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Contents

Editor's Letter

The current issue of the Nordic Journal of Business consists of two peer-reviewed articles. The first article by Laura Arranz-Aperte, Hanna Silvola and Eva Ström examines the association between different CSR reporting practices and firm performance using data on Finnish firms. In the second article, Anna-Maija Lantto and Juha Mäki examine banks' fair value estimates in different investor protection environments across 26 European countries.

I hope you enjoy reading these two interesting articles.

Sami Vähämaa
Editor
Nordic Journal of Business

The Association between Different CSR-Reporting Practices and Firm Performance

Laura Arranz-Aperte, Hanna Silvola and Eva Ström

Abstract

This study examines the association between Corporate Social Responsibility (CSR) reporting practices and firm performance by simultaneously studying five different CSR reporting practices: CSR integration, disclosure of the value-creation model, use of Global Reporting Initiative (GRI), disclosure of Green House Gas emissions (GHG), and disclosure of both qualitative and quantitative (CSR-targets). Our results indicate a positive association between CSR integration and the reporting of both qualitative and quantitative CSR-targets and future accounting-based performance, while the reporting of GHG emissions is positively associated with future market-based performance. Overall, our results show that the association between CSR reporting and firm performance hinges crucially on both the reporting practices and the aspect of performance being evaluated, hence suggesting that there is no one-type-fits-all solution to best CSR reporting practices.

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1 Introduction

Companies have many reasons to engage in corporate social responsibility (CSR), including value creation and profit-making (Freeman et al., 2010). Integrating economic decision-making with social and environmental decision-making allows companies to manage stakeholder interests in a better way and, consequently, create value and contribute to the overall success of the company (Freeman et al., 2010; Porter and Kramer, 2002). While CSR engagement is important, CSR reporting is equally important. CSR reporting enables companies to make decisions about value-creating activities (Freeman, 1994; Freeman et al., 2010, pp. 255–258; Donaldson and Preston, 1995), thus having an inside-out effect on firm performance (Schaltegger 2012; Beck et al., 2017). Also, CSR reporting can be viewed as a way of attaining legitimacy (DiMaggio and Powell, 1983; Deegan, 2002; Freeman et al. 2010), being CSR reporting is motivated by a desire to convey information, rather than being the outcome of actual CSR engagement, thus having an outside- in effect on the performance (Schaltegger 2012, Beck et al., 2017). The presence of these two alternative perspectives on reporting (inside-out and outside-in) might be behind the lack of consensus (Khan 2022) in the literature regarding the association between CSR reporting practices and firm performance.

Our study aims to integrate these two perspectives -the inside-out and the outside-in perspectives- by exploring whether the association between CSR reporting and firm performance is dependent on the type of CSR reporting practice. We aim to answer the following question:

Is the association between CSR reporting and firm performance dependent on the type of CSR reporting practice?

To answer this question, we extend prior research on CSR reporting practices by *simultaneously* studying five CSR reporting practices (CSR integration; disclosure of the value-creation model; use of Global Reporting Initiative (GRI); disclosure of Green House Gas (GHG) emissions; disclosure of both qualitative and quantitative CSR-targets) that help us to build a comprehensive view on CSR reporting practices beneficial to firm performance. We relate the use of these different reporting practices to the existing literature on CSR reporting, noting alternative motives to engage in CSR activities and analysing how each of these practices is associated with different aspects of performance. With this study, we contribute to the recent strand of the literature on CSR reporting that highlights the diversity in reporting practices (Dumay et al., 2016; Melloni et al., 2017).

For our study, we have hand-collected detailed information on CSR reporting practices from companies' public sustainability disclosures, for a sample of Finnish companies during the years 2013-2018. Finland, with an established tradition in CSR reporting, recent changes in the legislature, and flexibility in reporting format, provides a unique setting to study CSR reporting. CSR reporting has been voluntary in Finland since the early 1990 (PWC 2016 in Silvola and Vinnari 2020). The EU Directive (2014/95/EU) on non-financial information disclosure (NFRD), effective as of 2017 in Finland, made CSR mandatory for some companies starting in 2018. However, the mandatory requirement did not enforce a specific CSR reporting framework on companies. On the contrary, the legislation allows companies the discretion to choose the type of CSR reporting practice (TEM 2020).

Our dataset contains information on the above-mentioned CSR reporting practices (CSR integration; disclosure of the value-creation model; use of GRI; disclosure of GHG emissions; disclosure of both qualitative and quantitative CSR-targets), together with an additional set of sustainability control systems (the presence of external sustainability assurance; the presence

of a CSR manager; CEO or the board involvement in CSR report, and the presence of a CSR committee within the board of directors). We combine this hand-collected data from the sustainability disclosures with archival data on financial statements (Orbis, Capital IQ database, and Nasdaq Helsinki).

Our results provide three key insights. Firstly, our results indicate a positive association between two of the five studied reporting formats and future accounting-based performance. We find a positive and significant association between CSR integration and the reporting of both qualitative and quantitative CSR-targets and future accounting-based performance. Such a significant association is absent for the other three aspects of CSR reporting (disclosure of the value-creation model, use of GRI and disclosure of GHG emissions). Secondly, our results indicate a significant association between the disclosure of GHG emissions and future market-based performance. Finally, we find a positive association between use of GRI and future market-based performance, however this relation is not significant when we include CSR control systems, such as the presence of external sustainability assurance; the presence of a CSR manager; CEO or the board involvement in CSR report, and the presence of a CSR committee within the board of directors.

The results suggest that, in terms of CSR-reporting- CSR-disclosure practices- albeit they are difficult to compare between companies and difficult to verify – may provide different insight to managers than to investors, and stakeholders alike. CSR-integration and disclosing both qualitative and quantitative CSR-targets – whereby the purpose is to enable managers to make decisions - are associated with future accounting performance. On the other hand, CSR reporting practices focusing on qualitative aspects, like CSR-integration, CSR-value and the use of GRI are negatively, or not associated with market-based performance, once we include CSR sustainability control systems. Although this finding might seem counterintuitive, it could be explained by some omitted variable such as the cost of reporting (not included here) or even the characteristics of the GRI framework, a principled-based reporting protocol that provides long-term overview of CSR activities. Thus, it seems that these qualitative aspects of CSR reporting, while relevant for managers (inside-out perspective), do not help to gain legitimacy on the market (outside-in perspective). From a market perspective, the disclosure of GHG emissions, conveys value-relevant information to the financial market. This particular result is explained by the nature of GHG: numeric and comparable, directly translating into costs – and potential savings – for the company. GHG emissions information disclosed by companies has become increasingly important for investors because GHG emission indicators can reflect significant climate risks (Bonetti et al., 2018; Liesen et al., 2017).

Our study contributes to several strands of literature. Firstly, our study contributes to the literature that analyses the relationship between CSR reporting and performance (Bae, 2021; Van Beurden and Gossling, 2008; Margolis et al., 2009; Taneja et al., 2011; Lueg et al., 2019; Kaspereit and Lopatta, 2016; Dhaliwal et al., 2011; Malik, 2015, for a literature review). Despite the large number of papers that analyse this relation, there is no consensus on either the direction or the sign of this relation. We contribute by presenting a theoretical framework where both the inside-out and the outside-in perspectives are jointly considered. In this framework, the ultimate motives to engage in CSR activities will be associated with the type of reporting, having thus different reporting practices and different associations with performance.

Secondly, this study contributes to the recent strand of literature that highlights the diversity in reporting practices and the debate on the usefulness of various CSR reporting practices (Michelon et al., 2015; Dumay et al., 2016). Most previous empirical studies look at one aggre-

gated measure, such as the existence of an integrated report or the use of GRI or GHG disclosure. An exception is Michelon et al. (2015), who simultaneously study three different practices: stand-alone reporting, GRI guidelines, and assurance of CSR information. We contribute by analysing five key reporting practices and we control the effect of four sustainability control systems: the presence of external sustainability assurance, the presence of a CSR manager, CEO involvement in CSR disclosure, the presence of a CSR committee within the board of directors.

Thirdly, this study contributes to the recent literature on whether and how CSR reporting practices are integrated into the value-creation activities of the companies, and on the literature that provides inside-out and outside-in perspectives on reporting. Our study contributes to this strand of the literature by integrating both perspectives and relating them to the association between CSR reporting and different (accounting and market) measures of performance. Finally, our study contributes to the literature on the CSR reporting practices in Nordic countries. The Nordic countries are routinely cited as forerunners in sustainability, and the stakeholder approach of Nordic companies is well-acknowledged worldwide (Strand et al. 2015, Middtun et al 2015). Besides, transparency and quality of reporting are a part of Nordic business culture. Despite these unique features of the Nordic CSR model, most studies use either US or international data (Lueg and Pesheva, 2021). Results on Nordic countries are few (Lueg and Pesheva 2021; Vaihekoski and Yahya 2023; Khatri, 2022) and study quantitative aspects of CSR reporting practices. We contribute to the existing literature by combining quantitative and qualitative aspects of CSR reporting practices and evaluating their impact differently.

2 Theoretical framework and hypotheses development

Companies' voluntary disclosure of sustainability information has fascinated accounting scholars extensively, especially the motivations for such disclosures have been studied broadly, from various theoretical perspectives. (Christensen et al. 2021) According to stakeholder theory (Freeman, 1994; Freeman et al., 2010, pp. 255–258; Donaldson and Preston, 1995), CSR is seen as a value-creating activity, and managers use CSR reporting to achieve success in terms of higher performance. By contrast, legitimacy theory states that companies voluntarily disclose sustainability information to attain a licence to operate "legitimately' (DiMaggio and Powell, 1983; Deegan, 2002), using disclosure as a mechanism to signal that a firm has "nothing to hide" avoiding an adverse market reaction that might have eventuated from non-disclosure (Brammer and Pavelin, 2004). In other words, sustainability disclosure is generated in response to pressures exerted by diverse stakeholders (Sinclair-Desgagne and Gozlan, 2003).

CSR reporting can theoretically be motivated by these two rather different purposes, which result in different associations with performance. We suggest that the conflicting results in the previous literature arise from differences in CSR reporting practices.

In general, corporate sustainability reporting (CSR) encompasses financial and non-financial information related to the environmental, social, and governance (ESG) aspects of a company's operations. Companies can either publish CSR reports as part of their annual reports or as stand-alone reports. Stand-alone reports have been found to be associated with a larger amount of information, at least in comparison with companies that disclose information as part of their annual reports (Michelon et al., 2015). Consequently, the number of companies disclosing a stand-alone report has increased over the years (see Chao et al., 2011 in Michelon et al., 2015) and is nowadays the preferred choice worldwide. Previous research (Nazari et al., 2017) also shows that longer CSR reports, such as stand-alone reports, increase the transparency of CSR activities and are, as such, explained by higher CSR performance (environmental, social and governance performance).

One of the most well-established reporting formats is Integrated Reporting (IR), a principle-based framework overseen by the International Integrated Reporting Council (IIRC) (IIRC, 2020; KPMG, 2015 in Velte and Stawinoga, 2017; Michelon et al., 2015). The overall purpose of the framework is to convey information to the providers of financial capital about how the firm creates value. IR is a principle-based framework, and it does not prescribe which indicators are to be included in the reporting, for example. The framework focuses on reporting on the company's environmental and governance aspects, business model, strategy, and performance, as well as the outlook for the company (IIRC, 2020). Previous studies also document that the market reaction (in the form of company valuation and forecasts by analysts) towards IR-based CSR reporting has also been positive IR seems to be associated with higher information quality, resulting in positive outcomes with regard to firm valuation and analysts' forecast – hence providing incremental information to investors (Velte et al., 2017).

Another important reporting framework that has gained popularity is the GRI-framework. It is a standard-based framework overseen by the Global Sustainability Standards Board (GSSB). The purpose of the GRI framework is to report on the impact of the firm's operations on the economy, the environment, and society. In contrast to the IR framework, the GRI framework provides examples of indicators that are relevant to most stakeholders in the form of core indicators and supplemental indicators (Global Reporting Initiative 2020; Garmerschlag et al., 2011). As the GRI is a standard-based framework, previous research has analysed the content of GRI/IR reporting (see, for example, Chen et al., 2015 in Michelon et al., 2015). Chen et al. (2015) stress that companies tend to report more on quantifiable numbers. Previous research (Demir et. al 2022) indicates that GRI reports focus on labour practices, human rights and society, as well as product performance and responsibility.

In addition to the IR and GRI reporting frameworks companies choose to disclose their GHG emissions as a part of their environmental information. Delmas et al. (2015) investigate the association between GHG and firm performance. The results indicate that GHG has a somewhat different impact on firm performance: a decrease in GHG seems to result in an increase in *Tobin's* q and a decrease in ROA. Bonetti et al. (2018) analyse unique hand-collected data on Japanese companies on the relation between environmental disclosure (GHG reduction) and the cost of capital by exploiting the Fukushima nuclear disaster. They report that companies with high disclosure precision in their environmental reports experience a lower increase in the cost of capital than companies with low disclosure precision. The results are explained by increased investor uncertainty about the energy supply shortage following the disaster, rather than by future regulatory costs.

Lastly, an alternative to the IR and GRI frameworks and GHG reporting is to report quantifiable and non-quantifiable information related to the environmental, social and governance (ESG) aspects of the company. As such, providing non-quantifiable information can be particularly relevant if it coherently explains its holistic interactions in the business model of the firm, instead of only providing detached information on selected and unrelated sustainability issues (Bernardi and Stark, 2018). As Lueg and Pesheva (2021) note, non-quantifiable information could be useful for improving operations, building a strategic advantage, and creating a positive image of the company.

From this overview, we extend the argument to conclude that the value relevance of CSR reporting regarding performance is contingent on the firm´s operations and business environment and must be considered when studying the relation between CSR and performance. In addition, CSR reporting can theoretically be motivated by two rather different purposes, which also need to be taken into consideration.

Stakeholder theory suggests that CSR engagement is part of a firm's value-creation process, where engagement in CSR reporting is closely connected to the firm's performance (Freeman et al., 2010; Freeman, 1994). CSR reporting enables companies to create value by focusing on the activities that increase stakeholder interest, resulting in higher performance. In situations where CSR reporting conveys information about the value-creating aspects of the firm, it can be expected that there will be a positive association between CSR reporting and financial performance. In situations where the firm reports about its value-creating activities by, for example, using the IR framework the firm is expected to seek to enhance performance. This suggests that there is a positive association between CSR reporting and firm performance. We therefore suggest the following:

H (1): There is a positive association between CSR reporting practices and accounting performance.

