IFRS-based data for the previous year (year $t - 1$) as required by IFRS 1, as well as domestic GAAP-based financial statements for years $t - 1$ and $t - 2$, the two consecutive years prior to the transition to IFRS. Financial institutions are excluded.
[c]Countries allowing early adoption of IFRS (*source*: Deloitte Touche Tohmatsu, 2003, 2005).
[d]Companies reporting early IFRS adoption or partial adoption or classified as 'DA' (defined on Compustat as 'Domestic Adjusted' standards) on Compustat, and those for which GAAP-based financial data could not be identified, are excluded.

5.   Methodology and Analysis

To assess the extent of the difference between domestic GAAP-based accounting data and IFRS-based accounting data in each of the 14 EU countries, we calculate for each sample firm, in the year prior to its transition to IFRS, an overall comparability index that consists of two representative aggregate accounting measures: net income and book value of shareholders' equity. Specifically, for each sample firm j, in each EU country i ($i = 1, \ldots, 14$) an overall comparability index $(CI_T)_{j,i}$ is calculated as[32]

$$(CI_T)_{j,i} = (CI_{NI})_{j,i} + (CI_{BV})_{j,i} \qquad (1)$$

where

$$(CI_{NI})_{j,i} = \left|(NI_{IFRS,j} - NI_{DOM,j,i})\right| / \left|NI_{IFRS,j,i}\right|$$

and

$$(CI_{BV})_{j,i} = \left|(BV_{IFRS,j,i} - BV_{DOM_{j,i}})\right| / \left|BV_{IFRS,j,i}\right|.$$

$NI_{IFRS,j,i}$ and $BV_{IFRS,j,i}$ are IFRS-based net income and book value of shareholders' equity for firm j, respectively; and $NI_{DOM,j}$ and $BV_{DOM,j}$ are domestic GAAP-based net income and book value of shareholders' equity for firm j, respectively, for $t - 1$, the last year prior to mandatory IFRS adoption.

If net income is identical under IFRS and domestic GAAP, then $(CI_{NI})_{j,i}$ is equal to zero. A value greater than zero means that net income reported under IFRS is either greater or smaller than net income reported under domestic GAAP. Similar relationships apply for $(CI_{BV})_{j,i}$ with respect to the book value of the shareholders' equity. The sum of the two components is used as a proxy for the extent of comparability between domestic GAAP-based accounting data and IFRS-based accounting data for each sample firm in each EU country, in the year prior to the mandatory transition to IFRS (year $t - 1$). Finally, we use the median sample firms' overall comparability index in each of the 14 EU countries to establish a relative overall comparability ranking of the countries. The closer the median sample firms' overall comparability index to zero, the higher the ranking of the respective EU country in terms of IFRS-based accounting data comparability to the domestic GAAP-based accounting data, in the year prior to mandatory IFRS adoption ($t - 1$).[33] The median overall comparability index and the subsequent overall comparability ranking for each EU country are presented in Table 2.

The overall comparability ranking (Table 2, column 2) indicates that the two countries in the German group – Austria and Germany – exhibit the largest divergence of the domestic GAAP-based earnings and book value of equity from IFRS-based data (ranked 14 and 13, respectively), followed by Sweden

Table 2. Median index of overall comparability between domestic GAAP-based and IFRS-based accounting data for each EU country, in the year prior to the mandatory transition to IFRS, and three country-specific indices for institutional environment factors

Country (1)	Overall comparability index (CI$_T$)[a] (2)	Overall comparability ranking[b] (3)	Mandatory IFRS adoption (MIFRS)[c] (4)	Anti-director rights (ADIR)[d] (5)	Differences in GAAP (DDIFRS)[e] (6)
			Country-specific indices for institutional–environmental factors		
Common law regime					
Anglo-Saxon countries:					
UK	0.539	2	1	5	−3.4
Ireland	0.496	1	1	4	−3.3
Civil law regime					
French countries:					
Netherlands	0.564	3	0	2	−7.6
Belgium	0.621	7	0	0	1.4
France	0.645	9	1	3	0.4
Italy	0.586	5	1	1	0.7
Spain	0.640	8	1	4	2.2
Portugal	0.649	10	1	3	4.9
Scandinavian countries:					
Denmark	0.584	4	0	2	0.1
Finland	0.695	11	0	3	4.4
Norway	0.609	6	1	4	−3.8
Sweden	0.703	12	1	3	−0.7

(*Continued*)

Table 2. Continued

Country (1)	Overall comparability index (CI_T)[a] (2)	Overall comparability ranking[b] (3)	Country-specific indices for institutional–environmental factors		
			Mandatory IFRS adoption (MIFRS)[c] (4)	Anti-director rights (ADIR)[d] (5)	Differences in GAAP (DDIFRS)[e] (6)
German countries:					
Austria	1.016	14	0	2	2.5
Germany	0.833	13	0	1	1.5

[a]For each sample firm j, in each EU country i ($i = 1, \ldots, 14$) an overall comparability index is calculated as $(CI_T)_{j,i} = (CI_{NI})_{j,i} + (CI_{BV})_{j,i}$, where $(CI_{NI})_{j,i} = |(NI_{IFRS,j} - NI_{DOM,j,i})|/|NI_{IFRS,j,i}|$ and $(CI_{BV})_{j,i} = |(BV_{IFRS,j,i} - BV_{DOM,j,i})|/|BV_{IFRS,j,i}|$. $NI_{IFRS,j,i}$ and $BV_{IFRS,j,i}$ are IFRS-based net income and book value of shareholders' equity for firm j, respectively; and $NI_{DOM,j}$ and $BV_{DOM,j}$ are domestic GAAP-based net income and book value of shareholders' equity for firm j, respectively, for $t - 1$, the last year prior to mandatory IFRS adoption. The values in column (2) are the median sample firms' overall comparability index in each of the 14 EU countries. The IFRS data for year $t - 1$ are based on IFRS comparative (transitional) financial statements reported for each company in year t.
[b]Country's relative ranking of median overall comparability index. The closer the median sample firms' overall comparability index to zero, the higher the ranking of the respective EU country in terms of IFRS-based accounting data comparability to the domestic GAAP-based accounting data, in the year prior to mandatory IFRS adoption ($t - 1$).
[c]MIFRS is a mandatory IFRS adoption dummy, defined as 1 if a country allowed mandatory adoption of IFRS only in 2005, and 0 if a country allowed voluntary early adoption prior to this year (*source*: Deloitte Touche Tohmatsu, 2003, 2005).
[d]ADIR is an anti-director rights index aggregating shareholders' rights. The index is formed by adding the following attributes: (1) the country allows shareholders to mail their proxy vote, (2) shareholders are not required to deposit their shares prior to the General Shareholders' Meeting, (3) cumulative voting or proportional representation of minorities on the board of directors is allowed, (4) an oppressed minorities mechanism is in place, (5) the minimum percentage of share capital that entitles a shareholder to call for an Extraordinary Shareholders' Meeting is less than or equal to 10% (the sample median), or (6) shareholders have preemptive rights that can only be waived by a shareholders' meeting. The range for the index is from zero to five (La Porta *et al.*, 1998, 2006). Higher values represent more protection of investor rights across countries.
[e]DDIFRS is the difference between domestic GAAP and IAS (from Bae *et al.*, 2008; Daske *et al.*, 2008): a summary score of how domestic GAAP differ from IAS on 21 key accounting dimensions as of December 2001. Higher values stand for more discrepancies between domestic GAAP and IFRS.

and the Finland (ranked 12 and 11, respectively). In contrast, Ireland and the UK deviate the least (ranked 1 and 2, respectively), followed by the Netherlands and Denmark (ranked 3 and 4, respectively). Belgium and Spain (ranked 7 and 8, respectively) are ranked in the middle.[34]

Complementary Effect of Country-Specific Institutional Characteristics

As discussed earlier, it is possible that country-specific institutional character-istics may also affect the value relevance of accounting information similarly to the mandatory switch from local GAAP to IFRS. In other words, cross-country institutional differences may complement the differences between IFRS and local GAAP in explaining security prices and returns. Therefore, we expect a complementary effect of institutional factors on the value relevance of accounting information. Specifically, we also examine the effect of the com-parability index (CI) and the institutional characteristics on the incremental value relevance of IFRS over the value relevance of local GAAP as measured by the explanatory power of the vector of accounting variables used in our study. We use the following three cross-country complementary institutional environment factors:

(a) Mandatory IFRS Adoption (MIFRS): defined as 1 if a country allowed man-datory adoption of IFRS only on 31 December 2005, and 0 if it allowed voluntary early adoption prior to this date.
(b) An anti-director rights (ADIR) index aggregating shareholders' rights.[35] Higher values represent more protection of investor rights across countries.[36]
(c) A GAAP differential score (DDIFRS), calculated as the difference between local GAAP and IFRS (from Bae *et al.*, 2008; Daske *et al.*, 2008). This is a summary score of how domestic GAAP differ from IAS on 21 key account-ing dimensions. Higher values stand for more discrepancies between local GAAP and IFRS.

Details of CI and the three factors for our 14 EU countries are presented in Table 2.

Descriptive Statistics

Table 3 presents the number of sample firms and the median (or mean where the median equals zero) values of the per share explanatory variables used in regression equation (2) below, for each of the 14 EU countries. The figures in the first row for each country are the median values of the per share variables for the last year of reporting domestic GAAP-based financial statements (D_{t-1}) prior to mandatory IFRS adoption (denoted as year $t - 1$). The figures in the second row for each country are the median values of the per share variables for the first year that a company reported mandatory IFRS-based financial

Table 3. Comparative descriptive statistics across 14 European countries: domestic GAAP-based versus IFRS-based data median (mean) values[a]

Country (1)	No. of obs.[b] (2)	ADBVPS (3)	EPS (4)	GWPS (5)	RDPS (6)	REVALPS (7)
UK (D_{t-1})[c]	810	1.07	0.08	0.08	0.06	0 (2.45)
(IFRS$_t$)[d]	810	1.21	0.17	0.25	0.08	0 (2.35)
Ireland	26	1.38	0.10	0.05	0.13	0 (0.18)
	26	0.61	0.21	0.07	0.28	0 (0.14)
Netherlands	92	6.86	0.80	0.21	0.59	0 (0.12)
	92	11.74	0.99	0.22	0.98	0 (0.20)
Belgium	72	15.16	1.57	0.34	0.49	0 (21.55)
	72	17.38	1.83	0.32	0.38	0 (21.82)
France	415	8.58	0.74	1.08	0.49	0 (0.21)
	415	11.17	1.15	2.21	0.63	0 (0.16)
Italy	118	2.59	0.22	0.22	0.15	0 (0.25)
	118	2.71	0.20	0.27	0.11	0 (0.33)
Spain	77	8.52	0.81	0.10	0.17	0 (0.82)
	77	7.65	0.65	0.17	0.16	0 (1.73)
Portugal	22	1.56	0.09	0.06	n/a	0 (0.16)
	22	1.68	0.12	0.38	n/a	0.11 (0.26)
Denmark	83	18.32	1.26	0.17	0.79	0 (2.38)
	83	15.30	1.38	0.27	1.04	0 (2.34)
Finland	79	3.42	0.41	0.22	0.16	0 (0.06)
	79	3.43	0.35	0.26	0.12	0 (0.06)
Norway	83	1.42	0.12	0.12	0.33	0 (0.15)
	83	2.05	0.20	0.14	0.28	0 (0.19)
Sweden	174	1.63	0.11	0.08	0.16	0 (0.02)
	174	2.17	0.19	0.25	0.18	0 (0.02)
Austria	23	10.94	0.90	0.01	0.41	0 (0.45)
	23	15.70	2.21	0.12	0.32	0 (0.41)
Germany	224	5.09	0.26	0.02	0.28	0 (0.01)
	224	4.82	0.33	0.56	0.31	0 (0.03)

ADBVPS$_{jt}$ is book value per share minus goodwill and revaluation reserves per share for firm j in fiscal year t; EPS$_{jt}$ is annual earnings per share before extraordinary items for firm j in fiscal year t after excluding R&D expenses; GWPS$_{jt}$ is goodwill per share for firm j in fiscal year t; RDPS$_{jt}$ is R&D expenses per share for firm j in fiscal year t; REVALPS$_{jt}$ is revaluation reserves per share for firm j in fiscal year t.

[a]For each of the 14 EU countries, the table presents the number of sample firms and the median (or mean in parentheses, where the median equals zero) values of the original per share explanatory variables used in regression equation (2). Median values are reported because of extreme outliers for some variables. The figures are reported in euros, the domicile currency for most EU countries. For comparability, we convert to euros the British pound, the Danish krone, the Norwegian krone and the Swedish krona. The fiscal year-end exchange rates are used for the conversion.

[b]From Table 1.

[c]The figures in the first row for each country are the median values of the per share variables for the last year that a company reported domestic GAAP-based financial statements (D_{t-1}) prior to mandatory IFRS adoption (denoted as year t).

[d]The figures in the second row for each country are the median values of the per share values for the first year that a company reported mandatory IFRS-based financial statements (IFRS$_t$). The same number of observations is used for years $t-1$ and t.

statements in period t (denoted as year t). All figures are reported in euros, the domicile currency for most EU countries. For comparability, we convert euros to the British pound, the Danish krone, the Norwegian krone and the Swedish krona. The fiscal year-end exchange rates for 2004 and 2005 are used for the conversion.

The median value of REVALPS is zero in each of the 13 EU countries in the IFRS adoption year (t) and in the 14 EU countries for the last year of reporting domestic GAAP-based financial statements ($t - 1$). This suggests that in each country, at least 50% of the sample firms chose not to revaluate their fixed assets in the IFRS adoption year and did not revaluate in the prior year.[37]

Multivariate Models for Testing the Hypotheses

To test the first hypothesis (H_1), we examine via price and return regression models (described below), in the year prior to mandatory adoption of IFRS (year $t - 1$), the significance of the estimated coefficients of the three domestic GAAP-based accounting items of interest (goodwill, R&D and revaluation of PPE) and the χ^2 statistics for testing the incremental value relevance of the joint vector of these three variables, given that earnings and book value of equity are already included in the regression model for each country in both years.

To test the second hypothesis (H_2), whether the value relevance of the three accounting items of interest is affected by switching from domestic standards to IFRS, we employ both price and return valuation models. Each model is regressed twice across the sample firms of each EU country. In the first regression, we use domestic GAAP data for the year prior to implementing of IFRS (year $t - 1$), and in the second regression we use IFRS data for the year of implementation (year t). For each model, we compare, per EU country, the two regressions using three criteria. First, we compare the magnitude of each estimated coefficient between the two regressions. Next, we use the Chow F-test to assess whether the vector of estimated coefficients differs across the two regressions. Finally, we use the Wald χ^2-test to compare the explanatory power (adjusted R^2), in each country, of the two regressions.

For the price regression model, we run the share price on the book value of equity per share, earnings per share (Collins *et al.*, 1997; Francis and Schipper, 1999) and the three accounting variables of interest:[38]

$$P_{it} = b_0 + b_1 \text{ADBVPS}_{jt} + b_2 \text{EPS}_{jt} + b_3 \text{GWPS}_{jt} + b_4 \text{RDPS}_{jt} + b_5 \text{REVALPS}_{jt}$$
$$+ \text{Industry Control} + \varepsilon_{jt}$$

$$(2)$$

where

P_{jt}	= domestic stock price per share for firm j in a given EU country at the end of the fifth month after the fiscal year-end t,[39]
ADBVPS$_{jt}$	= book value of equity per share minus goodwill and revaluation reserves per share for firm j in fiscal year t,
EPS$_{jt}$	= annual earnings per share before extraordinary items for firm j in fiscal year t and after excluding R&D expenses,
GWPS$_{jt}$	= goodwill per share for firm j in fiscal year t,
RDPS$_{jt}$	= R&D expenses per share for firm j in fiscal year t,[40]
REVALPS$_{jt}$	= revaluation reserves per share for firm j in fiscal year t,
Industry Control	= industry dummy variables, using the first digit of the SIC code to define each industry.
ε_{jt}	= an error term satisfying the OLS regression requirements.

For the return regression model, we use the following return model:

$$\text{RET}_{it} = c_0 + c_1\text{EPS}_{jt} + c_2\text{CEPS}_{jt} + c_3\text{CGW}_{jt} + c_4\text{CRD}_{jt} + c_5\text{CREVAL}_{jt} + \text{Industry Control} + \phi_{jt} \tag{3}$$

where

RET$_{jt}$	= domestic buy-and-hold annual return for firm j in a given EU country measured from the end of the fifth month after the fiscal year-end t,[41]
CEPS$_{jt}$	= change in annual earnings per share before extraordinary items and after excluding R&D expenses for firm j in fiscal year t,
CGW$_{jt}$	= change in year-end goodwill for firm j in fiscal year t,
CRD$_{jt}$	= change in year-end R&D expenses for firm j in fiscal year t,
CREVAL$_{jt}$	= change in year-end revaluation reserves for firm j in fiscal year t,
ϕ_{jt}	= an error term satisfying the OLS regression requirements.

EPS$_{jt}$ and Industry Control are as defined above. All explanatory variables are deflated by the domestic share price as of the beginning of the annual return interval used to calculate the dependent variable.