Legitimacy theory suggests that CSR engagement is carried out to justify social disclosure (DiMaggio and Powell, 1983; Deegan, 2002). A key assumption of the theory is that successful operations require managers to ensure that their organisations appear to be operating in conformance with community expectations and are therefore attributed the status of being 'legitimate'. Michelon et al. (2015) provide evidence suggesting that CSR reporting practices are associated with higher reporting quality. This implies that CSR reporting is used by companies to legitimise their operations. In a similar manner, Chauvey et al. (2015) analyse the GRI framework and conclude that it can be used as a way to legitimise CSR, while the actual CSR engagement remains unclear.

In this setting, CSR reporting activities can be viewed as a way for an organisation to achieve 'legitimation', and hence we should expect a positive relation between CSR reporting and firm performance. Enhancing firm reputation and mitigating firm risk may not directly impact the firm's operations, but are reflected in its market value. CSR reporting provides shareholders and external stakeholders with information about future growth opportunities and the risks involved in the firm's operations.

Using legitimation theory, previous research has studied the association between CSR reporting and the market performance of companies. CSR reporting has been found to reduce information asymmetry between the firm and its stakeholders, as well as risks, in addition to improving performance (Albuquerque et al., 2019; Margolis et al., 2009; Jo and Harjoto, 2011; Servaes and Tamayo, 2013; Flammer, 2015). CSR reporting is positively perceived by the market and adds to firm value, even when the accounting performance remains unaltered. We therefore formulate the following:

H (2): There is a positive association between CSR reporting practices and market performance.

3 Methodology

3.1 Data and variable description

We examine CSR reporting practices and their association with financial performance in stock-listed companies in Finland for the period 2013–2018. In this study, we combine archival data on financial statements with hand-collected data from the sustainability disclosures by these companies.

Data were collected from three different sources. First, information about CSR reporting practices and CSR sustainability control systems was hand-collected from the sustainability reports and websites of the companies. Information about the listing status, share prices, industry, and market segment was obtained from the Nasdaq Helsinki stock exchange. Information on board independence and gender composition was hand-collected from annual reports, while financial and ownership information was obtained from Orbis and Capital IQ.

Our study covers a total of 104 listed companies (all companies listed in the Nasdaq stock exchange, excluding the financial sector) between 2013 and 2018, comprising a total of 624 observations and covering 90.4% of the companies listed on the Nasdaq Helsinki stock exchange. The total number of companies is very similar to that in Michelon et al. (2015), who performed their study with a sample of 112 companies from the London Stock Exchange between 2005 and 2007. We have tried to improve our data collection regarding two aspects. Firstly, instead of capturing a representative sample (that might only include the largest and most visible companies), we collect information about all companies on the Nasdaq Helsinki stock exchange, therefore providing a comprehensive sample. In so doing, we avoid the risk of selection bias in our results, as larger firms tend to disclose CSR activities more frequently (Brammer and Pavelin, 2008; Reverte, 2009; Chih et al., 2010; Hou and Reber, 2011; Bouten et al., 2011). Secondly, we monitor the companies over a longer period of time: we collect six years of data, from 2013 to 2018, while Michelon et al. (2015) only followed companies for three years. With a longer time span, we can observe changes in CSR reporting practices within companies and utilize both the time dimension and the cross-sectional dimension of our panel.

We hand-collect detailed information about the CSR reporting practices of each firm in our database. We have created four dummy variables to characterize each firm's CSR reporting practices and constitute our set of key explanatory variables. These variables are: *CSR_Integration* (=1 if the firm discloses CSR information in either its annual report or in a separate CSR report), *CSR_Value* (=1 if the firm discloses sustainability information about how sustainability affects the value-creation model); *GRI* (=1 if the firm applies GRI as its sustainability reporting framework); *GHG* (=1 if the firm discloses its GHG emissions)[1]; and *CSR_Targets* (=1 if the firm includes both qualitative and quantitative CSR-targets in its CSR report).

In addition, we gather information about organisational features that provide insight into the firm's involvement in CSR activities and are likely to drive sustainability reporting. These additional variables – what we call *CSR sustainability control systems*- are *CSR_Assurance* (=1 if the CSR report is externally assured by a third party); *CSR_Manager* (=1 if the firm has appointed a CSR manager); *CSR_Involvement* (=1 if the CEO or the board of directors are involved in the CSR report); and *CSR_Com* (=1 if the firm has a CSR committee). We link this hand-collected information with hand-collected board information, stock market data collected from Nasdaq Helsinki and archival data from Orbis and Capital IQ.

In Table 1, we present a detailed definition of all the variables in our analysis.

1 In our robustness test we include two additional variables: GHG1,2 (=1 if the company discloses scope2 editions), and GHG 1,2,3, (=1 if the company discloses all indirect emissions)

Table 1. Variable Definition
In this table, we present the definition of the variables included in the analysis. The information about CSR reporting practices and CSR sustainability control systems has been hand-collected. Financial information and information on firm ownership was obtained from Orbis and Capital IQ databases. The Helsinki stock exchange (Nasdaq Helsinki) provided information about firm listing status, year-end share price, industry, and market segment.

CSR REPORTING PRACTICES	
CSR Integration	=1 if the firm discloses CSR information in either its annual reports or in a separate CSR report
CSR Value	=1 if the firm's CSR statement explicitly states that the firm includes sustainability in its value-creation model
CSR GRI	=1 if the firm discloses in line with the GRI guidelines
CSR GHG	=1 if the firm discloses its GHG emissions
GHG 1-2	=1 if the firm discloses direct and /or indirect according to the classification issued by the GHG Protocol Corporate Standard. Scope 1 emissions are direct emissions from owned or controlled sources. Scope 2 emissions are indirect emissions from the generation of purchased energy.
GHG 1-3	=1 if the firm discloses all indirect emissions (also those not included in scope 2) that occur in the value chain of the reporting firm, including both upstream and downstream emissions (scope 3)
CSR Targets	=1 if the firm reports on both qualitative and quantitative (environmental/social/governance) targets
CSR SUSTAINABILITY CONTROL SYSTEMS	
CSR Assurance	=1 if the CSR report is assured by a third party
CSR Manager	=1 if the firm has a CSR manager
CSR Involvement	=1 if the CEO or the board are involved in the CSR report
CSR Com	=1 if the board has a CSR committee
FIRM PERFORMANCE	
ROA	Net income/total assets
EPS	Net income/common shares outstanding
TQ	Market capitalisation/total assets (Tobin's Q calculated by Orbis)
Stock Return	=(Pt-Pt-1+Divt)/Pt-1, where P_t is the share price adjusted for share splits and reverse stock splits at the end of the year; P_{t-1} is the share price at the beginning of the year; and Div_t is the dividend per share in year t.
FIRM-LEVEL CONTROLS	
Firm_size	Total Assets (in thousands)
Leverage	Total debt/total assets
Board Independence	Percentage of independent directors on the board
Board female	Percentage of female directors on the board
Ownership Concentration	Hirschman–Herfindahl index of ownership concentration
Industry	Industry classification (Nasdaq Helsinki classification)

In addition to CSR variables, we include two sets of variables to characterize firm performance. First, we proxy for accounting performance with two widely used metrics: *ROA*, which is defined as net income divided by total assets, and *EPS* which is the net income divided by the number of common shares outstanding. Second, we use *Tobin's q* (market capitalization divided by total assets) and stock return to characterize market performance.

Finally, we include the following firm-specific information: *firm_size,* characterized by total assets in thousands; *leverage,* defined as total debt divided by total assets, *board_independence*, which reflects the number of independent directors on the board and *board_female*, which is the percentage of female directors on the board. We also include a Hirschman–Herfindahl index of ownership concentration (*Ownership*) and Nasdaq Helsinki industry classification (*Industry*).

3.2 Descriptive statistics

We present a numerical description of the CSR practices in Table 2.

Table 2. Evolution of CSR Reporting Practices and CSR sustainability control systems
In this table, we present the annual average of the variables describing CSR reporting practices and CSR sustainability control systems. In the first column, we present the percentage change between 2013 and 2018. In the subsequent columns, we present the annual averages from 2013 to 2018. In the last column of the table, we present the average of all the observations in our sample

CSR REPORTING PRACTICES								
Year	Change	2013	2014	2015	2016	2017	2018	Total
CSR Integration	32.8%	0.673	0.673	0.692	0.75	0.856	0.894	0.756
CSR Value	90%	0.336	0.365	0.519	0.558	0.644	0.635	0.510
CSR GRI	25.6%	0.375	0.404	0.413	0.423	0.471	0.471	0.426
CSR GHG	47.4%	0.365	0.404	0.433	0.462	0.538	0.538	0.457
GHS 1-2	27.2%	0.173	0.144	0.144	0.144	0.20	0.22	0.17
GHS 1-3	66.6%	0.192	0.025	0.288	0.30	0.33	0.32	0.28
CSR Targets	90%	0.298	0.308	0.375	0.442	0.462	0.567	0.408
CSR SUSTAINABILITY CONTROL SYSTEMS								
CSR Assurance	55%	0.192	0.202	0.231	0.25	0.279	0.298	0.241
CSR Manager	40%	0.423	0.452	0.462	0.481	0.519	0.596	0.489
CSR Involvement	37%	0.625	0.673	0.721	0.779	0.846	0.856	0.75
CSR Com	100%	0.029	0.038	0.038	0.038	0.058	0.058	0.043

In general, CSR reporting is widespread in Finland. The number of companies that reported CSR activities in Finland (*CSR_Integration*) in 2018 is almost 90% of the sample companies. This figure is larger than the numbers reported for the United States by Lukomnik (2018), who found that 78% of S&P 500 companies issued a sustainability report in 2018, and by KPMG (2017), that reported that 78% of the world's top companies (G250) and 60% of US N100 companies issued a sustainability report.

Table 2 shows that in the year 2018, 64 % of sample companies reported information on their value creation model *(CSR_Value*), i.e., how their sustainability strategy creates economic value through their business to different stakeholders. The GRI reporting framework is applied by 47 % of the companies. In total, 54 % of companies disclose their GHG emissions. 56 % of companies disclose qualitative and quantitative CSR targets in their CSR reports.

From Table 2, we can also observe how CSR reporting practices have evolved over the years of our study. Two trends can be observed: an increase in CSR reporting throughout the period, and more homogeneous CSR activities across companies towards the end of the period.

The number of companies that report CSR activities within their annual reports or in a stand-alone CSR report (*CSR_Integration*) has increased from 67% in 2013 to almost 90% in 2018. This means that almost all companies – not just the largest ones – listed in the Nasdaq Helsinki stock exchange report CSR activities in a standard and consistent manner. The increase in CSR reporting is reflected in all the variables describing CSR reporting practices. For example, we observe a 90% increase in the number of companies that report value creation as part of their sustainability strategy (*CSR_Value*) and a 90% increase in the number of companies that report qualitative and quantitative CSR-targets (*CSR_Targets*).

All in all, we observe that CSR reporting has become more homogeneous. For example, in 2013, 67% of the companies disclosed CSR activities (*CSR_Integration*), but only 29.8% of them reported quantitative environmental, social, and governance targets (*CSR_Targets*), while the proportion of companies that reported value creation as part of their sustainability strategy (*CSR_Value*) had increased from 33.6% to 63.5% and the proportion of companies that reported qualitative and quantitative CSR-targets (*CSR_Targets*) had increased from 29.8% to 56.7% by 2018.

To further investigate GHG reporting practices, we divide the GHG-reporting companies in accordance with GHG-reporting scopes 1 and 2 (GHG 1–2) and scopes 1, 2 and 3 (GHG 1–3). Overall, the number of companies disclosing GHG 1–2 has increased by 27.2% from 2013 to 2018. We note that the increase is even larger for companies disclosing GHG 1–3: 66.5% from 2013 to 2108. The increase in GHG reporting follows the same pattern as the other CSR reporting practices.

With regard to CSR sustainability control systems (organizational features that provide insight into the firm's involvement in CSR activities), we also observe an increase over the years of the sample. In 2018, 29 % of our sample companies had assured their CSR report by a third party *(CSR_Assurance)* which has more than doubled over the years of the sample. 60 % of the companies have a *CSR_Manager*. In 85 % of the companies, management's view (*CSR_Involvement)* is included in the CSR report (i.e. the CEO or the board are involved in the CSR report), and only in 6% of the companies, the board has a CSR committee *(CSR_Com)*.

We note from the correlation matrix in Table 3 that the different aspects of CSR reporting are complementary and that companies tend to use 'bundles' of reporting practices. For example, we can see in Table 3 that reporting on greenhouse gas emissions (*CSR_GHG*) is highly correlated with the other reporting features, particularly *CSR_GRI* (0.69) and *CSR_Targets* (0.70). In addition, a report on CSR activities as part of value creation (*CSR_Value*) is positively related to the rest of the CSR reporting practices.

Table 3. Bivariate Correlations
In this table, we present the correlation matrix of the CSR reporting practices and CSR sustainability control systems. The asterisks refer to 0.10, 0.05 and 0.01 (*, **, ***) significance

	CSR INTEGR.	CSR VALUE	CSR GRI	CSR GHG	CSR TARGETS	CSR ASSUR.	CSR MANAG.	CSR INVOLV.	CSR COM
CSR Disclosure									
CSR Integration	1.00								
CSR Value	0.56***	1.00							
CSR GRI	0.49***	0.55***	1.00						
CSR GHG	0.52***	**0.62*** **	**0.69*** **	1.00					
CSR Targets	0.47***	0.60***	**0.64*** **	**0.70*** **	1.00				
CSR Sustainability Control Systems									
CSR Assurance	0.32***	0.32***	0.60***	0.56***	0.54***	1.00			
CSR Manager	0.50***	**0.59*** **	**0.66*** **	**0.63*** **	**0.55*** **	0.46***	1.00		
CSR Involvement	**0.59*** **	0.50***	0.36***	0.45***	0.44***	0.25***	0.39***	1.00	
CSR Com	0.10**	0.17***	0.18***	0.15***	0.13***	0.23***	0.15***	0.12***	1.00

We also observe a positive association between CSR reporting practices and the presence of CSR sustainability control systems, particularly the presence of a *CSR_Manager*. We observe a clear association between the presence of a *CSR_Manager* in the firm and the use of CSR reporting: the correlations between the variable '*CSR_Manager'* and the different CSR reporting variables range from 0.50 (the correlation between *CSR_Manager* and *CSR_Integration*) to 0.66 (the correlation between *CSR_Manager* and *CSR_GRI*).

Finally, Table 4 presents descriptive statistics of all the variables in the analysis over the observation period.