Testing the Hypotheses

The value relevance to investors of the three accounting items, goodwill, R&D and revaluation of fixed assets, is assessed by the price and return models, as reported in Tables 4 and 5, respectively. We control for the effect of influential observations by deleting observations with absolute studentized residual value

Table 4. The value relevance of goodwill, R&D and revaluation of fixed assets (in euros): comparative results per EU country of price regression model (2) using domestic GAAP-based data (D_{t-1}) versus IFRS-based data (IFRS$_t$)

Panel A: estimated regression coefficients for price model[a, b, c]

Country (1)	Overall comparability ranking[d] (2)	ADBVPS (3)	EPS (4)	GWPS (5)	RDPS (6)	REVALPS (7)	Adj. R^2 (8)	χ^2 [e] (9)
UK (D_{t-1})	2	0.474**	5.029*	0.321*	0.924**	0.393*	0.695	12.8**
(IFRS$_t$)		0.483**	5.677**	0.365**	0.960**	0.421**	0.704	49.6**
Ireland	1	0.992**	2.389*	0.497	0.838**	0.794*	0.683	10.3*
		1.027**	3.073**	0.518*	0.896**	0.901**	0.696	37.4**
Netherlands	3	1.671**	1.178**	3.866	4.351**	2.837*	0.694	16.4**
		1.762**	1.209**	4.175**	5.317**	3.740**	0.719	50.4**
Belgium	7	0.887**	6.271**	0.075	3.086*	0.307*	0.765	21.0**
		1.073**	6.185**	0.119*	3.152*	0.355**	0.796	27.1**
France	9	0.360*	1.592**	0.408*	0.120	5.046**	0.438	19.2**
		0.536**	1.584**	0.615**	0.259*	4.713**	0.497	50.7**
Italy	5	1.592**	3.602*	2.916**	2.834*	1.892**	0.621	31.9**
		1.507**	4.183**	3.260**	3.529**	2.181**	0.664	58.5**
Spain	8	1.318**	2.006	1.349	3.823**	0.384*	0.665	12.5**
		1.126**	2.873*	2.015**	5.027**	0.501**	0.734	28.8**
Portugal	10	0.875**	1.582*	0.451*	N/A	0.526	0.653	6.21*
		0.916**	1.759*	0.597**	N/A	0.747*	0.699	19.4**
Denmark	4	0.704**	5.299**	0.716*	3.596**	4.582**	0.764	29.6**
		0.731**	6.083**	0.825**	3.692**	4.858**	0.772	54.8**
Finland	11	0.651**	2.617**	2.094*	1.450**	0.273	0.801	10.7*
		0.639**	2.980**	2.835**	1.737**	0.358**	0.852	32.2**
Norway	6	0.594**	1.225	1.197*	3.724*	0.859	0.560	11.9**
		0.658**	1.970**	1.527**	4.236**	0.914**	0.659	28.5**

(*Continued*)

Table 4. Continued

Sweden	12	0.116*	3.410*	0.097	0.135*	0.331*	0.423	9.27*
		0.293**	4.544**	1.209**	0.292**	0.598**	0.492	45.7**
Austria	14	0.730**	-0.026	1.388	2.529*	0.507	0.388	4.10
		0.681**	0.215	1.979*	3.392**	0.726*	0.515	8.92*
Germany	13	0.805*	4.814**	0.186	0.022	0.582	0.661	5.33
		1.552**	3.570*	0.283**	0.087**	0.709*	0.697	12.7**

Panel B: tests for differences in estimated coefficients and explanatory power of price regression model (2) per EU country using domestic GAAP-based data (D_{t-1}) versus IFRS-based data (IFRS$_t$)

Country	Overall comparability ranking[d]	*t*-tests for differences in estimated coefficients[f]					Chow *F*-test[g]	Wald χ^{2h}
		ADBVPS	EPS	GWPS	RDPS	REVALPS		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
UK	2	1.58	2.47*	2.01*	1.56	2.19*	6.72**	2.51
Ireland	1	1.95	2.34*	2.12*	2.47*	2.83**	6.79**	3.08
Netherlands	3	1.43	1.98*	2.27*	2.94**	3.07**	19.3**	3.97*
Belgium	7	2.55*	−0.83	2.11*	2.01*	2.26*	3.01*	6.49*
France	9	1.12*	−0.06	4.91**	4.05**	−2.13*	32.9**	30.7**
Italy	5	−0.75	1.82	0.93	2.36*	2.57**	2.73*	5.83*
Spain	8	−1.19	2.45*	2,05*	3.10**	2.09*	7.48**	19.6**
Portugal	10	1.63	2.58*	2.83**	n/a	3.26**	4.07*	18.5**
Denmark	4	1.56	1.91	2.54*	1.95	2.17*	2.86*	2.35
Finland	11	−0.89	2.16*	2.91**	2.73**	2.88**	27.9**	22.9**
Norway	6	2.96**	2.33*	2.04*	5.17**	2.40*	22.5**	35.6**
Sweden	12	2.98**	2.75**	4.27**	3.80**	4.51*	41.3**	37.4**
Austria	14	−0.51	2.03*	3.07**	3.26**	4.10**	52.0**	64.3**
Germany	13	2.93**	−0.79	2.57*	3.58**	4.03**	31.8**	36.2**

(*Continued*)

The table reports the results for price regression model (2):

$$P_{it} = b_0 + b_1 ADBVPS_{jt} + b_2 EPS_{jt} + b_3 GWPS_{jt} + b_4 RDPS_{jt} + b_5 REVALPS_{jt} + \text{Industry Control} + \varepsilon_{jt}$$

where for firm j in a given EU country in fiscal year t, P_{jt} is domestic stock price per share for firm j in a given EU country at the end of the fifth month after the fiscal year-end t; $ADBVPS_{jt}$ is book value per share minus goodwill and revaluation reserves per share for firm j in fiscal year t; EPS_{jt} is annual earnings per share before extraordinary items for firm j in fiscal year t after excluding R&D expenses; $GWPS_{jt}$ is goodwill per share for firm j in fiscal year t; $RDPS_{jt}$ is R&D expenses per share for firm j in fiscal year t; $REVALPS_{jt}$ is revaluation reserves per share for firm j in fiscal year t; Industry Control is a series of dummy variables, using the first digit of the SIC code to define each industry.

[a]For each country, we run regression model (2) twice. The figures in the first row for each country are the estimated coefficients and statistical significance levels using domestic GAAP-based data (D_{t-1}) for the last year prior to IFRS adoption (denoted as year $t - 1$). The figures in the second row for each country are the estimated coefficients and statistical significance levels using IFRS-based data (IFRS$_t$) for the first year of IFRS implementation (denoted as year t).

[b]White's t-statistics (1980) adjusted for heteroskedasticity (not reported in Panel A) are used to estimate the significance level of the estimated coefficients.

[c]The number of final sample firm observations per country with complete IFRS-based financial statements for the year of mandatory IFRS adoption (year t) and comparative IFRS-based data for the prior year (year $t - 1$) as required by IFRS 1 is shown in Table 3.

[d]From Table 2.

[e]χ^2-statistics for testing the significance level of the joint vector of GWPS, RDPS and REVALPS, given that ADBVPS and EPS are already included in the regression model.

[f]White's t-statistics (1980) adjusted for heteroskedasticity are used to estimate the significance level for the differences in each pair of estimated coefficients reported per EU country in Panel A: domestic GAAP-based (D_{t-1}) versus IFRS-based data (IFRS$_t$) coefficients.

[g]The Chow F-statistics are used to test whether the two vectors of the five estimated coefficients reported per EU country in Panel A are the same for domestic GAAP-based (D_{t-1}) and IFRS-based data (IFRS$_t$), when the coefficients are considered as a group.

[h]Wald χ^2-statistics with heteroskedasticity adjustment (Biddle *et al.*, 1995) test for differences in the explanatory power (adjusted R^2) of the domestic GAAP-based (D_{t-1}) versus IFRS-based data (IFRS$_t$) regressions reported in Panel A per EU country.

n/a = not available.

**$p < 0.01$, significance levels are for two-tailed tests.

*$p < 0.05$, significance levels are for two-tailed tests.

Table 4. Continued

Panel C: comparative summary statistics of estimated coefficients across 14 European countries of price regression model (2): number of countries with IFRS-based estimated coefficients larger than or smaller than domestic GAAP-based estimated coefficients (IFRS$_t$ > D_{t-1} versus IFRS$_t$ < D_{t-1})

Explanatory variable (1)	No. of countries with IFRS$_t$ > D_{t-1} (2)	No. of countries with IFRS$_t$ < D_{t-1} (3)
ADBVPS	10 (5)[a]	4 (0)
EPS	11 (9)	3 (0)
GWPS	14 (13)	0 (0)
RDPS	13 (11)	0 (0)
REVALPS	13 (13)	1 (1)

D_{t-1}:   using for each country domestic GAAP-based data (D_{t-1}) for the last year prior to IFRS mandatory adoption (denoted as year $t - 1$).
IFRS$_t$:   using for each country IFRS-based data (IFRS$_t$) for the first year of mandatory IFRS adoption (denoted as year t).
[a]The number of differences which are statistically significant at either the 5% or 1% levels is given in parentheses.

Table 5. The value relevance of goodwill, R&D and revaluation of fixed assets (in euros): comparative results per EU country of return regression model (3) using domestic GAAP-based data (D_{t-1}) versus IFRS-based data (IFRS$_t$)

Panel A: estimated regression coefficients for return model[a, b, c]

Country (1)	Overall comparability ranking[d] (2)	EPS (3)	CEPS (4)	CGW (5)	CRD (6)	CREVAL (7)	Adj. R^2 (8)	χ^2 [e] (9)
UK (D_{t-1})	2	1.407**	0.283*	0.106	0.169*	0.221*	0.167	14.2**
(IFRS$_t$)		1.355**	0.392**	0.142*	0.194**	0.227**	0.179	39.5**
Ireland	1	1.471**	0.438*	0.162*	0.207**	0.095*	0.161	16.9**
		1.399**	0.429*	0.178*	0.225**	0.180**	0.168	38.3**
Netherlands	3	1.216**	0.720**	2.135*	2.397**	3.171**	0.188	70.4**
		1.229**	0.729**	2.152*	2.513**	3.294**	0.192	73.5**
Belgium	7	1.438**	0.377**	0.106	2.095*	1.400*	0.108	14.1**
		1.505**	0.411**	0.153*	2.162*	1.539**	0.114	16.7**
France	9	1.215**	0.386**	0.287**	0.091	0.488*	0.089	15.7**
		1.198**	0.403**	0.390**	0.156*	0.715**	0.125	23.1**
Italy	5	1.186**	0.385*	0.352*	0.374*	0.490**	0.087	12.7**
		1.776**	0.409*	0.413**	0.391*	0.581**	0.095	15.2**
Spain	8	0.759**	0.378**	1.300**	1.062**	0.285	0.105	27.5**
		0.816**	0.414**	1.578**	1.319**	0.364*	0.163	38.4**
Portugal	10	0.689*	0.491**	0.892*	n/a	0.317*	0.109	9.38**
		0.724**	0.485**	1.273*	n/a	0.529**	0.171	18.6**
Denmark	4	5.681*	0.925**	0.627*	9.272**	0.926**	0.176	50.2**
		5.749*	0.922**	0.646*	9.908**	0.934**	0.179	52.9**
Finland	11	1.229*	0.626*	0.357*	1.002**	0.106	0.115	8.40*
		1.285**	1.014**	0.502**	1.150**	0.181*	0.154	32.5**
Norway	6	4.628**	0.702*	0.379*	0.316*	0.381	0.116	7.92*
		4.607**	0.895**	0.525**	0.403**	0.450*	0.123	15.7**

(*Continued*)

Table 5. Continued

Sweden	12	5.253**	0.416*	0.304*	0.459*	0.301	0.074	9.21*
		5.307**	0.415*	0.472**	1.096**	0.952**	0.112	30.7**
Austria	14	0.663*	0.027	0.116	0.452*	0.063	0.019	3.28
		0.652*	0.095*	0.267*	0.639**	0.170*	0.088	11.9**
Germany	13	0.681*	0.230*	0.124*	0.397*	0.077	0.051	5.14
		0.669*	0.243*	0.171*	0.526**	0.172*	0.082	19.0**

Panel B: tests for differences between estimated coefficients and explanatory power of return regression model (3) per EU country using domestic GAAP-based data (D_{t-1}) versus IFRS-based data (IFRS$_t$)

Country (1)	Overall comparability ranking[d] (2)	*t*-tests for differences in estimated coefficients[f]					Chow *F*-test[g] (8)	Wald χ^{2h} (9)
		EPS (3)	CEPS (4)	CGW (5)	CRD (6)	CREVAL (7)		
UK	2	−0.96	2.71**	2.48*	2.35*	1.62	4.09**	4.73*
Ireland	1	−1.40	−0.27	1.83	2.16*	2.52*	3.40**	2.01
Netherlands	3	0.47	0.53	2.06*	2.12*	2.35*	5.68**	3.15
Belgium	7	1.72	1.68	2.46*	1.85	2.88**	2.79*	5.16*
France	9	−1.58	0.92	3.79**	2.94**	3.08**	34.6**	31.9**
Italy	5	−0.36	1.59	1.98*	1.64	2.93**	3.27**	6.95*
Spain	8	1.88	2.75**	2.81**	3.72**	2.68**	9.15**	19.8*
Portugal	10	2.01	−0.26	2.94**	n/a	3.29**	4.58*	25.9**
Denmark	4	1.62	−0.14	1.93	2.05*	1.17	2.11	1.72
Finland	11	2.06*	3.25**	2.89**	2.37*	2.46*	8.71**	8.79**
Norway	6	−0.75	2.73*	2.96**	3.82**	2.94**	23.8**	6.15*
Sweden	12	1.81	−0.05	5.01**	6.12**	9.26**	56.1**	52.7**
Austria	14	−1.05	2.64*	2.90**	3.47**	4.41**	60.3**	85.2**
Germany	13	−0.58	1.70	2.58**	3.59**	6.26**	41.4**	72.1**

(*Continued*)

The table reports the results for return regression model (3):

$$\text{RET}_{it} = c_0 + c_1\text{EPS}_{jt} + c_2\text{CEPS}_{jt} + c_3\text{CGW}_{jt} + c_4\text{CRD}_{jt} + c_5\text{CREVAL}_{jt} + \text{IndustryControl} + \phi_{jt}$$

where for firm j in a given EU country in fiscal year t RET_{jt} is buy-and-hold annual return including dividends measured at the end of the fifth month after the fiscal year-end t; EPS_{jt} is earnings per share before extraordinary items after excluding R&D expenses; CEPS_{jt} is change in annual earnings per share before extraordinary items after excluding R&D expenses; CGW_{jt} is change in year-end goodwill; CRDPS_{jt} is change in year-end R&D expenses; CREVAL_{jt} is change in year-end revaluation reserves; Industry Control is a series of dummy variables, using the first digit of the SIC code to define each industry; all explanatory variables are deflated by the domestic share price as of the beginning of the annual return interval used to calculate the dependent variable.

[a]For each country, we run regression model (3) twice. The figures in the first row for each country are the estimated coefficients and statistical significance levels using domestic GAAP-based data (D_{t-1}) for the last year prior to mandatory IFRS adoption (denoted as year $t - 1$). The figures in the second row for each country are the estimated coefficients and statistical significance levels using IFRS-based data (IFRS_t) for the first year of mandatory IFRS implementation (denoted as year t).

[b]White's t-statistics (1980) adjusted for heteroskedasticity (not reported in Panel A) are used to estimate the significance level of the estimated coefficients.

[c]The number of final sample firm observations per country with complete IFRS-based financial statements for the year of mandatory IFRS adoption (year t) and comparative IFRS-based data for the prior year (year $t - 1$) as required by IFRS 1 is shown in Table 3.

[d]From Table 2.

[e]χ^2-statistics for testing the significance level of the joint vector of CGW, CRD and CREVAL, given that EPS and CEPS are already included in the regression model.

[f]White's t-statistics (1980) adjusted for heteroskedasticity are used to estimate the significance level for the differences in each pair of estimated coefficients reported per EU country in Panel A: domestic GAAP-based (D_{t-1}) versus IFRS-based data (IFRS_t) coefficients.

[g]The Chow F-statistics are used to test whether the two vectors of the five estimated coefficients reported per EU country in Panel A are the same for domestic GAAP-based (D_{t-1}) and IFRS-based data (IFRS_t), when the coefficients are considered as a group.

[h]Wald χ^2-statistics with heteroskedasticity adjustment (Biddle et al., 1995) test for differences in the explanatory power (adjusted R^2) of the domestic GAAP-based (D_{t-1}) versus IFRS-based (IFRS_t) regressions reported in Panel A per EU country.

n/a = not available.

**$p < 0.01$, significance levels are for two-tailed tests.

*$p < 0.05$, significance levels are for two-tailed tests.

Table 5. Continued

Panel C: comparative summary statistics of estimated coefficients across 14 European countries of return regression model (3): number of countries with IFRS-based estimated coefficients larger than or smaller than domestic GAAP-based estimated coefficients (IFRS$_t$ > D_{t-1} versus IFRS$_t$ < D_{t-1})

Explanatory variable (1)	No. of countries with IFRS$_t$ > D_{t-1} (2)	No. of countries with IFRS$_t$ < D_{t-1} (3)
EPS	7 (1)[a]	7 (0)
CEPS	10 (5)	4 (0)
CGW	14 (12)	0 (0)
CRD	13 (11)	0 (0)
CREVAL	14 (12)	0 (0)

D_{t-1}:   using for each country domestic GAAP-based data (D_{t-1}) for the last year prior to mandatory IFRS adoption (denoted as year $t - 1$).