Table 4. Descriptive Statistics
In this table, we present a description of the variables used in the analysis. The first column shows the number of observations, the second column shows the average, and the third column shows the standard deviation. The minimum and maximum values are presented in the fourth and fifth columns.

VARIABLE	OBS	MEAN	STD. DEV.	MIN	MAX
CSR Disclosure					
CSR Integration	624	0.756	0.430	0	1
CSR Value	624	0.510	0.500	0	1
CSR GRI	624	0.426	0.495	0	1
CSR GHG	624	0.457	0.499	0	1
CSR Targets	624	0.409	0.492	0	1
CSR Sustainability Controls					
CSR Assurance	624	0.242	0.429	0	1
CSR Manager	624	0.489	0.500	0	1
CSR Involvement	624	0.75	0.433	0	1
CSR Com	624	0.043	0.204	0	1
Firm Performance					
Accounting Performance					
ROA	619	0.021	0.164	-1.55	2.44
Earnings per Share	599	0.486	1.287	-12.49	9.4
Market Performance					
TQ	585	1.07	1.36	.044	15.09
Stock Return	516	0.384	0.698	-.999	3.44
Firm-level Controls					
Firm Size	619	7130.308	36790.26	5.336	293558
Leverage	618	0.25	0.191	0	1.94
Ownership Concentration	598	.105	0.11	7.02e-06	0.686

Even before CSR became mandatory, CSR reporting activities were widespread in Finland. At this point in time (2013-2018), the most common channel to disclose the CSR activities is via annual reports or a separate CSR report: more than 75% choose these two channels to disclose their activities (*CSR_Integration*). Up to 51% of the companies report narrative CSR information stating that CSR is part of their value creation (*CSR_Value*). Less than half of the companies in our sample produce standardized reports, like GRI reporting and GHG reporting, while 40% of them report qualitative and quantitative CSR-targets with respect to their CSR activities (*CSR_Targets*).

Despite the widespread use of CSR reporting in Finland, assurance of these reports is not a widespread practice. Only 24% of the companies in our sample have their CSR reports assured by a third party (*CSR_Assurance*). Board and CEO are involved in setting that strategy in 70% of the cases (*CSR_Involvement*), while fewer companies have a CSR manager (only 49%) or a CSR committee (less than 5% of the companies).

4 Empirical results

4.1 CSR Reporting and Accounting Performance

To test whether CSR-reporting matters for firm performance, we run a multivariate analysis using the following model.

$$Performance_{it+1} = a + \beta_1 CSR\ Integration_{it} + \beta_2 CSR\ Value_{it} + \beta_3 CSR\ GRI_{it} + \beta_4 CSR\ GHG_{it} + \beta_5 CSR\ Targets_{it} + \beta_6 CSR\ Assrurance_{it} + \beta_7 CSR\ Manager_{it} + \beta_8 CSR\ Involvement_{it} + \beta_9 CSR\ Com_{it} + \beta_{10} log\ at_{it} + \beta_{11} Leverage_{it} + \beta_{12} Board\ Independence_{it} + \beta_{13} Board\ female_{it} + \beta_{14} Ownership\ concentration_{it} + \beta_{15-19} Industry_{it} + \beta_{20-24} Year_{it} + \varepsilon_{it}$$

where $Performance_{it+1}$ is one of the two measures described in the previous section (ROA, earnings per share) and summarised in Table 4.

As explanatory variables, we include the variables that map the CSR reporting practices (*CSR_Integration; CSR_Value; CSR_GRI; CSR_GHG; CSR_Targets*), along with CSR sustainability control systems (*CSR_Assurance, CSR_Manager, CSR_Involvement, CSR_Com*) and firm-level controls. As firm-level controls, we include the natural logarithm of total assets to measure firm size (*firm_size*), the ratio of total debt to total assets (*leverage*), and three variables that characterize the corporate governance model: the percentage of independent board members *(boad_independence),* percentage of female directors (*board_female*) and a Hirschman–Herfindahl index of ownership concentration (*Ownership*). We do this to include the extensive findings that firm characteristics – such as size, industry sector and corporate governance – predominantly appear to drive the CSR reporting agenda (Aguilera et al., 2021; Ali et al., 2017; Miras-Rodriguez and Di Pietra, 2018; Christensen et al., 2021). Each OLS regression is run with robust standard errors clustered at the firm level and using industry and year fixed effects.

The results for this model are presented in Table 5.

Table 5. Multivariate Analysis. CSR Reporting Practices and CSR sustainability control systems and Accounting Performance
In this table, we present OLS regressions with year and industry fixed effects. The dependent variable is return on assets, ROA_{t+1} , in columns 1 to 4, and earnings per share EPS_{t+1} in columns 5–8. As explanatory variables, we include the variables defining CSR reporting practices (CSR Integration, CSR Value, CSR GRI, CSR GHG and CSR Targets) in all columns. We add sequentially CSR sustainability control systems in columns 2, 4, 6 and 8. Al regressions contain controls for firm size, firm leverage, ownership concentration, and industry and year FE. Significant values are presented in bold. The asterisks refer to 0.10, 0.05 and 0.01 (*, **, ***) significance.

	(1) ROA_{T+1}	(2) ROA_{T+1}	(3) ROA_{T+1}	(4) ROA_{T+1}	(5) EPS_{T+1}	(6) EPS_{T+1}	(7) EPS_{T+1}	(8) EPS_{T+1}
CSR Integration	**0.0384*** **(0.059)**	**0.0423*** **(0.069)**			-0.0180 (0.903)	-0.0166 (0.920)		
CSR Value			0.0175 (0.344)	0.0187 (0.343)			0.0372 (0.782)	0.112 (0.423)
CSR GRI			-0.00621 (0.768)	-0.0148 (0.508)			0.234 (0.128)	0.0200 (0.900)
CSR GHG			-0.0229 (0.315)	-0.0283 (0.224)			0.0845 (0.611)	-0.0465 (0.779)
CSR Targets			**0.0428**** **(0.038)**	**0.0400*** **(0.056)**			-0.0146 (0.923)	-0.0866 (0.562)
CSR Assurance		0.0203 (0.335)		0.0215 (0.347)		**0.594***** **(0.000)**		**0.637***** **(0.000)**
CSR Manager		0.0151 (0.414)		0.0183 (0.359)		**0.367***** **(0.005)**		**0.350**** **(0.014)**
CSR Involvement		-0.0108 (0.625)		0.000497 (0.980)		-0.0522 (0.741)		-0.0651 (0.653)
CSR Com.		-0.0228 (0.504)		-0.0244 (0.479)		**-0.484*** **(0.052)**		**-0.513**** **(0.042)**
Firm Size	-0.00141 (0.770)	-0.00462 (0.423)	-0.00173 (0.755)	-0.00403 (0.500)	**0.123***** **(0.000)**	0.0264 (0.521)	**0.0789*** **(0.051)**	0.0233 (0.586)
Leverage	-0.0125 (0.730)	-0.00843 (0.818)	-0.0162 (0.656)	-0.0126 (0.732)	-0.341 (0.199)	-0.242 (0.353)	-0.339 (0.200)	-0.247 (0.344)
Board independence	**0.00975**** **(0.030)**	**0.00893**** **(0.050)**	**0.0109**** **(0.016)**	**0.0107**** **(0.019)**	0.0500 (0.127)	0.0326 (0.315)	0.0402 (0.222)	0.0322 (0.321)
Board female	-0.00224 (0.800)	-0.00407 (0.650)	-0.00319 (0.721)	-0.00465 (0.605)	-0.0223 (0.730)	-0.0745 (0.245)	-0.0354 (0.587)	-0.0695 (0.281)
Ownership	**-0.287***** **(0.000)**	**-0.294***** **(0.000)**	**-0.292***** **(0.000)**	**-0.290***** **(0.000)**	-0.300 (0.509)	-0.351 (0.447)	-0.291 (0.523)	-0.321 (0.488)
Constant	-0.0540 (0.181)	-0.0306 (0.483)	-0.0412 (0.337)	-0.0288 (0.524)	**-0.651**** **(0.028)**	-0.110 (0.725)	-0.452 (0.149)	-0.0971 (0.764)
N	562	562	562	562	558	558	558	558
r2	0.0994	0.103	0.104	0.107	0.103	0.147	0.110	0.149
r2_a	0.0747	0.0718	0.0742	0.0710	0.0786	0.117	0.0807	0.114

From Table 5 columns 1, we observe that CSR reporting practice in the form of *CSR_Integration* is positively associated with future accounting-based performance. This result holds when we include controls for CSR sustainability control systems, as shown in Table 5, column 2. We also find evidence suggesting that reporting both qualitative and quantitative CSR-targets (*CSR_Targets*) is positively associated with future accounting-based performance, measured by ROA

(See Table 5, columns 3 and 4). Companies disclosing qualitative and quantitative CSR targets enjoy, on average, 0.0428 higher ROA in the subsequent year than companies not disclosing that information. This relation is robust to the inclusion of CSR sustainability control systems, as observed in Table 5, column 4. By contrast, CSR reporting, using standardized reporting practices, such as reporting of greenhouse gas emissions (*CSR_GHG*) or reporting according to GRI standards (*CSR_GRI*) is not significantly related to future accounting performance. When we measure accounting performance using different metrics, we find that CSR reporting practices are not related to EPS (See table 5, columns 5–8), while it is the CSR sustainability control systems, such as assurance and manager that are associated with future accounting performance (measured by EPS).

The results suggest that CSR-integration and disclosing both qualitative and quantitative-CSR-targets – whereby the purpose is to enable managers to make decisions - are associated with future accounting performance. Our results provide support for the theoretical view (Freeman, 1994; Freeman et al., 2010; Donaldson and Preston, 1995) of the benefits of CSR engagement resulting in an inside-out effect of the reporting (Schaltegger 2012, Beck et al., 2017)- whereby the purpose of the reporting is to convey important information to the management, or the firm itself.

The other CSR reporting practices (*CSR_Value, CSR_GRI, CSR_GHG*) are not statistically associated with future ROA. This lack of relationship is in line with the window-dressing hypothesis or the symbolic legitimacy explanation: if CSR reporting is only performed for window-dressing, it should not have an impact on accounting performance. In sum, we find significant associations between two of the five CSR reporting practices and future accounting-based performance. Hence, hypothesis one (H1) is partially supported.

4.2 CSR Reporting and Market Performance

To test our second hypothesis predicting a positive association between CSR reporting practices and market performance, we perform the multivariate analysis described in the previous section using the following empirical model:

$$
\begin{aligned}
Performance_{it+1} &= \alpha + \beta_1 CSR\ Integration_{it} + \beta_2 CSR\ VALUE_{it} + \beta_3 CSR\ GRI_{it} + \beta_4 CSR\ GHG_{it} \\
&+ \beta_5 CSR\ Targetes_{it} + \beta_6 CSR\ Assrurance_{it} + \beta_7 CSR\ Manager_{it} \\
&+ \beta_8 CSR\ Involvolvement_{it} + \beta_9 CSR\ Com_{it} + \beta_{10} log\ at_{it} \\
&+ \beta_{11} Leverage_{it} + \beta_{12} Board\ Indepe_{it} + \beta_{13} Board\ female_{it} \\
&+ \beta_{14} Ownership_{it} + \beta_{15-19} Industry_{it} + \beta_{20-24} Year_{it} + \varepsilon_{it}
\end{aligned}
$$

where performance is measured using two alternative variables: *Tobin's q*, measured as the ratio of market capitalisation to the book value of the firm, and the annual stock return measured as the percentage change of the year-end adjusted share price (see variable definitions in Table 1).

Table 6. Multivariate Analysis. CSR Reporting Practices and CSR sustainability control systems Market Performance
In this table, we present OLS regressions with year and industry fixed effects. The dependent variable is TQ_{t+1} in columns 1–4, and Stock $Returns_{t+1}$ in columns 5–8. As explanatory variables, we include the variables defining CSR reporting practices (CSR Integration, CSR Value, CSR GRI, CSR GHG, and CSR Targets) in all columns. We add sequentially CSR sustainability control systems in columns 2, 4, 6 and 8. All regressions contain controls for firm size, firm leverage, ownership concentration, and industry and year FE. Significant values are presented in bold. The asterisks refer to 0.10, 0.05 and 0.01 (*, **, ***) significance.

	(1) TQ_{T+1}	(2) TQ_{T+1}	(3) TQ_{T+1}	(4) TQ_{T+1}	(5) STOCK RETURNS$_{T+1}$	(6) STOCK RETURNS$_{T+1}$	(7) STOCK RETURNS$_{T+1}$	(8) STOCK RETURNS$_{T+1}$
CSR Integration	**-0.464*** **	**-0.377** **			-1.599	-3.119		
	(0.007)	**(0.048)**			(0.779)	(0.631)		
CSR Value			-0.173	-0.102			3.555	1.981
			(0.261)	(0.533)			(0.490)	(0.717)
CSR GRI			**0.325***	**0.149**			2.867	0.213
			(0.065)	**(0.421)**			(0.625)	(0.973)
CSR GHG			**0.404** **	**0.347***			4.027	3.200
			(0.040)	**(0.080)**			(0.525)	(0.620)
CSR Targets			0.0203	0.0151			-4.537	-3.960
			(0.907)	(0.931)			(0.429)	(0.498)
CSR Assurance		**0.468*** **		**0.353***		0.184		0.706
		(0.007)		**(0.062)**		(0.975)		(0.913)
CSR Manager		**0.435*** **		**0.291***		10.01*		9.041
		(0.005)		**(0.090)**		(0.053)		(0.103)
CSR Involvement		-0.260		**-0.437*** **		0.443		-1.080
		(0.150)		**(0.009)**		(0.943)		(0.849)
CSR Com		-0.219		-0.161		5.175		4.724
		(0.447)		(0.579)		(0.644)		(0.676)
Firm Size	**-0.108*** **	**-0.201*** **	**-0.218*** **	**-0.237*** **	**-2.870** **	**-4.179*** **	**-3.748** **	**-4.425*** **
	(0.009)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.033)**	**(0.010)**	**(0.016)**	**(0.009)**
Leverage	**-1.989*** **	**-1.882*** **	**-1.943*** **	**-1.870*** **	-9.703	-8.179	-9.729	-8.084
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	(0.340)	(0.424)	(0.339)	(0.430)
Board independence	**0.0888** **	**0.0666***	0.0467	0.0368	1.904	1.790	1.601	1.538
	(0.019)	**(0.078)**	(0.218)	(0.329)	(0.131)	(0.160)	(0.206)	(0.226)

Board female	-0.111	**-0.150****	**-0.134***	**-0.151****	**4.114***	3.683	**4.144***	3.869
	(0.130)	**(0.040)**	**(0.068)**	**(0.040)**	**(0.097)**	(0.143)	**(0.099)**	(0.126)
Ownership	-0.493	-0.712	-0.552	-0.856	3.356	2.521	4.851	2.644
	(0.338)	(0.176)	(0.285)	(0.104)	(0.847)	(0.890)	(0.782)	(0.885)
Constant	**1.980*****	**2.614*****	**2.352*****	**2.780*****	6.745	11.67	10.29	12.99
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	(0.552)	(0.340)	(0.393)	(0.305)
N	538	538	538	538	556	556	556	556
r2	0.262	0.289	0.272	0.291	0.146	0.153	0.149	0.153
r2_a	0.241	0.262	0.247	0.261	0.123	0.123	0.120	0.118

Our results in Table 6 columns 1 to 4 indicate a negative association between *CSR_Integration* and future market-based performance, and a positive association between companies disclosing green house gas emissions (*CSR_GHG*) and market performance measured by *Tobin's q*, while in columns 5–8 we show that CSR reporting practises are not related to future market-based performance measured by changes in stock prices (stock returns). Results also indicate that the CSR sustainability control systems (particularly the presence of *CSR Assurance* and *CSR Manager*) are positively related to *Tobin's q*.