IFRS$_t$:   using for each country IFRS-based data (IFRS$_t$) for the first year of mandatory IFRS adoption (denoted as year t).

[a]The number of differences which are statistically significant at either the 5% or 1% levels is given in parentheses.

above 2 for our regression models in each country (Belsley *et al.*, 1980; Hung and Subramanyam, 2007).

Each table reports results on the testing of our two hypotheses for each of the 14 EU countries. We use four tests to examine the effect of each of the three variables of interest and to compare between the regression in period $t - 1$ and period t in each country. The first test is reported in Panel A of each table and is used to test the first hypothesis (H_1). The other three tests are reported in Panel B of each table and are used to test the second hypothesis (H_2). In Panel A of Tables 4 and 5, the figures in the first row for each country are the estimated coefficients and statistical significance levels using domestic GAAP-based data (D_{t-1}) for the last year prior to mandatory IFRS adoption (denoted as year $t - 1$). The figures in the second row for each country are the estimated coefficients and statistical significance levels using IFRS-based data (IFRS$_t$) for the first year of mandatory IFRS implementation (denoted as year t). The second column in each table presents the overall comparability ranking among the 14 EU countries reported in Table 2. In the last column of Panel A of Table 4 we present the χ^2-statistics for testing the significance level of the joint vector of GWPS, RDPS and REVALPS, given that ADBVPS and EPS are already included in regression model (2). Similarly, in the last column of Panel A of Table 5 we present the χ^2-statistics for testing the significance level of the joint vector of CGW, CRD and CREVAL, given that EPS and CEPS are already included in regression model (3).

In Panel B of Tables 4 and 5 we test for differences in each pair of the regression results (per EU country) presented in the respective Panel A. We use three tests for each pair of regressions: differences between individual estimated coefficients, differences between the vectors of all five estimated coefficients and differences between the explanatory powers. In columns 3 through 7, we present *t*-statistics adjusted for heteroskedasticity (White, 1980), to estimate the significance level for the differences in each pair of the estimated regression coefficients reported in Panel A per EU country. In column 8 we present the Chow *F*-statistics, which test whether the two vectors of the five estimated coefficients significantly differ across the two regressions reported per EU country in Panel A. Finally, in column 9, the Wald χ^2-statistics with heteroskedasticity adjustment (Biddle *et al.*, 1995) test for differences in the explanatory power (adjusted R^2) of the domestic GAAP-based data (D_{t-1}) regressions versus the IFRS-based data (IFRS$_t$) regressions reported in Panel A per EU country.[42]

Ex ante, we expect positive coefficients for all explanatory variables in both regression models (2) and (3). The results presented in Panel A of Tables 4 and 5 are consistent with this expectation. As shown in Panel A of Table 4, the estimated coefficients of all five accounting variables, using the price model (columns 3 through 7) are positive.[43] While all IFRS-based estimated coefficients are statistically significant, quite a few domestic GAAP-based estimated

coefficients are statistically insignificant. Similar results appear in Panel A of Table 5 using the return regression model (3).

To test our first hypothesis, we examine the incremental value relevance of the joint vector of GWPS, RDPS and REVALPS, when ADBVPS and EPS are already included in regression model (2) in the pre-IFRS adoption year.[44] The χ^2-statistics (Table 4, Panel A, column 9) clearly show the incremental relevance of the joint vector of GWPS, RDPS and REVALPS is higher in countries with higher overall comparability ranking,[45] that is, in countries where the respective domestic standards were more compatible with the IFRS. For example, for Ireland and the UK (ranked 1 and 2, respectively, in Table 4), the χ^2-statistics in the pre-IFRS adoption year are 10.3 and 12.8, respectively (statistically significant at the 5% and 1% level, respectively). In contrast, for Austria and Germany (ranked 14 and 13, respectively) the χ^2-statistics are 4.10 and 5.33, respectively, statistically insignificant. Similar results appear in Panel A of Table 5 (column 9) for the return model regarding the incremental value relevance of the joint vector of CGW, CRD and CREVAL, when EPS and CEPS are already included in regression model (3). Overall, these results support our first hypothesis that, in the pre-IFRS adoption year, the incremental value relevance of the three domestic GAAP-based accounting items was greater in countries where the respective domestic standards were more compatible with the IFRS.

In Panel B of Tables 4 and 5, we use the other three statistical criteria to test the second hypothesis. The *t*-tests for the pair-wise differences in estimated coefficients presented in Panel B of Table 4 clearly show that the effects on prices of each of the three accounting items (goodwill, R&D and revaluation of fixed assets) measured using IFRS-based data are greater than their effects measured using domestic GAAP-based data. The *t*-statistics are positive and statistically significant for each of the three accounting items in each of the 14 EU countries.[46] These results are even more striking when they are aligned with the overall comparability ranking by EU countries (in column 2). The table shows that the effects on prices of each of the three accounting items measured using IFRS-based data are greater than their effects measured using domestic GAAP-based data, where the overall comparability rankings of the respective EU country are lower (i.e. more compatible). For example, the *t*-statistics for RDPS are 3.26, 3.58 and 3.80 (statistically significant at the 1% level) for the three EU countries with the lowest overall comparability ranking, Austria, Germany and Sweden, respectively. In contrast, for Ireland, the UK and the Netherlands (ranked first, second and third, respectively), the *t*-statistics are smaller (2.47, 1.56 and 2.94, respectively) and for the UK even statistically insignificant. Similar patterns are observed for REVALPS and GWPS. Results following the same pattern (and even stronger) are presented in Panel B of Table 5 for the CGW, CRD and CREVAL used in the return model. Overall, these results support our second hypothesis that the higher the deviation of a domestic accounting standard from its corresponding IFRS, the greater the incremental benefits to investors from accounting information resulting from switching to IFRS.

In Panel C of Tables 4 and 5 we provide further comparative summary statistics of the estimated coefficients, presented in the respective Panel A (in columns 3 through 7) across the 14 EU countries. Panel C of Table 4 shows that the IFRS-based estimated coefficients are larger than the domestic GAAP-based estimated coefficients in most pair-wise comparisons and, as in Panel B, in most cases the differences are statistically significant at either the 5% or 1% level. For example, for all 14 EU countries, the estimated coefficient of goodwill per share (GWPS) is significantly larger when estimated with IFRS-based rather than with GAAP-based accounting data and in 13 out of the 14 countries these differences are statistically significant. Similar results (though somewhat less striking) appear in Panel C of Table 5 for the return model. These results further suggest that the value relevance of each accounting variable used in either the price model or the return model is greater when measured using IFRS-based data.

For each EU country we also test whether the vectors of the five estimated coefficients considered as a group differ for IFRS-based data ($IFRS_t$) and for domestic GAAP-based data (D_{t-1}). The results, presented in column 8 of Panel B of Tables 4 and 5, show that the Chow F-statistics for almost all EU countries are statistically significant at either the 5% or 1% level.[47] This suggests that the value relevance of the five explanatory variables, taken as a group, is higher when measured using IFRS-based rather than domestic GAAP-based data. Furthermore, the lower the overall comparability ranking of a given EU country the larger its corresponding Chow F-statistics. For example, using the price model (Table 4, Panel B), for Austria, Germany and Sweden (ranked 14, 13 and 12, respectively) the respective Chow F-statistics are 52.0, 31.8 and 41.3 (statistically significant at the 1% level). In contrast, for Ireland, the UK and the Netherlands (ranked 1, 2 and 3, respectively) the respective Chow F-statistics are smaller, 6.79, 6.72 and 19.3 (but also statistically significant at the 1% level). Similar results appear in Table 5 for the return model. Overall, these results further support our second hypothesis, namely, that the larger the deviation of a domestic accounting standard from its corresponding IFRS, the greater the value relevance of the five explanatory variables.

We compare the explanatory power (values of adjusted R^2) of regression model (2) and of regression model (3) for each EU country, measured via IFRS-based data ($IFRS_t$) and via domestic GAAP-based (D_{t-1}) data. The results, presented in column 8 of Panel A, in Tables 4 and 5, indicate that for each country, the IFRS-based adjusted R^2 is larger than the respective domestic GAAP-based adjusted R^2.[48] The results, presented in the last column of Panel B (in Tables 4 and 5), show that the Wald χ^2-statistics, testing for differences in each pair of values of adjusted R^2, are statistically significant at either the 5% or 1% level for 11 out of the 14 EU countries using either the price model (Table 4) or the return model (Table 5). Further, the Wald χ^2-statistics are low and not significant in countries with domestic standards compatible with IFRS (a lower comparability index), whereas in countries with standards less

compatible with IFRS (a higher comparability index) they are considerably higher and statistically insignificant. For example, in Panel B of Table 4, for Austria, Germany and Sweden (ranked 14, 13 and 12, respectively) the respective Wald χ^2-statistics are 64.3, 36.2 and 37.4 (statistically significant at the 1% level). In contrast, for Ireland, the UK and the Netherlands (ranked 1, 2 and 3, respectively), the respective Wald χ^2-statistics are 3.08, 2.51 and 3.97 (statistically insignificant for Ireland and the UK, and significant only at the 5% level for the Netherlands). Similar results appear in Panel B of Table 5. These results further support our second hypothesis, and the assertion that the value relevance increases when measured using IFRS-based rather than domestic GAAP-based data.

Incremental Value Relevance of IFRS and Country-Specific Institutional– Environmental Factors

In Table 2, we introduce and report the comparability index (CI_T) and three country-specific institutional–environmental factors: mandatory IFRS adoption dummy (MIFRS), anti-director rights index (ADIR), and a summary score of the difference between local GAAP and IFRS (DDIFRS).[49] As discussed earlier, we expect that differences in these factors across countries may complement the differences between IFRS and local GAAP in explaining security prices and returns. Applying a methodology used in prior studies (e.g. Ali and Hwang, 2000; Barniv and Myring, 2006), we provide in Table 6 some evidence that the differences across countries between the values of adjusted R^2 for the IFRS regression models and the local GAAP regression models (denoted DR4 for the price model and DR5 for the returns model) are primarily correlated with CI_T and to some extent also with the institutional factors. Further, we show that the cross-country variations in DR4 and DR5 can be explained by the cross-country variations in CI_T and the complementary institutional factors. The results reported here should be cautiously interpreted given that we use only 14 country observations.

In Panel A of Table 6 we present the Pearson and Spearman correlation matrices. First, the correlations between DR4 or DR5 and our overall comparability index (CI_T) are positive and statistically significant. Second, the correlations of DR4 or DR5 with each of the three country-specific institutional factors tend to be statistically insignificant or marginally significant, except for the correlations of DR5 with DDIFRS, which are significant (at the 1% level). Overall, the results suggest that DR4 and DR5 are significantly greater for countries with larger differences between the IFRS-based accounting data and the domestic GAAP-based accounting data (i.e. a lower comparability index), in the year prior to mandatory IFRS adoption.

We also report the cross-country correlations between CI_T and each of the three country-specific institutional factors. The correlations of CI_T with either MIFRS or ADIR are negative (as expected) but statistically insignificant. Both

Table 6. Cross-country correlations and regressions of the differences in adjusted R^2 (DR) with the overall comparability index (CI_T) and three alternate country-specific indices for institutional–environmental factors[a]

Panel A: Pearson and Spearman rank correlations[b]

Variables	DR4[c]	CI_T[d]	MIFRS[d]	ADIR[d]	DDIFRS[d]
DR4	**1.000**	**0.694*****	**0.068**	**0.016**	**0.273**
CI_T	0.697***	**1.000**	− 0.430	− 0.316	**0.495***
MIFRS	0.215	−0.251	**1.000**	**0.620****	− **0.113**
ADIR	0.081	−0.263	0.658**	**1.000**	− **0.206**
DDIFRS	0.332	0.688***	−0.215	−0.227	**1.000**
Correlations with DR5[e]					
Pearson	**0.612****	**0.686*****	**0.069**	**0.149**	**0.683*****
Spearman	0.653**	0.723***	0.216	0.245	0.714***

Panel B: price regressions – dependent variable: DR4[c]
Independent variables[d, f]

Intercept	−0.069 (−1.92)*	−0.119 (−3.13)***	−0.099 (−2.30)**	−0.076 (−1.80)*
Overall comparability index (CI_T)	0.180 (3.34)***	0.230 (4.47)***	0.201 (3.61)***	0.192 (2.99)**
Mandatory IFRS adoption (MIFRS)		0.030 (2.27)**		
Anti-director rights (ADIR)			0.006 (1.21)	
GAAP difference (DDIFRS)				−0.001 (−0.38)
Adjusted R^2	0.439	0.582	0.460	0.396

(*Continued*)

Table 6. Continued

Panel C: return regressions – dependent variable: DR5[e]

Independent variables[d, f]

Intercept	-0.053 (-2.12)*	-0.088 (-3.27)***	-0.086 (-3.16)**	-0.027 (-1.06)
Overall comparability index (CI_T)	0.123 (3.27)***	0.157 (4.34)***	0.141 (3.86)***	0.082 (2.17)*
Mandatory IFRS adoption (MIFRS)		0.021 (2.21)**		
Anti-director rights (ADIR)			0.007 (2.07)*	
GAAP difference (DDIFRS)				0.003 (2.14)*
Adjusted R^2	0.426	0.566	0.550	0.559

[a]Fourteen country observations are used in Panels A, B and C.
[b]Pearson correlation coefficients appear in bold in the upper triangle and Spearman correlation coefficients appear in the lower triangle.
[c]DR4 is the difference between the values of adjusted R^2, per EU country, for the price model (2) from Panel A, column 8 of Table 4.
[d]The overall comparability index (CI_T), mandatory IFRS adoption (MIFRS), anti-director rights index (ADIR) and GAAP differences (DDIFRS) are defined in Table 2.
[e]DR5 is the difference between the values of adjusted R^2, per EU country, for the returns model (3) from Panel A, column 8 of Table 5.
[f]t-statistics are in parentheses. Statistical tests suggest no violations of OLS assumptions, including homoskedasticity.
***$p < 0.01$; **$p < 0.05$; *$p < 0.10$ significance levels (two-tailed tests).

the Spearman and the Pearson correlations between CI_T and DDIFRS are positive (as expected) and statistically significant. Finally, we also report positive and significant correlations between MIFRS and ADIR.

The cross-country regressions of DR on CI_T alone and on CI_T together with one additional country-specific institutional factor alternately are reported in Panels B and C of Table 6, for the price and returns models, respectively.[50] In each regression model, the estimated coefficient of CI_T is positive (as expected) and highly statistically significant. For the price model (Panel B), the estimated coefficient for MIFRS is positive (as expected) and statistically significant (at $p < 0.01$) when CI_T is already included in the regression; in the other two multiple regressions, the estimated coefficients for ADIR or DDIFRS are statistically insignificant. For the returns model (Panel C), we report that the estimated slope coefficients of MIFRS, ADIR and DDIFRS are positive and statistically significant. In particular, the estimated coefficients of both CI_T and MIFRS are positive (as expected) and highly significant.

Taken together, the results reported in Table 6 suggest that CI_T has a significant effect on the incremental explanatory power of IFRS-based regressions over that of local GAAP-based regressions, and that the differences in cross-country variations of the institutional–environmental factors partially complement the differences between IFRS and local GAAP in explaining security prices or returns.[51]

In sum, the results reported in Tables 4 through 6 are consistent with the view that adopting IFRS is likely to be beneficial to the EU capital markets, particularly for investors in countries where domestic standards deviate more from the IFRS. In addition, country-specific institutional–environmental characteristics tend to complement these results. Thus, from the equity investor's perspective, our findings support the EU decision in favor of adopting the IAS.

6. Additional Analyses and Robustness Tests

Market-to-Book Value Regressions

As a robustness test, we also use a market-to-book value regression model suggested by Core *et al.* (2003). Its dependent variable is the market value of equity deflated by the book value of equity. The independent variables include the book value of equity minus goodwill and revaluation reserves, net income before extraordinary items and after R&D expenses, and a dummy variable for negative net income (equal to one if net income is negative and zero otherwise), goodwill, R&D expenses and revaluation of PPE. All independent variables are deflated by the book value of equity. The results, not tabulated, and the inferences are similar to those presented in Tables 4, 5 and 6, and the conclusions for testing our hypotheses across EU countries remain unchanged.

BVPS and EPS Regressions

We repeat the regressions reported in Tables 4 and 5 to examine only the value relevance of book value of equity and earnings. For the price regressions, we find

that the IFRS-data-based EPS estimated coefficients are significantly greater (at the 5% level) than the domestic GAAP-based EPS estimated coefficients in nine countries, but for BVPS only in six countries. For example, the value relevance of both earnings and book value of equity significantly increased in the UK, Ireland, Portugal and Sweden. In contrast, for Italy and Spain the value relevance of book value of equity decreased. For Germany, the value relevance of BVPS significantly increased but that of EPS insignificantly decreased. Generally, the results tend to be consistent with prior studies (e.g. Hung and Subramanyam, 2007; Devalle et al., 2009). Further, as with the results for the full five-variable models, the Wald χ^2-statistics, testing for differences in each pair of the values of adjusted R^2, are low and not significant in countries with domestic standards compatible with IFRS (a lower comparability index), whereas in countries with domestic GAAP less compatible with IFRS they tend to be higher and statistically significant. Overall, the full five-variable model presents stronger support for our second hypothesis than the two-variable model.