We conclude the disclosure of GHG-emissions, convey value-relevant information to the financial market. The results are explained by the nature of GHG-information, which is easily quantifiable. Unlike the other CSR reporting practices, which are subject to managers' discretion and not necessarily comparable between companies – GHG-reporting is numerical and comparable between companies, enabling investors to assess the companies' climate-related risks. (Bonetti et al., 2018; Liesen et al., 2017)

4.3 Additional tests

To test in more detail the association between the GHG scopes and performance, we run the following regression:

$$
\begin{aligned}
Performance_{it} &= \alpha + \beta_1 GHG1.2 + \beta_2 GHG1.2.3_{it} + \beta_3 CSR\ VALUE_{it} + \beta_4 CSR\ GRI_{it} \\
&+ \beta_5 CSR\ Targets_{it} + \beta_6 CSR\ Assurance_{it} + \beta_7 CSR\ Manager_{it} \\
&+ \beta_9 CSR\ Involvement_{it} + \beta_{10} GCSR\ Com_{it} + \beta_{11} log\ at_{it} \\
&+ \beta_{12} Leverage_{it} + \beta_{13} Board\ Indepe_{it} + \beta_{14} Board\ female_{it} \\
&+ \beta_{15} Ownership_{it} + \beta_{16-20} Industry_{it} + \beta_{21-25} Year_{it} + \varepsilon_{it}
\end{aligned}
$$

Results from this model specification are reported in Table 7.

Table 7. Scope of GHG Reporting and Accounting and Market Performance
In this table, we present OLS regressions with year and industry fixed effects. The dependent variable is ROA_{t+1} (columns 1–2), TQ_{t+1} in columns 3 and 4, and EPS_{t+1} columns 5–6 and Stock Returns $_{t+1}$ in columns 7 and 8. As explanatory variables, we include the variables defining CSR reporting practices ((GHG 1–2, GHG 1–3, CSR Value, CSR GRI, and CSR Targets) in all columns. We add sequentially CSR sustainability control systems in columns 2, 4, 6 and 8. All regressions contain controls for firm size, firm leverage, ownership concentration, and industry and year FE. Significant values are presented in bold. The asterisks refer to 0.10, 0.05 and 0.01 (*, **, ***) sign.

	(1) ROA_{T+1}	(2) ROA_{T+1}	(3) TQ_{T+1}	(4) TQ_{T+1}	(5) EPS_{T+1}	(6) EPS_{T+1}	(7) STOCK RETURNS $_{T+1}$	(8) STOCK RETURNS $_{T+1}$
GHG 1–2	-0.0153	-0.0202	0.378**	0.325**	0.0733	-0.0290	3.817	3.073
	(0.508)	(0.382)	(0.035)	(0.038)	(0.721)	(0.882)	(0.464)	(0.548)
GHG 1–3	-0.0327	-0.0434	0.266	0.0891	0.235	0.0100	3.033	1.307
	(0.225)	(0.114)	(0.129)	(0.576)	(0.295)	(0.970)	(0.661)	(0.858)
CSR Value	0.0172	0.0193	-0.175	-0.0982	0.0351	0.109	3.558	2.053
	(0.185)	(0.173)	(0.339)	(0.476)	(0.803)	(0.459)	(0.389)	(0.665)
CSR GRI	-0.00364	-0.0128	0.360**	0.194	0.196	0.0109	3.090	0.494
	(0.845)	(0.524)	(0.044)	(0.210)	(0.253)	(0.957)	(0.510)	(0.914)
CSR Targets	0.0452	0.0433	0.0594	0.0808	-0.0537	-0.1000	-4.289	-3.539
	(0.134)	(0.161)	(0.634)	(0.577)	(0.611)	(0.379)	(0.354)	(0.466)
CSR Assurance		0.0276		0.420**		0.622**		1.248
		(0.162)		(0.018)		(0.034)		(0.817)
CSR Manager		0.0192		0.307**		0.346*		9.141**
		(0.158)		(0.023)		(0.094)		(0.029)
CSR Involvement		-0.000997		-0.439		-0.0650		-1.086
		(0.966)		(0.344)		(0.704)		(0.873)
CSR Com		-0.0195		-0.114		-0.520		5.025
		(0.540)		(0.671)		(0.136)		(0.324)
Firm Size	-0.00134	-0.00394	-0.211**	-0.233**	0.0726	0.0223	-3.696***	-4.387***
	(0.823)	(0.579)	(0.040)	(0.011)	(0.255)	(0.744)	(0.003)	(0.001)
Leverage	-0.0171	-0.0129	-1.946**	-1.868**	-0.330	-0.247	-9.769	-8.118
	(0.923)	(0.943)	(0.013)	(0.014)	(0.257)	(0.377)	(0.483)	(0.574)
Board Independence	0.0109*	0.0106*	0.0506	0.0414	0.0383	0.0312	1.625	1.563
	(0.088)	(0.098)	(0.382)	(0.460)	(0.506)	(0.565)	(0.176)	(0.198)
Board female	-0.00282	-0.00423	-0.134	-0.149	-0.0388	-0.0698	4.141*	3.877*
	(0.742)	(0.604)	(0.285)	(0.214)	(0.738)	(0.535)	(0.078)	(0.096)
Ownership	-0.285*	-0.284*	-0.513	-0.789	-0.350	-0.331	5.119	3.122
	(0.053)	(0.072)	(0.700)	(0.617)	(0.543)	(0.559)	(0.741)	(0.855)
	(0.507)	(0.575)	(0.145)	(0.280)	(0.899)	(0.923)	(0.126)	(0.174)
Constant	-0.0481	-0.0353	2.275**	2.665**	-0.371	-0.0772	9.749	12.20
	(0.377)	(0.529)	(0.011)	(0.011)	(0.324)	(0.849)	(0.283)	(0.255)
N	562	562	538	538	558	558	556	556
r2	0.105	0.109	0.271	0.291	0.113	0.149	0.149	0.153
r2_a	0.0733	0.0707	0.244	0.260	0.0813	0.112	0.119	0.117

The results in Table 7 show no significant association between either of the two formats of GHG reporting (*GHG 1–2* and *GHG 1–3*) and ROA (see Table 7, columns 1 and 2). However, when *Tobin's q* is the performance metrics (TQ_{t+1}), this relation turns out to be positive and significant: the results in Table 7 show a positive and significant association between *GHG 1–2* and *Tobin's q* (β-value 0.378). The results suggest that of all the studied reporting formats, CSR reporting in the form of GHG reporting scope 1–2 (direct CO_2 emissions) shows the strongest association with market performance.

We found evidence of a positive relation between *GHG* and *Tobin's q* (Table 6, columns 1 and 2) in the previous section. When we look closely at what drives this relation, we observe that the reporting of scope 1 and 2 emissions is important in this relation: the coefficient of the variable *GHG 1-2* is significant and higher in magnitude than any of the previously reported coefficient (0.378 versus 0.325 in the previous section). This strong significance is in line with the explanation that markets react positively to the reporting of direct emissions, as they find it a credible figure: more concrete and easier to measure and assess than the general scope 1,2, and 3, which extends beyond the firm´s control systems.

In short, our robustness tests suggest that the reporting of GHG is not related to accounting performance, but it does have a relation to the financial markets. It seems that the market price captures long-term expectations (in terms of future improvements in performance) that are absent from the accounting performance measures such as ROA.

5 Discussion and conclusions

Motivated by the contradictory evidence regarding the association between CSR reporting and firm performance, this paper seeks to explore whether the association between CSR reporting and firm performance is dependent on the type of CSR reporting practice.

In terms of CSR-reporting, the results suggest that CSR-disclosure practices, although difficult to compare between companies and difficult to verify, may provide different insights to managers than to investors and stakeholders alike. Disclosing CSR-reports, and especially qualitative and quantitative CSR-targets – whereby the purpose is to enable managers to make decisions – is associated with future accounting performance. Our results provide support for the theoretical view (Freeman, 1994; Freeman et al., 2010; Donaldson and Preston, 1995) of the benefits of CSR engagement resulting in an inside-out effect of the reporting (Schaltegger 2012, Beck et al., 2017)- whereby the purpose of the reporting is to convey important information to the management, or the firm itself. On the other hand, the disclosure of CSR and CSR reporting practices focusing on qualitative aspects (the disclosure of the value creation model, and the use of the GRI reporting framework) – whereby the purpose of the CSR reporting is to gain legitimacy, rather than effectiveness regarding performance – are negatively, or not associated with market-based performance. Also, the disclosure of GHG-emissions shows a relation with metrics that convey value-relevant information to the financial market. This particular result is explained by the nature of GHG: numeric and comparable, directly translating into costs – and potential savings – for the firm. GHG emissions information disclosed by companies has become increasingly important for investors because GHG emission indicators can reflect significant climate risks (Bonetti et al., 2018; Liesen et al., 2017) that might affect future firm performance.

The non-significant association between certain reporting practices (the disclosure of the value-creation model, the use of GRI and the disclosure of GHG emissions) and accounting

performance is in line with earlier studies reporting a non-significant association between CSR reporting and short-term accounting performance, such as ROA (Aupperle et al., 1985; Connelly and Limpaphayon, 2004). A possible explanation for the non-significant relation is the fact that reporting in itself is costly and affects accounting performance in a negative way (Gallardo-Vázquez et al., 2019).

As noted, our results indicate a positive association between GHG and market performance. The results are in line with previous research showing a positive association between a decrease in GHG and market performance (Delmas et al., 2016). However, no significant association between GHG and accounting performance was found, which in turn supports the conclusion that GHG is costly and is not, as such, reflected in enhanced accounting performance. Instead, the results provide support for the theoretical view that CSR reporting in the form of GHG is used for legitimation purposes rather than to attain effectiveness. Alternatively, GHG may generate benefits in the long term, while accounting performance (ROA) is often analysed over the short term. However, GHG disclosure seems to convey value-relevant information to the financial market as measured by Tobin's q. The results may be explained by the nature and importance of GHG, as it is numeric and comparable, directly translating into costs – and potential savings/costs in the long run – for the firm. Information about GHG emissions disclosed by companies has become increasingly important for investors, because GHG emission indicators can reflect significant climate risks (Bonetti et al., 2018; Liesen et al., 2017). Investors may thus see GHG emissions as a negative aspect in the long run in their valuation formula, which is usually based on discounted future cash flows. GHG emissions can increase costs and reduce return on investment in the future if regulatory and stakeholder pressure further limits pollution.

Our results have implications for companies as well as investors. Given the recent changes in the CSR-reporting landscape, the results add to the debate on the usefulness of various CSR reporting practices. For example, the EU launched on February 26th, 2025, the Omnibus sustainability rules simplification package, aiming to simplify the sustainability reporting practices of small and medium enterprises. Our study suggests that different sector or company-specific rules might be preferable, in contrast to the "one-size-fits-all" type of mandatory CSR reporting practices currently in place

In conclusion, the association between CSR reporting and performance is, to a certain degree, contingent on the type of CSR reporting practice. Integrating CSR and especially qualitative and quantitative CSR-targets matters to the firm's accounting performance, while GHG is important in terms of the financial market.

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Perceptions of Banks' Fair Value Estimates in Different Investor Protection Environments

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Abstract

This study analyses 151 banks from 26 European countries between 2014 and 2021 and examines whether challenges related to IFRS 13 Fair Value Measurement implementation have been resolved in Europe and whether the value relevance of the fair value (FV) estimates disclosed by firms is associated with the investor protection (IP) environment during an eight-year time period. The study contributes to the scant literature examining the value relevance of the FV hierarchy in Europe by showing that the investor protection environment plays a role in explaining the differences in the value relevance of the FV estimates years after IFRS 13 implementation. The findings of the study imply that investors only found the FV estimates useful and reliable, suggesting that implementation challenges have been resolved in an environment offering strong protection for investors during this special period.

Keywords

Fair value accounting, fair value hierarchy, financial instruments, IFRS 13, investor protection

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Introduction

This study examines whether challenges related to IFRS 13 *Fair Value Measurement* implementation have been resolved in Europe and whether the value relevance of the fair value (FV) estimates disclosed by firms is associated with the IP environment between 2014 and 2021. Although Filip, Hammami, Huang, Jeny, Magnan and Moldovan (2021a) show that 'the value relevance of FV levels has indeed experienced an upward trend since the financial crisis, with value relevance of L3 FV assets actually closing the gap with L1 and L2' (until 2016), we have little evidence as to whether this development has been identical across different IP environments and different time periods in Europe. Previously, Siekkinen (2016, 2) analysed a (global) sample of firms from 34 countries between 2012 and 2014 and reported that 'the value relevance of the fair value estimates is positively associated with the IP environment'. In its Post-implementation Review of IFRS 13 Fair Value Measurement[1] in 2018, the International Accounting Standards Board (IASB) concluded that 'the information required by IFRS 13 is useful to users of financial statements'. However, the IASB also noted that 'some areas of IFRS 13 present implementation challenges, largely in areas requiring judgement' but that 'evidence suggests that practice is developing to resolve these challenges'. Although it was suggested that practice is developing, we still have little knowledge of investors' perceptions of FV estimates in Europe and in different IP environments. Previous studies (e.g. Fiechter and Novotny-Farkas, 2017) provide evidence that a strong information environment plays an important role in helping investors to process FV information.