Aggregating the Results by Law Regimes and Country Groups

We also test our hypotheses after aggregating the sample firms, first by law regimes and then also by country groups (see Table 1 for these partitions). Prior literature shows that in common law countries the financial reporting systems are perceived to have higher quality and the investor protection laws to be stronger than in civil law countries (La Porta *et al.*, 1997, 1998, 2002; Ball *et al.*, 2000; Barniv *et al.*, 2005). Therefore, we generally expect stronger value relevance of goodwill, R&D expenses and revaluation of PPE in common law countries than in civil law countries. Our unreported findings provide only little support for this expectation when testing our hypotheses for the specific law regimes and groups of countries. These findings are expected given that some countries in the civil law regime and country group have higher overall comparability rankings and other countries within the same group and law regime have lower comparability rankings. Also, only two countries in our sample (Ireland and the UK) are in the common law regime. Overall, the findings further justify our focus on testing our hypotheses for each country separately.

The Number of Observations across Countries

The number of observations differs substantially across countries. For example, our samples include 810 observations for the UK and 415 for France, but only 79 for Finland, 77 for Spain and 72 for Belgium. We re-estimate the country-specific regression models (2) and (3) after randomly selecting 72 observations for each of the 11 countries with larger numbers of observations. The untabulated results are similar to those reported in Tables 4, 5 and 6. These findings suggest that our results are not affected by differences in sample size across countries.

7. Conclusion

The International Financial Reporting Standards (IFRS), consisting of prior International Accounting Standards (IAS), most of which have been revised, and the first six new IFRS, became mandatory for the 2005 consolidated financial statements of all publicly traded European Union (EU) firms. We examine the impact of this adoption on the value relevance of financial reporting information only for investors in equity securities in the EU countries. We provide evidence of the impact of goodwill, research and development expenses (R&D) and revaluation of fixed assets, on security prices, stock returns and market-to-book values, in 14 European countries, for which domestic financial reporting standards for these items differed from the IFRS. We also include the book value of equity and earnings in our models.

We expected the impact of IFRS adoption on the value relevance of the three accounting practices to differ across the EU countries. Our findings provide support for our two hypotheses. (1) In the pre-IFRS mandatory adoption year, the three accounting items had a greater incremental association with security prices or returns the greater the compatibility of the domestic accounting standards with the IFRS, and the incremental value relevance diminished the more the domestic standards deviated from the IFRS. (2) Using comparability indices and price, return and market-to-book valuation models, we show that the higher the deviation of the three domestic GAAP-based accounting items from their corresponding IFRS, the greater the incremental value relevance to investors resulting from switching to IFRS in the IFRS mandatory adoption year; for countries where domestic standards resembled international standards, however, the incremental value relevance is smaller. We report some complementary effect of cross-country differences in various institutional environment factors on the incremental value relevance of IFRS, particularly for the returns model. In sum, the results suggest that in the pre-IFRS mandatory adoption year our three items of interest had greater incremental value relevance to investors in equity securities when domestic standards were compatible with the IFRS, and that investors benefited most from implementing IFRS for goodwill, R&D expenses and asset revaluation in EU countries where local standards deviated more from IFRS. Although value relevance tests on their own cannot be used to unambiguously determine regulatory decisions or rank the preferences of equity investors for different accounting regimes, the findings might be of interest to regulators and policy makers as well as to capital market participants in the EU.

The results must be interpreted with caution for at least four reasons. First, while we indicate that mandatory adoption of the IFRS is beneficial to investors in the EU capital markets, we do not examine the possible costs involved in making this switch. Further research may examine whether the benefits outweigh the costs of switching from the domestic standards to the IFRS. Second, we include the impact of earnings and book value of equity but our examination

focuses mainly on three types of information items, goodwill, R&D and asset revaluation. It is also possible that our findings may not be generalized to other information items. This should be examined in future studies. Third, we use only R&D expenses for our R&D variable because R&D capitalization is not available in our data. Further manual examinations of many cross-listing firms and several only domestic firms suggest (as expected) that R&D capitalization was not allowed in most countries and was not reported by companies in the year prior to the mandatory adoption, and many of these companies did not report R&D capitalization in the mandatory adoption year. Finally, we assume no changes in market efficiency during our sample period (2004 and 2005), and no differences therein among the 14 EU countries studied. Future research may examine whether potential changes in market efficiency provide an alternative explanation for observed differences in the value relevance subsequent to financial accounting standard changes.

Acknowledgements

Notes

[1]One exception is Daske *et al.* (2008), who examine 26 countries (including 14 EU countries) and find that capital market effects are stronger in the EU. A more detailed discussion of prior studies can be found below (see pp. 541–3).

[2]Hung and Subramanyam (2007) conduct a detailed examination on a sample of 80 German firms that voluntarily adopted IAS between 1998 and 2002, and Horton and Serafeim (2009) conduct an examination on a sample of 297 UK firms that adopted mandatory IFRS reporting in 2005. Gjerde *et al.* (2008) compare the value relevance of IFRS accounting figures versus the corresponding figures for a sample of Norwegian public companies; Callao *et al.* (2007) conduct a similar examination for Spanish firms, while Devalle *et al.* (2009) conduct a comparative analysis among five EU countries: Germany, Spain, France, the UK and Italy.

[3]With respect to intangibles, Wyatt (2008) establishes three broad resource categories: technology, human capital and production. Due to lack of empirical data, we excluded human capital intangibles from our study.

[4]The International Accounting Standards Board (IASB) defines and titles all previous and amended standards as International Accounting Standards (IAS) unless a standard has been replaced (e.g. IAS 22 has been replaced by IFRS 3). As of December 2009, the IASB has issued nine new IFRS. Thus, the IFRS include the IAS and new IFRS. Generally, we use the term IFRS, but refer to IAS where applicable.

[5]From 1988 to 1998, IAS were not permitted for domestic reporting by most EU countries. Even in 2003, IAS were not permitted in 8 of the 14 countries examined in our study: France, Italy, Norway, Spain, Portugal Sweden, Ireland and the UK (Deloitte Touche Tohmatsu, 2003).

[6]Using a large sample of companies from 51 countries (including 26 countries that mandatorily adopted IFRS by December 2005), Daske *et al.* (2008) find that specific capital market effects for mandatory adopters are smaller in countries that have fewer differences between local GAAP and IFRS and a pre-existing convergence strategy towards IFRS. These effects are largest for countries with large GAAP differences that also have strong legal regimes.

[7]Aboody *et al.* (2002) argue that differences in market efficiency across time and countries affect the coefficient estimates in value-relevance regressions and that this effect is potentially most pronounced in return regressions.

[8]Our main comparability index is a measure of comparability of accounting outcomes based on differences in accounting standards (i.e. IFRS versus GAAP).

[9]We also construct an alternative comparability index based on goodwill, R&D expenses and revaluation of PPE. Our results and conclusions remain unchanged.

[10]For example, prior studies discuss the EU's recognition of the need to establish and enforce the high quality international accounting standards (Sunder, 2002; Carmona and Trombetta, 2008) in general and the potential problems with the adoption of IAS by the EU countries in particular (Stolowy and Jeny-Cazavan, 2001; Haller, 2002; Chua and Taylor, 2008).

[11]The International Accounting Standards Committee (IASC) revised IAS 22 ('Business Combinations') in 1995 and in 1998, and IAS 16 in 1995 and 1998. The IASC issued IAS 38 on R&D in 1999, suppressing IAS 9 which was revised in 1995. These standards have recently been revised again by the IASB. IAS 16 was revised in December 2003 (effective January 2005) and IAS 38 in March 2004 (effective then). In addition, the IASB issued IFRS 3 in March 2004 and suppressed IAS 22 (Deloitte Touche Tohmatsu, 2003, 2005).

[12]Goodwill could also be capitalized and immediately written off against reserves (e.g. Germany and the UK). Immediate write off became the preferred method in the UK due to its favorable effect on reported future earnings (Radebaugh and Gray, 1997, p. 275). This practice was later amended in the UK to apply a systematic amortization in most cases via the profit and loss account, effective on or after 31 December 1998 (FRS 10, 1997).

[13]Van Tendeloo and Vanstraelen (2005) find that voluntary adopters of IAS in Germany engaged less in earnings management compared with those reporting under German GAAP. Radebaugh *et al.* (2006) provide evidence on countries in the French and German accounting regimes, and Hung and Subramanyam (2007) examine deviations of German GAAP from IAS.

[14]The discussion on accounting standards versus incentives draws on the comprehensive analysis in Daske *et al.* (2008, Section 2).

[15]Hail *et al.* (2009) examine the potential of adoption of IFRS in the USA and show that it involves cost–benefit tradeoff between comparability benefit to investors, recurring future cost savings, particularly for large multinational companies, and one-time transition costs for all firms and the whole economy.

[16]Our study is not designed to provide explicit standard setting inferences (Holthausen and Watts, 2001) or participate in the well-known, ongoing debate in the literature on the merits and shortcomings of the value-relevance concept in this context. Recent studies examine the value relevance of accounting disclosures across countries (e.g. Alford *et al.*, 1993; Ali and Hwang, 2000; Guenther and Young, 2000; Hope, 2003; Daske *et al.*, 2008; Devalle *et al.*, 2009).

[17]In the UK, Aboody *et al.* (1999) find that revaluation is positively associated with returns and future earnings, though being value relevant revaluation is costly (Dietrich *et al.*, 2000).

[18]Powell (2003) argues that accounting for intangible assets is one of the least developed areas of international accounting theory and regulation. Prior studies use valuation models and find that R&D expenditures are value relevant and have significant future economic benefits (Ballester *et al.*, 2003; Oswald and Zarowin, 2007). Godfrey *et al.* (2006) show that differences in GAAP across four countries affect the value relevance of goodwill, R&D and brands.

[19]The accounting treatments under IFRS and under domestic GAAPs differ for these three accounting items. Further, depending on the country, the international standards for these categories are quite different from the firm's domestic GAAP. We, therefore, selected one specific typical asset type from each of the three main asset categories encompassing the balance sheet for the analysis in this study: tangible assets, assets in the developing stage and intangible assets.

[20]Devalle *et al.* (2009) also report mixed results for the impact of IFRS on value relevance for Germany, and Callao *et al.* (2007) report similar results for Spain.

[21]It should be noted that unlike Germany (and some other EU countries) UK regulation did not permit early implementation of IFRS prior to 2005.

[22]Horton and Serafeim (2009) selected the six items based on their actual size and the frequency with which they were applied by the majority of the companies within their sample. They provide evidence that investors view share-based payments, goodwill impairment, financial instruments and deferred taxes as value relevant, supporting their claim that IFRS appears to reveal timely value-relevant information in the UK.

[23]Similarly, some research also compares relevance level across legal regimes rather than by individual countries. For example, Ball *et al.* (2000) compare earnings timeliness across several countries and between common law and civil code countries.

[24]Ginger and Rees (2005) discuss three themes of IFRS adoption in the EU: convergence, enforcement and future research.

[25]Assuming that the IFRS result in financial reporting of higher quality, we may test hypotheses in regimes where accounting data have previously been considered less transparent and of lower quality; further, increasing the sample size may provide more powerful tests. Focusing on the benefits of IFRS adoption, Cuijpers and Buijink (2005) find that EU firms voluntarily using non-local GAAP during 1999 are more likely to be domiciled in countries with lower quality financial reporting. Renders and Gaeremynck (2007) explicitly incorporate the costs for company insiders resulting from early IFRS adoption. They suggest that these costs may offer an explanation why only 15% of the EU companies had adopted IFRS in 2002. We neither address issues related to enforcement of security regulations in the EU (Brown and Tarca, 2005; Schipper, 2005) nor examine or report implications of early adoption of IFRS across the EU countries.

[26]Street (2002), Street and Gray (2002), and Larson and Street (2004) discuss problems impeding the worldwide acceptance of and compliance with IAS, such as the location of the listing exchange and industry effects. They suggest several factors that could mitigate such problems.

[27]La Porta *et al.* (1998, 2002), Ball *et al.* (2000) and Barniv *et al.* (2005), for example, used a similar category distribution.

[28]About 72% of the firms in our initial database and about 71% in the final sample are calendar year firms.

[29]Norway is also included in our sample, as a member of the European Economic Area, committed to follow the EU accounting directives and IAS for consolidated financial statements (Johnsen, 1993; Alexander and Schwencke, 2003; Larson and Street, 2004).

[30]DA (Domestic Adjusted) is defined on Compustat as domestic standards that are only generally in accordance with IFRS. DA is reported only for a small number of companies and further comparisons with actual financial statements indicate partial adoption of IFRS reflected only in selected items.

[31]In Germany, IAS was adopted by many domestic listed companies between 1998 and 2003. More than 50% of the German companies in our initial sample had voluntarily adopted IFRS by November 2005. In Austria, IFRS were adopted by many domestic listed companies by 2003, but US GAAP was also permitted, though it was used by only a few (Deloitte Touche Tohmatsu, 2005).

[32]Similar comparability indices have been used in prior studies (e.g. Adams *et al.*, 1999; Street *et al.*, 2000, Haverty, 2006; Henry *et al.*, 2009). One variant was previously termed the index of conservatism (Radebaugh *et al.*, 2006).

[33]The IFRS data for year $t - 1$ are based on IFRS comparative (transitional) financial statements reported for each company in year t.

[34]In a similar manner, we also constructed alternative comparability indexes to CI_T. First, formulated like CI_T, we constructed indices only for net income and only for shareholders' equity (see equation (1)). Similarly, we constructed a three-variable summary index that sums CI_{GW}, CI_{RD} and CI_{REVAL} for goodwill, R&D and revaluation of PPE, respectively. We then use the median sample firms' overall comparability index in each of the 14 EU countries. The correlation between the alternative three-variable summary index and that of CI_T across the 14 countries is 0.97.

[35]The index is formed by aggregating the following attributes: (1) the country allows shareholders to mail their proxy vote, (2) shareholders are not required to deposit their shares prior to the General Shareholders' Meeting, (3) cumulative voting or proportional representation of minorities on the board of directors is allowed, (4) an oppressed minorities mechanism is in place, (5) the minimum percentage of share capital that entitles a shareholder to call for an Extraordinary Shareholders' Meeting is less than or equal to 10% (the sample median), and (6) shareholders have preemptive rights that can only be waived by a shareholders' meeting. The range for the index is from zero to five (La Porta *et al.*, 1998, 2006).

[36]La Porta *et al.* (2002) and Djankov *et al.* (2008) show that cross-country anti-director rights affect corporate valuation. Specifically, anti-director rights affect value relevance of earnings and book values across countries (Barniv and Myring, 2006). Further, we show that anti-director rights tended to be higher in countries where the domestic GAAP was more compatible with IFRS. However, the theory does not yet predict the impact of IFRS adoption on the relation between anti-director rights and value relevance.

[37]The only exception is Portugal for which the median value of REVALPS is positive in year t.

[38]Numerous studies employ this type of price model to test the impact of specific accounting items (e.g. Aboody and Lev, 1998; Barth and Clinch, 1998; Aboody *et al.*, 1999; Horton and Serafeim, 2009).

[39]The five-month period following the fiscal year-end is used to assure that the fiscal year-end financial information was available to investors. Our results are robust for prices obtained more than five months subsequent to the fiscal year-end.

[40]We use R&D expenses as reported by Compustat Global Vantage (GV) and/or the annual reports. R&D capitalization was not reported on GV and was not disclosed on annual reports for most companies.

[41]The annual returns include dividends. Empirical sensitivity analyses suggest that our results are robust across alternative annual returns measured starting from three to eight months after the fiscal year-end.

[42]Price regression model (2) may be subject to potential scale effect factor bias, which induces interpretation problems in comparing values of adjusted R^2 (Easton, 1998; Brown *et al.*, 1999; Gu, 2005). As we compare only two consecutive years for each country included in our sample, and the comparison of the values of adjusted R^2 is only one of the four tests used in the study, the results of this test must be interpreted cautiously. It is for this reason that we also use a market-to-book value regression model suggested by Core *et al.* (2003) as a robustness test, as discussed in the additional analyses in Section 6.

[43]The only exception is a negative but statistically insignificant coefficient of EPS for Austria, using domestic-GAAP-based data (D_{t-1}).

[44]The null hypothesis is that $b_3 = b_4 = b_5 = 0$.

[45]An F-test provides similar results, that is, both the χ^2 and F-tests reject the null hypothesis for most countries in our sample, except for Austria and Germany (see Maddala, 2001, ch. 4).

[46]The only three exceptions are GWPS in Italy and RDPS in the UK and Denmark (which are not statistically significant at the 5% level).

[47]The only exception is a statistically insignificant F-Chow for Denmark in the return model (Table 5).

[48]As is typically the case with return models, their explanatory powers are considerably lower than those of price models.

[49]We examine several other controls for institutional environment (e.g. log of GNP, GDP growth, GDP per capita growth, research and development expenditure as a percentage of GDP and other WDI Time Series Indicators (World Bank, 2009)) and find insignificant effects (at the 10% level).

[50]Again, having only 14 cross-country observations, any such multivariate analysis is limited for obvious statistical reasons. Also, note that since each dependent variable does not provide an explicit economic measure, we may draw only limited conclusions from the association between the dependent variable and the respective sets of independent variables. Thus, this analysis is of limited scope and should be interpreted cautiously.

[51]These findings tend to be consistent with Daske *et al.* (2008).

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