This paper analyses banks from 26 European countries [including European Union (EU) member states and the UK] between 2014 and 2021 and expands upon the above-mentioned previous work by examining how investors priced Level 1, 2 and 3 financial assets and liabilities during the time period, which was special in Europe in many respects. There were many events and processes that impacted the European stock markets during this time. In 2012, the European Commission presented draft regulations, which assigned specific supervisory tasks to the European Central Bank (ECB) and aligned the role and responsibilities of the European Banking Authority (EBA) with the new framework for banking supervision (see www.bankingsupervision.europa.eu). In late 2013, the Single Supervisory Mechanism entered into force. In response to the financial crises, the ECB implemented non-standard monetary policy to stimulate economic growth, guide inflation back to the target rate and ensure price stability. The ECB's asset purchase programme (APP) was initiated in 2014 (and lasted until 2023). The European debt crisis also took place in the EU from 2009 until the mid to late 2010s. The UK voted to leave the EU in a referendum in June 2016 and Brexit took place in January 2020. The Covid-19 pandemic caused a large shock to European economies in 2020.

Our empirical results show that when the regression is estimated with the whole sample, Level 1 financial assets, Level 2 financial assets and Level 1 and 2 financial liabilities are value relevant. While Siekkinen (2017) found that all FVs reported by European financial firms in 2012 and 2013 are value relevant to investors, we have not found evidence that Level 3 financial assets and Level 3 financial liabilities were value relevant between 2014 and 2021 for the whole sample of European firms. However, when we divide our sample of firms into three clusters: strong, medium and weak IP clusters of countries, we find that all FV assets and liabilities are value relevant for investors in a strong IP environment. Moreover, our empirical results show

1 Retrieved from the IASB site (on 2 Feb. 2024): https://www.ifrs.org/projects/completed-projects/2018/pir-of-ifrs-13-fair-value-measurement/

that none of the FVs in the FV hierarchy are value relevant for investors in a medium IP environment and investors found only Level 1 assets useful in a weak IP environment during the period from 2014 to 2021. The results of the analysis using net FV assets (i.e. FV assets minus FV liabilities) give similar results except in a weak IP environment. We find that in a medium IP environment, the three levels of financial assets and financial liabilities are not value relevant. In a weak IP environment, Level 2 and Level 3 net financial assets are value relevant. Finally, Level 1, Level 2 and Level 3 net financial assets are value relevant for investors in a strong IP environment. Taken together, these results help standard setters to evaluate the usefulness of the information required by IFRS 13 in different IP environments in Europe between 2014 and 2021.

Furthermore, we examine how investors price the different FV estimates in a strong IP environment and find that investors did not place less weight on Level 3 estimates than Level 1 and Level 2 FV assets and liabilities between 2014 and 2021. The study contributes to the literature by showing that in a strong IP environment, investors value Level 3 assets higher than Level 2 assets and Level 3 liabilities higher than Level 1 and 2 liabilities. The coefficient on Level 3 FV assets (1.001) is significantly higher than the coefficient on Level 2 assets (0.499) but not significantly higher than the coefficient on Level 1 assets (0.606). Furthermore, the coefficient on Level 3 FV assets is not different from its theoretically predicted value of 1. The results also show that the coefficient on Level 3 FV liabilities (-0.966) is significantly lower than the coefficient on Level 1 and 2 liabilities (-0.500) and is not different from its theoretically predicted value of -1.

Previously, Altamuro and Zhang (2013, 833) studied US banks between 2008 and 2011 and found that the FV of mortgage servicing rights (MSRs) based on managerial inputs 'better reflects the cash flow and risk characteristics of the underlying asset' than the FV of MSRs based on market inputs. However, other studies (e.g., Song et al., 2010; Goh et al., 2015; Lawrence et al., 2016; Siekkinen, 2016, 2017; Mechelli and Cimini, 2019) suggest that Level 3 FVs are of lower or similar value relevance to Level 1 and Level 2 FVs. Therefore, it is somewhat surprising that investors place more weight on Level 3 FV assets (liabilities) than Level 2 (Level 1 and 2) FV assets (liabilities) between 2014 and 2021 in Europe, in a strong IP environment. One explanation could be that investors found these estimations the most helpful during this special time period because these estimates are based on managerial views that are not otherwise available to investors (see also e.g., Goh et al., 2015; Altamuro and Zhang; Fiechter et al., 2022). This paper contributes to the scant literature (e.g., Siekkinen, 2017; Mechelli and Cimini, 2019; Filip et al., 2021a) studying the value relevance of the FV hierarchy in Europe by showing that the IP environment plays a role in explaining the differences in the value relevance of the FV estimates years after IFRS 13 implementation. Taken together, the present study also provides valuable information for standard setters and other stakeholders, since the findings of the study imply that investors only found the FV estimates useful and reliable (thus implementation challenges have been resolved) in an environment offering strong protection for investors during this special period from 2014 to 2021.

A series of robustness tests was conducted to corroborate our findings. We estimated the regression excluding observations from the UK to find out whether UK firms were driving the results. We found that even when the UK firms were not included in the sample of a strong IP cluster of countries, the regression results are roughly the same and all the FVs in the FV hierarchy are value relevant. We also used an alternative clustering of countries and categorised countries into 'market-based' and 'bank-based' clusters based on their financial structures to test whether our results are driven by the financial structures of countries. Our results show that this alternative clustering of countries was not driving our main results. We also estimated

the main regressions excluding observations from the Covid-19 pandemic years 2020 and 2021. Our main results remain roughly the same for the shorter period from 2014 to 2019, except for the coefficient on Level 3 financial assets (liabilities) being lower (higher) for the firms in the strong protection cluster. This finding indicates that investors would have placed more weight on Level 3 assets and liabilities, especially during the pandemic years. Finally, we examine whether the results hold for periods before and after IFRS 9 is applied (mandatory effective date of January 1, 2018), between 2014 and 2017 and 2018 and 2021 and the Brexit-period between 2016 and 2019. The results for firms in the strong IP cluster hold for the different time periods; all FV assets and liabilities are value relevant for investors in a strong IP environment in the different time frames.

This paper is divided into six sections, with the background and prior literature presented next. Section 3 presents the sample, descriptive statistics, and research design. Section 4 presents the results and Section 5 provides additional analysis. Section 6 concludes the study.

2. Background and prior literature

IFRS 13 *Fair Value Measurement* was issued in 2011 and became effective for annual periods beginning on or after 1 January 2013 (IASB, 2011)[2]. The standard was a joint project between the IASB and the FASB. It applies to IFRS standards that require or permit FV measurements or disclosures. It defines FV on the basis of an 'exit price' notion and thus FV is estimated as 'the price at which an orderly transaction to sell the asset or to transfer the liability would take place between market participants at the measurement date under current market conditions' (IFRS 13, paragraph 2). The standard requires firms to use and disclose an FV hierarchy based on the type of data used to measure FV. The assets and liabilities are categorised into the following three levels: Level 1 inputs are quoted prices in active markets for identical assets or liabilities (IFRS 13:76). Level 2 inputs are inputs other than quoted prices that are observable for the asset or liability either directly or indirectly (IFRS 13:81). Level 3 inputs are unobservable inputs for the asset or liability (IFRS 13:86). At the time when IFRS 13 became effective, IFRS 7 *Financial Instruments: Disclosures* had required European banks to disclose a FV hierarchy. However, IFRS 13 clarified FV measurement and required banks to disclose, for example, 'a description of the valuation processes used by the entity' and 'quantitative information about the significant unobservable inputs used' in the measurement (for FV measurements categorised within Level 3) and more detailed information about transfers between levels of the FV hierarchy (see e.g. PwC, 2014, 18). IFRS 13 was expected to formalize FV measurement and play 'a significant role in increasing the value relevance of (at least)' Level 3 FVs (see Filip et al., 2021a, 213).

Standard setters want to give the highest (lowest) priority to quoted prices in active markets (unobservable inputs) because it is assumed that quoted p rices provide the most reliable evidence of FV and because allowing managerial discretion in FV measurement might adversely affect the quality of financial information (e.g., Fargher & Zhang, 2014). However, both FV measurement standards allow the use of internally generated estimates of FV if active markets do not exist. Therefore, several studies have focused on examining how investors price the FVs (mark-to-model and mark-to-market assets relative to the fair estimates) reported by fi-

2The FASB has also issued the Statement of Financial Accounting Standards No. 157, Fair value measurements (SFAS 157) in 2006, which became effective for financial statements issued for fiscal years beginning after 15 November 2007. Like IFRS 13, SFAS 157 'provides a uniform definition of fair value, establishes a framework for measuring fair value, and expands disclosure about fair value measurements' (Song et al., 2010, p. 1376).

nancial institutions and their perception of the reliability of internally generated FV estimates (e.g., Song et al., 2010; Goh et al., 2015; Lawrence et al., 2016; Kolev, 2019). Analysing quarterly reports of banking firms from the US in 2008, Song et al. (2010, 1375) found that 'the value relevance of Level 1 and Level 2 fair value is greater than the value relevance of Level 3 fair values.' Moreover, Goh et al. focus on US data and report that 'while there is a significant improvement in investors' perception of the pricing of Level 3 estimates in 2010 and 2011, these instruments continue to receive a substantial valuation discount even after market stability was restored.' However, using the closed-end fund setting, Lawrence et al. (2016, 207) found that 'Level 3 fair values are of similar value relevance to Level 1 and Level 2 fair values' between 2008 and 2013.

The EBA 'believes that the introduction of IFRS 13 has improved the financial information provided in the banks' financial statements and contributed to the understanding of their balance sheets' (EBA comment letter: EBA/2017/D/1488). Furthermore, the results of previous studies suggest that 'IFRS 13 has successfully reduced the information asymmetry related to FV estimates' (Siekkinen, 2017, 435). Siekkinen (2017, 463) analysed financial firms' 2012 and 2013 annual reports/data from 29 European countries and reported that 'all FVs are value relevant to investors'. The results of the study 'show that pre IFRS 13, investors valued Levels 1 and 2 assets higher than Level 3 assets' (Siekkinen, 2017, 437). However, 'the valuation coefficient for Levels 1 and 2 assets do not differ significantly from the coefficient for Level 3 assets' following the adoption of IFRS 13 (p. 437).

Filip et al. (2021b) analysed 16 studies on the value relevance of fair value hierarchy using sample periods between 2006 and 2015. Providing meta-analysis, they suggest that value relevance is lower for Level 3 than for Level 1 and Level 2. However, Filip et al. (2021b) also report that value relevance for Level 3 increases over time. Interviews with eight preparers and auditors (in Canada) provide potential explanations for 'the apparent increase in value relevance across the three FV levels' by suggesting that 'processes for both auditors and preparers have improved over time' (Filip et al., 2021b, 277, 290). For example, auditors interviewed explain how the practice has developed during the past decade and how Level 3 FVs are 'systematically benchmarked against outside sources' and 'proprietary databases of comparable transactions and valuations' are used to audit 100% of FV transactions (Filip et al., 2021b, 277). Filip et al. (2021b, 290) report that 'the apparent increase in value relevance across the three FV levels most likely reflects a learning effect that is taking place among the key players (e.g., accounting staff, auditors, and top management) but could also reflect a regulatory effect'.

Strong corporate governance (e.g. Song et al., 2010; Siekkinen, 2017; Mechelli and Cimini, 2019) and strong IP are argued to explain the differences in the value relevance of Level 1, 2 and 3 FVs. Siekkinen (2016) examined the value relevance of FVs under IFRS 13 in an international (global) setting and found that IP affects the value relevance of FVs in the FV hierarchy under IFRS 13. The results produced by Siekkinen (2016, 2) show that 'in the strongest IP cluster investors are willing to pay close to equally much for Level 1, 2, and 3 assets, while in the medium IP cluster investors seem to value Level 1 and 2 assets higher than Level 3 assets'. Siekkinen also found that 'only Level 1 FV assets (market prices) are value relevant in the weak IP cluster of countries' (p. 2).

Previous literature (e.g. Ball et al., 2000; Morck et al., 2000) suggest that 'legal institutions that protect investors' rights are associated with numerous structural factors in the financial reporting environment that are likely to affect the price discovery process and in turn accounting information usefulness' (DeFond, Hung & Trezevant, 2007, 40). For example, Leuz, Nanda & Wysocki (2003) report that it is less likely that managers in strong investor protection coun-

tries would manage earnings because their ability to acquire private control benefits is limited and therefore, they have fewer incentives to mask performance. Studies (e.g. Christensen et al., 2013; Christensen et al., 2015; Daske et al., 2008) also report that capital markets benefit from IFRS adoption only in countries with strong legal enforcement mechanisms/strong regulatory enforcement system and where firms have incentives to be transparent. Finally, Ball (2016) asks to pay attention to not only enforcement by regulators but also enforcement mechanisms generally such as internal and external auditing, monitoring by boards, security analysts, whistle-blowers, private parties on the other side of irregular transactions, press etc. to ensure uniform implementation of IFRS around the world and realize the benefits of IFRS adoption. Even within the EU, countries have different enforcement systems (e.g., Filip et al., 2021a). Therefore, it is important to examine whether challenges related to IFRS 13 Fair Value Measurement implementation have been resolved in Europe, in different enforcement systems.

3. Data and research design

3.1 Sample

The data was collected from annual reports (years 2014–2021), i.e., consolidated financial statements and Orbis (Bureau van Dijk) databases. The data set is unique since the fair values for Level 1, Level 2 and Level 3 were manually sourced from firms' annual reports. Other firm-specific data, such as net income, total assets, book value of equity, share price and shares outstanding were collected from Orbis. The IP indicators/measures are from the World Economic Forum (WEF) and Freedom House. We first obtained a list of all banks on Orbis to construct our sample. Similar to other studies (e.g., Filip et al., 2021a; Goh et al., 2015; Siekkinen, 2016; 2017; Song et al., 2010) analysing the value relevance of FV estimates, we analysed banks because these firms have significant amounts of FV assets and liabilities.

From a starting sample of 259 banks (from Orbis), we excluded 108 banks that do not disclose required information (missing data) on FVs in their notes. Table 1 presents the sample consisting of 151 listed banks (classified as/'type of entities: Banks' in Orbis) from 26 European (including EU countries and the UK) countries. However, from a total of 1,208 firm-year observations, we were only able to use 915 firm-year observations, as variables such as net income and/or share price are not available for every firm/year in Orbis. Finally, we winsorised variables at a 1% level to control the effects of outliers.

Table 1
Geographical distribution of firms included in the sample.

Austria	8	France	12	Poland	11
Belgium	2	Germany	8	Portugal	1
Bulgaria	3	Greece	5	Romania	2
Croatia	2	Hungary	1	Slovakia	1
Cyprus	1	Ireland	4	Slovenia	1
Czechia	1	Italy	24	Spain	8
Denmark	13	Lithuania	1	Sweden	7
Estonia	1	Malta	3	The UK	24
Finland	4	The Netherlands	3	**Total**	**151**

3.2 IP clusters

The conditions of the judicial system explain the differences in legal IP between countries (e.g., La Porta et al., 1999). For example, 'independent judiciaries, which constrain arbitrary state power, ensure that state promises to respect individual rights are perceived credible' (Ríos-Figueroa & Staton, 2012, p. 104; see also e.g., North and Weingast 1989). Different corporate governance mechanisms, such as a board of directors to monitor senior management and help outside investors protect themselves against expropriation by insiders (e.g. Fama & Jensen, 1983; La Porta et al., 1999). For example, outside directors help to ensure that managers act in the interests of outside shareholders (e.g., Fama & Jensen, 1983). The previous studies also report an association between board effectiveness and earnings management (Peasnell, Pope & Young, 2005). Overall, the quality of accounting information is affected by the quality of accounting standards and regulatory enforcement, and the application of the standards (Kothari, 2000, p. 92). Enforcement of securities laws, such as 'insider trading laws may deter managers from manipulating earnings to profit from trading in the firm's stock' (Hope, 2003, p. 243).

We selected six country-level measures of investor protection: judicial independence, strength of auditing and reporting standards, efficacy of corporate boards, protection of minority shareholders' interests, regulation of securities exchanges and freedom of the press to classify countries into 'IP clusters' (see also e.g. Siekkinen, 2016; Houqe et al., 2012). This information (i.e., six IP indicators/measures) is provided by the WEF (2015–2016 & 2019) and Freedom House (2017). All measures are coded on a scale from 1 to 7. The key to the WEF's report, Global Competitiveness Report (study), used in this study, is the Executive Opinion Survey 2015, which captured the opinions of over 14,000 business leaders in 144 economies between February and June 2015. A description of each indicator/the full question and associated answers are defined in Table 2.

Table 2
The five measures of IP provided by the WEF.

INDICATOR	QUESTION	ANSWER
Judicial independence	In your country, how independent is the judicial system from influences of the government, individuals, or companies?	1 = not independent at all; 7 = entirely independent
Strength of auditing and reporting standards	In your country, how strong are financial auditing and reporting standards?	1 = extremely weak; 7 = extremely strong
Efficacy of corporate boards	In your country, to what extent is management accountable to investors and boards of directors?	1 = not at all; 7 = to a great extent
Protection of minority shareholders' interests	In your country, to what extent are the interests of minority shareholders protected by the legal system?	1 = not protected at all; 7 = fully protected
Regulation of securities exchanges	In your country, to what extent do regulators ensure the stability of the financial market?	1 = not at all; 7 = to a great extent

The study also uses 'Freedom of the press' published in 2017 by Freedom House, which measures the degree of media freedom [0 = the most free; 100 = the least free] (Freedom House, 2017). Freedom House defines its methodology as follows:

> 'Scores are assigned in response to 23 methodology questions that seek to capture the varied ways in which pressure can be placed on the flow of objective information and the ability of platforms to operate freely and without fear of repercussions. The methodology covers the Legal, Political, and Economic environments in which print, broadcast, and digital media operate. The scores reflect not just government actions and policies, but also the behaviour of the press itself in testing boundaries, as well as the influence of private owners, political or criminal groups, and other nonstate actors.' (Freedom House, 2017, 2)

Table 3 presents the number of firms, the values of the six IP variables and the average of the six IP variables. The average scores of the six indicators vary between 3.8 and 6.3. The table shows that the countries with the highest averages are Finland (6.3), the Netherlands (5.9), Denmark (5.8) and Sweden (5.8). The countries with the lowest average are Croatia (3.8), Greece (3.9) and Hungary (4.0). The IP indicators are highly correlated with each other. The correlations vary between 0.66 and 0.87.

Table 3
IP indicators by country.

COUNTRY	N	JUDICIAL IND.	STRENGTH OF STANDARDS	EFFICACY OF BOARDS	PROTECT. OF MINORITY INTERESTS	REGULATION OF SECURITIES EXCHANGES	P RESS	AVG.
Austria	8	5.7	5.8	5.8	4.9	4.6	5.7	5.4
Belgium	2	5.7	5.6	5.8	5.0	4.9	6.3	5.6
Bulgaria	3	3.3	4.6	4.5	3.7	3.7	4.5	4.1
Croatia	2	2.4	4.2	4.4	3.5	3.8	4.5	3.8
Cyprus	1	4.6	5.0	4.1	4.3	3.6	5.6	4.5
Czechia	1	4.5	5.3	5.2	4.3	4.9	5.7	5.0
Denmark	13	6.2	5.7	5.8	5.0	5.5	6.3	5.8
Estonia	1	5.4	5.6	5.4	4.3	5.1	6.0	5.3
Finland	4	6.6	6.5	6.1	6.1	6.2	6.3	6.3
France	12	4.9	5.5	5.6	4.5	5.2	5.4	5.2
Germany	8	5.0	5.8	5.6	4.7	5.2	5.8	5.4
Greece	5	3.5	4.1	4.0	4.1	3.5	4.4	3.9
Hungary	1	3.0	4.7	4.2	3.8	3.7	4.4	4.0
Ireland	4	5.6	4.8	5.7	4.8	4.5	5.9	5.2
Italy	24	4.0	4.2	4.0	3.5	3.9	5.1	4.1
Lithuania	1	4.2	5.0	5.4	3.8	4.1	5.7	4.7
Malta	3	4.0	5.7	4.6	4.9	5.2	5.6	5.0
The Netherlands	3	6.2	6.0	5.9	5.3	5.5	6.3	5.9
Poland	11	2.7	5.0	4.8	4.1	4.6	5.0	4.4
Portugal	1	4.5	4.4	4.5	4.1	4.1	6.0	4.6
Romania	2	4.0	4.3	4.3	3.7	3.7	4.7	4.1
Slovakia	1	2.8	5.3	4.8	3.7	4.1	5.4	4.4
Slovenia	1	3.5	4.3	4.8	3.4	3.5	5.6	4.1
Spain	8	4.2	4.6	4.9	3.7	4.4	5.3	4.5
Sweden	7	5.6	6.0	5.8	5.4	5.5	6.3	5.8
The UK	24	5.2	5.9	5.7	5.4	5.4	5.5	5.5

This table presents the IP variables for the individual countries that are included in the sample. The final column titled 'Avg.' presents the average of the six IP variables.

We divided the countries into clusters of similar IP environments based on the average scores for the six indicators. The strong IP cluster of countries is made up of those countries with an average above 5.2. The medium IP cluster of countries is made up of those countries with an average between 4.5 and 5.2 and the weak IP cluster of countries is made up of those countries with an average between 3.8 and 4.4. The clusters are presented in Table 4.

Table 4
Countries divided by cluster.

TRONG IP CLUSTER	MEDIUM IP CLUSTER	WEAK IP CLUSTER
Austria	Cyprus	Bulgaria
Belgium	Czechia	Croatia
Denmark	France	Greece
Estonia	Ireland	Hungary
Finland	Lithuania	Italy
Germany	Malta	Poland
The Netherlands	Portugal	Romania
Sweden	Spain	Slovakia
The UK		Slovenia

This table presents countries in the sample divided by cluster.

3.3 Descriptive statistics

Table 5 presents descriptive statistics of the variables used to test the value relevance of FVs for our sample banks. The mean share price is 0.102 and the mean FV assets, i.e., Level 1 FV financial assets (FVA1), Level 2 FV financial assets (FVA2) and Level 3 FV financial assets (FVA3), are 0.082, 0.101 and 0.013, respectively. The mean FV liabilities, i.e., Level 1 and 2 FV financial liabilities (FVL12) and Level 3 FV financial liabilities (FVL3), are 0.060 and 0.005, respectively. The means of the net non-FV assets, net income and the natural logarithm of a firm's total assets are 0.027, 0.016 and 16.727, respectively. The mean net FV assets for Net FV1, FV2 and FV3 are 0.068, 0.049 and 0.005, respectively.

On average, 17 per cent of the total assets are classified as Level 1 FV assets, 10 per cent as Level 2 FV assets and 7 percent as Level 3 FV assets. On average, 10 per cent of the total liabilities are classified as Level 1 and 2 FV liabilities and 4 per cent as Level 3 liabilities. These average values are not tabulated. Descriptive statistics of the three clusters are presented in Appendices A, B and C.

Table 5
Descriptive statistics of the whole sample

	N	MEAN	STD	MIN.	Q1	MEDIAN	Q3	MAX.
Price	915	0.102	0.735	0.000	0.002	0.010	0.272	7.065
FVA1	915	0.082	0.358	0.000	0.002	0.0117	0.041	3.069
FVA2	915	0.101	0.308	0.000	0.000	0.004	0.025	2.075
FVA3	915	0.013	0.050	0.000	0.000	0.001	0.003	0.359
FVL12	915	0.060	0.183	0.000	0.000	0.003	0.026	1.347
FVL3	915	0.005	0.025	0.000	0.000	0.000	0.000	0.184
Net FV1	915	0.068	0.302	-0.084	0.002	0.009	0.034	2.580
Net FV2	915	0.049	0.197	-0.106	0.000	0.000	0.006	1.165
Net FV3	915	0.005	0.025	-0.033	0.000	0.000	0.002	0.207
Net non-FV	915	0.027	0.197	-0.297	-0.013	0.000	0.004	1.261
NI	915	0.016	0.083	-0.007	0.000	0.001	0.003	0.696
LNTA	915	16.727	2.415	10.900	15.123	16.719	18.170	21.466
L	915	0.127	0.333	0	0	0	0	1

This table presents descriptive statistics of the variables that are used in this study. The table shows means, medians, standard deviations (Std), minimums, maximums, and quartiles of the test variables on a share basis. All variables are defined in the text.

Table 6 presents the Pearson correlations among the variables. As the table shows, the correlation between FVA1 and price is higher than the correlations between price and FVA2 and between price and FVA3. The correlation between FVL12 and price is substantially higher than the correlation between FVL3 and price.

Table 6
Correlation matrix.

	PRICE	FVA1	FVA2	FVA3	FVL12	FVL3	NET NON-FV	NI	LNTA	L
Price	1.00									
FVA1	0.82***	1.00								
FVA2	0.63***	0.78***	1.00							
FVA3	0.45***	0.63***	0.49***	1.00						
FVL12	0.67***	0.83***	0.79***	0.59***	1.00					
FVL3	0.05	0.10***	0.09***	0.68***	0.17***	1.00				
Net non-FV	0.53***	0.37***	0.54***	0.12***	0.30***	-0.06*	1.00			
NI	0.80***	0.89***	0.74***	0.51***	0.73***	0.07**	0.42***	1.00		
LNTA	0.01	0.08**	0.11***	0.06*	0.21***	0.05*	-0.04	-0.01	1.00	
L	-0.01	-0.03	-0.06**	-0.04	-0.04	-0.06*	-0.02	-0.08**	0.01	1.00

This table presents the Pearson correlations among the variables used in the regression analyses. *, **, and *** indicate statistical significance at the 0.10, 0.05 and 0.01 levels, respectively. The variables are defined in the text.

3.4 Research design

We tested the value relevance of FVs using a modified Ohlson (1995) model. We share-deflated all variables to reduce scale effects. We used the following equation (Mechelli and Cimini, 2019; Kolev, 2019) to test the value relevance of the FV estimates disclosed by firms:

$$Price_{it} = \beta_0 + \beta_1 *FVA1_{it} + \beta_2 *FVA2_{it} + \beta_3 *FVA3_{it} + \beta_4 *FVL12_{it} + \beta_5 *FVL3_{it} + \beta_6 *Net\ NonFV_{it} + \beta_7 *NI_{it} + \beta_8 *LNTA_{it} + \beta_9 *L_{it} + \beta_{10} *L_{it} *NI_{it} + \sum_{t=2014}^{2021} \delta_t year_t + \varepsilon_{it} \quad (1)$$

Where:

$$Net\ NonFV_{it} = BE_{it} - FVA1_{it} - FVA2_{it} - FVA3_{it} + FVL12_{it} + FVL3_{it}$$

And where *Price*it is the price of a share of firm i four months after the end of the fiscal year t. *FVA1*it (*FVA2*it; $FVA3_{it}$) is the FV of assets per share of firm i related to Level 1 (Level 2; Level 3) of the FV hierarchy at the end of the fiscal period t. $FVL12_{it}$ ($FVL3_{it}$) is the FV of liabilities per share of firm i related to Levels 1 and 2 (Level 3) of the FV hierarchy at the end of the fiscal period t. BE_{it} is a firm's book value of equity per share at the end of the fiscal period t. NI_{it} is a firm's net income per share at the end of the fiscal period t. $LNTA_{it}$ is the natural logarithm of a firm's total assets at the end of the fiscal period t. We controlled the size of the entity because previous studies argued that on the one hand, investors find FV estimates reported by small banks less reliable (Song et al., 2010) and on the other hand, 'valuation coefficients are higher for small financial firms than the coefficients for large financial firms' (Siekkinen, 2016, p. 11). We also examine whether the relationship between share price and book values is the same for profit and loss firms. For example, Hayn (1995, p. 125) reported that losses are 'less informative than profits about the firm's future prospects'. Therefore, we added a dummy variable L_{it} that takes the value one if a firm's earnings at the end of the fiscal period t are negative, and otherwise it is zero. As in other studies (e.g. Song et al., 2010; Goh et al., 2015; Mechelli & Cimini, 2019), we combined Level 1 and Level 2 liabilities. All variables are defined in Appendix D.

As other studies (e.g. Song et al., 2010; Goh et al., 2015) investigating the value relevance of Level 1, 2 and 3 FVs, we focus on the regression coefficients and corresponding standard error of Level 1 FV (or Level 2 FV or Level 3 FV) on share price. If the coefficients are significantly different from the value of zero, the FVs are considered value relevant. Assuming that the model is properly specified, and markets are efficient, the theoretically predicted value (coefficient) is expected to be 1 for assets (Level 1, Level 2 or Level 3 FV assets) and -1 for liabilities (Level 1, Level 2 or Level 3 FV liabilities) and therefore, these values are used as benchmarks for statistical testing (see also e.g. Song et al., 2010; Goh et al., 2015). Lower (higher) valuation coefficients of assets (Level 1, Level 2 or Level 3 FV) suggest that investors place less (more) weight on Level 1, 2 or 3 FV assets and lower (higher) valuation coefficients of liabilities (Level 1 and 2 or Level 3) suggest that investors place more (less) weight on Level 1, 2 or 3 FV liabilities.

4. Empirical results

Before dividing the sample countries into the IP clusters, we estimated the equation for the whole sample to examine the value relevance of FVs of the pooled sample. After examining the pooled sample, we divided the sample countries into the three clusters as described here and examined whether the value relevance of FVs varied across the three clusters. Table 7 reports the results of the four regressions. The standard errors in the regressions are clustered by firm (Rogers, 1993).

Table 7
Value relevance of FVs in different IP environments.

PRICE	ALL	STRONG PROTECTION	MEDIUM PROTECTION	WEAK PROTECTION
FVA1	1.406***	0.606***	0.042	0.115***
	(3.48)	(7.88)	(0.47)	(2.95)
FVA2	-0.707***	0.499***	-0.012	-0.059
	(-2.95)	(5.54)	(-0.30)	(-0.13)
FVA3	-2.737	1.001***	-0.195	-2.101
	(-1.36)	(3.76)	(-1.59)	(-1.14)
FVL12	0.512*	-0.500***	0.109	0.837
	(1.84)	(-5.17)	(1.63)	(1.51)
FVL3	3.258	-0.966***	0.018	9.907
	(1.09)	(-3.65)	(0.14)	(0.93)
Net non-FV	1.075**	0.642***	0.010	0.801***
	(2.25)	(6.97)	(0.59)	(4.08)
NI	2.469	0.589***	0.623	3.849***
	(1.12)	(9.74)	(0.94)	(2.96)
LNTA	-0.006	0.000	-0.004*	-0.001
	(-0.92)	(0.77)	(-1.76)	(-0.05)
L	0.010	-0.004*	-0.023**	0.000
	(0.65)	(-1.77)	(-2.03)	(0.01)
*L*NI*	-26.912*	-3.100	-19.024	14.956
	(-1.97)	(-0.61)	(-1.01)	(0.29)
cons	0.111	0.004	0.092*	0.346
	(0.83)	(0.60)	(1.85)	(1.23)
Observations	915	359	253	303
R-squared	0.752	0.758	0.419	0.921

This table presents the results of the regression analysis using three separate samples. All variables except the dummy variables are winsorised at the 1st and 99th percentiles. The *t*-statistics (in parentheses) test whether the coefficient estimates are different from 0. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively. The calculated mean variance inflation factor (VIF): 10.28 (strong protection); 3.50 (medium protection) and 7.92 (weak protection).

The results presented in Table 7 show that when the regression is estimated with the whole sample, FVA1, FVA2 and FVL12 are value relevant. The coefficients on FVA1 and FVA2 are 1.406 and -0.707 and are statistically significant at the 0.01 level. The coefficient on FVL12 is 0.512 and statistically significant at the 0.10 level. The adjusted R-squared (0.75) is equal to 0.74 as reported by Goh et al. (2015) but a little bit lower than those (between 0.84 and 0.88) reported by previous studies using European or international data (Siekkinen, 2016, 2017; Mechelli and Cimini, 2019). The coefficient on FVA1 is close to 1.183 as reported by Lawrence et al. (2016) and high compared to 0.162, 0.326 and 0.34, as reported by studies using an international/European data set (Siekkinen, 2016, 2017; Mechelli and Cimini, 2019). By contrast with the findings of previous studies, the coefficient on FVA2 is negative and the coefficient on FVL12 is positive. The coefficient on the net non-FV assets is 1.075 and statistically significant at the 0.05 level.

Table 7 presents the results of different IP environments: strong, medium and weak investor protection. As the table shows, all of the FVs in the FV hierarchy are value relevant in a strong IP environment. However, none of the FVs are value relevant in a medium IP environment and only FVA1 is value relevant in a weak IP environment. The adjusted R-squared for firms in the

strong IP cluster is lower (0.758) than 0.883 as reported by Siekkinen (2016) and higher than 0.690 and 0.677 as reported by Lawrence et al. (2016) and Song et al. (2010), but equal to 0.74 as reported by Goh et al. (2015).

The coefficients on FVA1, FVA2 and FVA3 are 0.606, 0.499 and 1.001, respectively, and statistically significant at the 0.01 level for firms in the strong IP cluster. This finding is interesting, since previous studies (e.g., Siekkinen, 2016; 2017; Goh et al., 2015; Lawrence et al., 2016) found that the coefficient on FVA3 is lower than FVA2 and/or FVA1. Siekkinen (2016) used international data and reports that 'for firms in the strong IP cluster, the FV coefficients for FVA1, FVA2 and FVA3 are 0.198, 0.247 and 0.211' and that FVA2 are significantly more value relevant than FVA1 and FVA3. The coefficients on FVA1 and FVA2 presented in Table 7 are lower than those (between 0.928 and 1.183) reported by Song et al. (2010), Goh et al. (2015) and Lawrence et al. (2016). However, the coefficient on FVA3 is higher than 0.87 and 0.683 as reported by Goh et al. and Song et al. (2010), but close to 1.092 as reported by Lawrence et al. (2016). In addition to this, the coefficient on FVA3 is not different from its theoretically predicted value of 1 and the coefficients on FVA1 and FVA2 are significantly less than 1. This result indicates that investors place less weight on Level 1 and Level 2 FV assets relative to Level 3 FV assets.

The table also shows that the coefficients on FVL12 and FVL3 are -0.500 and -0.966 and statistically significant at the 0.001 level. The coefficients are substantially less than -0.205 and -0.191 as reported by Siekkinen (2016). The coefficient on FVL3 is close to -0.87 as reported by Goh et al. and -1.175 as reported by Lawrence et al. (2016). The coefficient on FVL12 is significantly higher than -1 and the coefficient on FVL3 is not significantly different from its theoretically predicted value of -1. Our results show that the coefficient on FVL3 is significantly lower than FVL12 at the 0.05 level. Thus, our results indicate that investors place more weight on Level 3 FV liabilities than Level 1 and 2 FV liabilities.

Table 7 also shows that the coefficient on the net non-FV assets is 0.642 and higher than the net income (NI) coefficient of 0.589 for firms in the strong IP cluster. The table shows that the coefficients on the net non-FV assets and NI are 0.801 (t-statistic: 4.08) and 3.849 (t-statistic: 2.96) for firms in the weak IP cluster. The results reported by Siekkinen (2016) show that the coefficient on NI or earnings per share (EPS) is higher than the book value coefficients. Our results show that the NI coefficient is close to the book value coefficients in the strong IP cluster and substantially higher than the book value coefficient in the weak IP cluster. Therefore, our results indicate that the market value of equity is more extensively driven by earnings than by book values in a weak IP environment.

When we re-estimated the model without the natural logarithm of a firm's total assets (LNTA), loss variable (L) and interaction variable (L*NI) for firms in the strong IP cluster, the results were similar to those reported in Table 7. Table 8 presents the results of the re-estimated model. As the table shows, the coefficients on FVA1, FVA2 and FVA3 are 0.614, 0.505 and 0.994, respectively, and statistically significant at the 0.001 level. The coefficients on FVL12 and FVL3 are -0.503 and -0.958, respectively, and statistically significant at the 0.001 level. Table 8 also presents the test results for differences in the pricing of the assets and liabilities (F-tests). As the table shows, the coefficient on FVA1 is significantly different from that of FVA2 at the 0.10 level but not different from that of FVA3. However, the coefficient on FVA3 is significantly different from that of FVA2 at the 0.05 level and FVL12 is significantly different from that of FVL3 at the 0.05 level. The results of the re-estimated model (without LNTA, L and L*NI) for firms in the medium and weak IP clusters are similar to those reported in Table 7 and presented in Appendix E.

Table 8
Value relevance of FVs in a strong IP environment.

PRICE	COEFFICIENT	F-STAT (COEFF. = 1)	F-STAT (COEFF. = -1)
FVA1	0.614***		
	(8.01)	25.27***	
FVA2	0.505***		
	(5.60)	30.27***	
FVA3	0.994***		
	(3.79)	0.00	
FVL12	-0.503***		
	(-5.25)		26.88***
FVL3	-0.958***		
	(-3.68)		0.03
Net non-FV	0.647***		
	(7.05)		
NI	0.578***		
	(10.46)		
cons	0.008***		
	(3.60)		
Observations	359		
R-squared	0.756		
	F-TESTS (F-STAT)		
FVA1 = FVA2	1.95		
FVA1 = FVA 3	1.74		
FVA2 = FVA 3	3.53**		
FVL12 = FVL3	2.89**		

This table presents the results of the regression analysis using the strong IP cluster of countries. All variables are winsorised at the 1st and 99th percentiles. The *t*-statistics (in parentheses) test whether the coefficient estimates are different from 0. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively. F-statistics test whether the coefficient estimates of each level of FV assets are different from 1 and whether the coefficient estimates of each level of FV liabilities are different from -1.

As Table 7 reports, the mean variance inflation factors (VIF) are between 3.5 and 10.28, meaning that multicollinearity may exist in the regression models. Following the lead of the paper by Filip et al. (2021a), we also tested the value relevance of the net FV assets (i.e. FV assets minus FV liabilities) by level to avoid possible multicollinearity problems. The Pearson correlations among the variables are presented in Appendix F and Table 9 presents the results of the four regressions.

Table 9
Value relevance of the net FV of assets in different IP environments

PRICE	ALL	STRONG PROTECTION	MEDIUM PROTECTION	WEAK PROTECTION
Net FV1	1.125***	0.660***	0.086	0.037
	(2.10)	(7.97)	(1.62)	(0.56)
Net FV2	-0.733***	0.644***	-0.017	-2.336***
	(-2.03)	(8.84)	(-0.38)	(-5.11)
Net FV3	-0.890	0.944**	-0.160	4.731***
	(-0.48)	(3.01)	(-1.28)	(3.75)
Net non-FV	1.161*	0.684***	0.003	0.815***
	(1.87)	(7.19)	(0.19)	(4.45)
NI	3.205	0.600***	0.798	4.561***
	(1.23)	(11.8)	(1.11)	(3.96)
LNTA	-0.001	0.002	-0.002	-0.039
	(-0.15)	(0.66)	(-0.81)	(-1.10)
L	-0.006	-0.004*	-0.025**	-0.057
	(-0.28)	(-1.93)	(-2.25)	(-0.85)
*L*NI*	-33.436***	-2.670	-22.653	13.118
	(-2.37)	(-0.53)	(-1.31)	(0.26)
cons	0.039	0.004	0.056	0.994
	(0.28)	(0.62)	(1.11)	(1.49)
Observations	915	359	253	303
R-squared	0.736	0.758	0.344	0.926

This table presents the results of the regression analysis using three separate samples. *Net FV1*$_{it}$ (*Net FV2*$_{it}$; *Net FV3*$_{it}$) is the net FV assets (i.e. FV assets minus FV liabilities) per share of firm i related to Level 1 (Level 2; Level 3) of the FV hierarchy at the end of the fiscal period t. All variables except the dummy variables are winsorised at the 1st and 99th percentiles. The standard errors in the regressions are clustered by firm. The *t*-statistics (in parentheses) test whether the coefficient estimates are different from 0. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively. The calculated mean variance inflation factor (VIF): 2.81 (strong protection); 3.19 (medium protection) and 4.28 (weak protection).

As Table 9 reports, when the regression is estimated with the whole sample, Net FV1 and Net FV2 are value relevant. The coefficients on Net FV1 and Net FV2 are 1.125 and -0.733 and statistically significant at the 0.01 level. In contrast to the findings of previous studies (Filip et al., 2021a), the coefficient on FVA2 is negative. Filip et al. (2021a) report that the coefficients on Net FV1, Net FV2 and Net FV3 are 0.049, 0.083 and 0.158, respectively, for European banks between 2009 and 2016. As the table shows, all of the FVs in the FV hierarchy are value relevant in a strong IP environment. The coefficients on Net FV1 and Net FV2 are 0.660 and 0.644 and are statistically significant at the 0.01 level. The coefficient on Net FV3 is 0.944 and statistically significant at the 0.05 level. The table also reports that none of the net FV assets are value relevant in a medium IP environment. Finally, the table shows that the coefficients on Net FV2 and Net FV3 are -2.336 and 4.731, and these are statistically significant at the 0.01 level for firms in the weak IP cluster. This result suggests that investors recognise that the two net FV assets are value relevant. Finally, similarly to the results in Table 7, the results reported in Table 9 show that the NI coefficient is substantially higher than the book value coefficient in the weak IP cluster.

5. Robustness tests

Since around one-third of firms included in the strong IP cluster of countries are from the UK, the regression was estimated excluding observations from the UK to find out whether the UK

firms were driving the results (among the strong IP cluster of countries). The results presented in Table 10 show that although the UK firms are not included in the sample, all the FVs in the FV hierarchy are value relevant. The coefficients on FVA1, FVA2 and FVA3 are 0.673, 0.579 and 1.190, respectively, and statistically significant at the 0.01 level for firms in the strong IP cluster. Furthermore, the coefficients on FVL12 and FVL3 are -0.565 and -1.174 and statistically significant at the 0.01 level. Thus, after excluding the UK firms, the coefficients on the FV assets are higher and the FV liabilities lower, as reported in Table 10.

Table 10
Value relevance of FVs in a strong investor protection environment (without the UK)

PRICE	ALL (WITHOUT THE UK)	STRONG PROTECTION (WITHOUT THE UK)	STRONG PROTECTION
FVA1	0.536*** (2.78)	0.673*** (7.58)	0.606*** (7.88)
FVA2	-0.590*** (-3.93)	0.579*** (6.13)	0.499*** (5.54)
FVA3	-1.050 (-0.50)	1.190*** (3.43)	1.001*** (3.76)
FVL12	0.499 (2.46)	-0.565*** (-5.71)	-0.500*** (-5.17)
FVL3	2.402 (0.68)	-1.174*** (-3.38)	-0.966*** (-3.65)
Net non-FV	0.857 (8.90)	0.707*** (7.32)	0.642*** (6.97)
NI	2.997 (1.70)	0.515*** (6.30)	0.589*** (9.74)
LNTA	0.001 (0.17)	0.000 (0.42)	0.000 (0.77)
L	0.000 (0.02)	-0.001 (-0.23)	-0.004* (-1.77)
*L*NI*	-22.971 (-1.08)	0.180 (0.03)	-3.100 (-0.61)
cons	0.070 (0.53)	0.000 (0.02)	0.004 (0.60)
Observations	759	203	359
R-squared	0.908	0.769	0.758

This table presents the results of the regression analysis using three separate samples. All variables except the dummy variables are winsorised at the 1st and 99th percentiles. The *t*-statistics (in parentheses) test whether the coefficient estimates are different from 0. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively. The calculated mean variance inflation factor (VIF): 13.21 (strong protection).

Prior studies also suggest that differences in the value relevance of accounting figures between countries could be explained by the type of financial systems (bank-oriented vs. market-oriented). For example, Ali and Hwang (2000) found that the value relevance of financial accounting data is lower for countries with bank-oriented financial systems. Using 'hand-collected data on reported FVs of financial instruments for IFRS banks from 2006 through 2009', Fiechter et al. (2016, p. 392–394) found that the valuation discount on 'fair value through profit or loss' assets 'is more pronounced in bank-based economies'. To find out whether our results were driven by the financial structures of countries, we estimated the regression using an al-

ternative clustering of countries. More precisely, we categorised countries into 'market-based' and 'bank-based' clusters based on their financial structures in the early 2010s using the bank-market ratio. The 'ratio is defined as the ratio of total bank assets to stock and private bond market capitalisation' (see e.g. Langfield and Pagano, 2015, p. 39). The bank-based (market-based) cluster of countries includes those countries that have a ratio of above (less than) 4. The two clusters are presented in Table 11 and the regression results are presented in Table 12.

Table 11
Alternative clustering: Cluster membership of countries.

MARKET-BASED	BANK-BASED
Belgium	Austria
Czechia	Bulgaria
Denmark	Croatia
Estonia	Cyprus
Finland	Greece
France	Germany
The Netherlands	Hungary
Poland	Ireland
Portugal	Italy
Spain	Lithuania
Sweden	Malta
The UK	Romania
	Slovakia
	Slovenia

This table presents the cluster membership of the countries in the sample.

The results in Table 12 show that the financial structures of countries do not seem to drive the results of the regression presented in Table 7. The table shows that the coefficients on FVA1, NI and loss variable (L) are 0.160, 0.692 and -0.015, respectively, and statistically significant at the 0.001 level for firms in the market-based cluster. The coefficients on net non-FV assets (net non-FV) and NI are 0.649 and 4.359, respectively, and statistically significant at the 0.001 level for firms in the bank-based cluster of countries. Thus, as in the weak IP cluster of countries, in the bank-based cluster of countries, the coefficient on NI is substantially higher than the coefficient on net non-FV. This finding is in contrast to Anandarajan et al. (2011), who argue that earnings have less explanatory power in bank-based economies. Finally, the table shows that the coefficients on FVA3 and FVL3 are -3.140 and 3.659, respectively, and statistically significant at the 0.005 and 0.010 level for firms in the bank-based cluster of countries.

Since the COVID-19 pandemic caused a large shock to European economies in 2020, we also estimated the regression excluding observations from the years 2020 and 2021 to find out whether the results would remain the same. For example, previously, the study by Liu and Sun (2022) examined US firms and suggested that the Covid-19 pandemic impaired the value relevance of earnings. The regression results reported in Table 13 (and in Table 14) are roughly the same as in Table 7 (and in Table 9), except for the coefficients on FVA3 and FVL3 for the firms in the strong protection cluster. As Table 13 reports, the coefficients on FVA1, FVA2 and FVA3 are 0.684, 0.694 and 0.636, respectively, and statistically significant at the 0.01 level for firms in the strong investor protection cluster. Furthermore, the coefficient on FVL12 is -0.704 and

Table 12
Value relevance of FVs in bank-based and market-based environments.

PRICE	ALL	MARKET-BASED	BANK-BASED
FVA1	1.406***	0.160***	0.042
	(3.48)	(3.22)	(0.29)
FVA2	-0.707***	-0.008	0.002
	(-2.95)	(-0.33)	(0.00)
FVA3	-2.737	0.155	-3.140**
	(-1.36)	(0.67)	(-2.32)
FVL12	0.512*	-0.013	1.688
	(1.84)	(-0.34)	(1.68)
FVL3	3.258	-0.259	3.654*
	(1.09)	(-1.09)	(1.91)
Net non-FV	1.075**	0.003	0.649***
	(2.25)	(0.14)	(2.90)
NI	2.469	0.692***	4.359***
	(1.12)	(4.65)	(2.89)
LNTA	-0.006	0.000	-0.036*
	(-0.92)	(-0.08)	(-1.84)
L	0.010	-0.015***	-0.028
	(0.65)	(-2.66)	(-0.40)
*L*NI*	-26.912*	-42.010**	-10.130
	(-1.97)	(-2.34)	(-0.18)
cons	0.111	0.017	0.963*
	(0.83)	(1.64)	(1.88)
Observations	915	590	325
R-squared	0.752	0.417	0.910

This table presents the results of the regression analysis using three separate samples. All variables except the dummy variables are winsorised at the 1st and 99th percentiles. The *t*-statistics (in parentheses) test whether the coefficient estimates are different from 0. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively. The calculated mean variance inflation factor (VIF): 2.36 (market-based) and 12.55 (bank-based).

statistically significant at the 0.01 level. FVL3 is -0.627 and statistically significant at the 0.10 level. These results show that without 2020 and 2021 included, the coefficient on FVA3 (FVL3) would be lower (higher), indicating that investors would have placed more weight on Level 3 assets and liabilities, especially during the pandemic years. As the table reports, the three levels of financial assets and financial liabilities are not value relevant in the medium IP cluster of countries and only Level 1 financial assets are value relevant in the weak IP cluster of countries.

Table 13
Value relevance of FVs in different investor protection environments (2014–2019)

PRICE	ALL	STRONG PROTECTION	MEDIUM PROTECTION	WEAK PROTECTION
FVA1	0.383	0.684***	0.053	0.103***
	(0.81)	(10.49)	(0.51)	(6.47)
FVA2	-1.243***	0.694***	-0.005	-0.199
	(-2.74)	(7.39)	(-0.07)	(-0.29)
FVA3	-2.542	0.636***	-0.135	-1.074
	(-0.66)	(2.16)	(-0.92)	(-0.53)
FVL12	0.939	-0.704***	0.081	0.759
	(1.36)	(-7.43)	(1.04)	(1.32)
FVL3	2.845	-0.627*	-0.009	9.589
	(0.53)	(-1.81)	(-0.07)	(0.86)
Net non-FV	2.397	0.757***	0.002	0.795***
	(1.63)	(8.57)	(0.02)	(3.39)
NI	7.836	0.458***	0.673	4.704***
	(2.01)	(9.70)	(0.47)	(3.25)
LNTA	0.003	0.001	-0.004	-0.003
	(0.17)	(1.57)	(-1.52)	(-0.11)
L	-0.044	-0.004*	-0.018**	-0.034
	(-1.13)	(-1.74)	(-2.34)	(-0.58)
*L*NI*	-116.068**	-0.727	-1.814	2.560
	(-2.18)	(-0.18)	(-0.25)	(0.05)
cons	0.031	-0.000	0.076	0.338
	(0.11)	(-0.04)	(1.67)	(0.99)
Observations	676	262	189	224
R-squared	0.780	0.778	0.422	0.923

This table presents the results of the regression analysis using three separate samples. All variables except the dummy variables are winsorised at the 1st and 99th percentiles. The *t*-statistics (in parentheses) test whether the coefficient estimates are different from 0. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively. The calculated mean variance inflation factor (VIF): 10.79 (strong protection); 5.92 (medium protection) and 8.22 (weak protection).

Finally, we study in which time frames the results hold. Because the number of yearly observations is small and one needs 10–20 observations per parameter estimated, we decided to study specific (four-year) periods to find out whether the results hold in different time frames. First, we study periods before and after IFRS 9 is applied (mandatory effective date of 1. January 2018), between 2014 and 2017 and 2018 and 2021. Second, we also study whether the results for firms in the strong IP cluster hold for the Brexit period between 2016 and 2019. When we estimate the regression for the whole sample of firms, firms in the medium and weak clusters, we obtain similar results (not tabulated). None of the FVs in the FV hierarchy are value relevant for investors in a medium (weak) IP environment, except Level 1 and 2 FV liabilities (Level 1 and Level 3 assets and Level 1 and 2 FV liabilities) are value relevant between 2018 and 2021 (2014 and 2017). Table 15 reports that the results for firms in the strong IP cluster hold for the different timeframes. As Table 15 shows, all FV assets and liabilities are value relevant for investors in a strong IP environment in the different timeframes. However, the mean variance inflation factors (VIF) are between 10.79 and 19.30, meaning that there is a high risk that multicollinearity

Table 14
Value relevance of the net FV of assets in different investor protection environments (2014–2019)

PRICE	ALL	STRONG PROTECTION	MEDIUM PROTECTION	WEAK PROTECTION
Net FV1	0.222 (0.49)	0.674*** (10.27)	0.076 (1.02)	0.037 (0.07)
Net FV2	-1.155*** (-2.18)	0.663*** (10.93)	-0.015 (-0.21)	-3.171*** (-6.56)
Net FV3	-1.135 (-0.28)	0.772*** (2.99)	-0.133 (-0.83)	4.757*** (6.22)
Net non-FV	2.382 (1.54)	0.752*** (8.33)	-0.020 (-0.31)	0.927*** (8.21)
NI	8.059** (2.16)	0.467*** (9.55)	1.015 (0.73)	4.961*** (6.70)
LNTA	0.004 (0.39)	0.001 (1.62)	-0.002 (-0.72)	-0.058 (-1.09)
L	-0.057 (-1.23)	-0.004 (-1.59)	-0.019** (-2.43)	-0.118 (-1.26)
*L*NI*	-128.245*** (-2.39)	-0.486 (-0.12)	-7.353 (-1.26)	-0.802 (-0.02)
cons	0.014 (0.06)	0.000 (-0.08)	0.050 (1.04)	1.208 (1.26)
Observations	676	262	189	224
R-squared	0.776	0.771	0.375	0.940

This table presents the results of the regression analysis using three separate samples. *Net FV1*$_{it}$ (*Net FV2*$_{it}$; *Net FV3*$_{it}$) is the net FV assets (i.e. FV assets minus FV liabilities) per share of firm i related to Level 1 (Level 2; Level 3) of the FV hierarchy at the end of the fiscal period t. All variables except the dummy variables are winsorised at the 1st and 99th percentiles. The standard errors in the regressions are clustered by firm. The *t*-statistics (in parentheses) test whether the coefficient estimates are different from 0. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively. The calculated mean variance inflation factor (VIF): 2.70 (strong protection); 5.42 (medium protection) and 3.62 (weak protection).

exists in the regression models. Therefore, we also tested the value relevance of the net FV assets (i.e., FV assets minus FV liabilities) by level to avoid possible multicollinearity problems. The results (not tabulated) show that the coefficients on Net FV1 and Net FV2 are 0.577 (0.770) and 0.541 (0.811) and statistically significant at the 0.01 level. The coefficient on Net FV3 is 0.950 (1.101) and statistically significant at the 0.05 level between 2018 and 2021 (2014 and 2017). The results indicate all net FV assets are value relevant for investors during this time period and that investors would have valued Level 3 estimates higher than Level 1 and Level 2 net FV assets.

Table 15
Value relevance of FVs in a strong IP environment in different timeframes.

PRICE	2014–2017	2014–2019	2016–2019	2018–2021
FVA1	0.787***	0.684***	0.695***	0.554***
	(11.86)	(10.49)	(9.13)	(8.20)
FVA2	0.836***	0.694***	0.732***	0.353***
	(9.67)	(7.39)	(7.16)	(3.76)
FVA3	0.954***	0.636***	0.630***	0.847***
	(4.27)	(2.16)	(2.59)	(2.27)
FVL12	-0.843***	-0.704***	-0.749***	-0.349***
	(-9.10)	(-7.43)	(-7.28)	(-3.65)
FVL3	-0.843***	-0.627*	-0.600***	-0.848***
	(-2.93)	(-1.81)	(-2.48)	(-2.21)
Net non-FV	0.839***	0.757***	0.767***	0.539***
	(20.62)	(8.57)	(7.15)	(5.06)
NI	0.412***	0.458***	0.577***	0.776***
	(10.63)	(9.70)	(11.83)	(8.48)
LNTA	0.001***	0.001	0.001	0.000
	(2.02)	(1.57)	(1.53)	(0.06)
L	-0.004	-0.004*	-0.004	-0.001
	(-1.37)	(-1.74)	(-1.45)	(-0.70)
*L*NI*	2.702	-0.727	-5.889	-0.690
	(0.68)	(-0.18)	(-1.23)	(-0.08)
cons	-0.005	-0.000	-0.002	0.003
	(-0.87)	(-0.04)	(-0.40)	(0.50)
Observations	165	262	188	194
R-squared	0.841	0.778	0.805	0.781

This table presents the results of the regression analysis using the strong IP cluster of countries. All variables except the dummy variables are winsorised at the 1st and 99th percentiles. The *t*-statistics (in parentheses) test whether the coefficient estimates are different from 0. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively. The calculated mean variance inflation factors (VIF) are between 10.79 and 19.30.

6. Conclusions

This study analysed how investors priced the FV assets and liabilities reported by European banks under IFRS 13 between 2014 and 2021. IFRS 13 requires the use (and disclosure) of a FV hierarchy that categorises FVs into three categories (Level 1, Level 2 and Level 3) based on the data used to measure the FV. The study examined whether challenges related to IFRS 13 *Fair Value Measurement* implementation have been resolved in Europe and whether the value relevance of the FV estimates disclosed by the firms is associated with the IP environment between 2014 and 2021.

In contrast to Siekkinen (2017), we found that Level 3 FV assets and liabilities were not value relevant to investors when we estimated the regression for the whole sample of firms. However, we found that the Level 1 and 2 FV assets and Level 1 and 2 FV liabilities were value relevant. The results also show that all FV assets and liabilities are value relevant for investors in a strong IP environment. However, none of the FVs in the FV hierarchy are value relevant for investors in a medium IP environment and investors find only Level 1 assets useful in a weak IP environment. We also tested the value relevance of the net FV assets (i.e., FV assets minus FV liabilities) by

level to avoid possible multicollinearity problems and found that the three FV levels were value relevant for investors in a strong IP environment, none of the net FV assets were value relevant for investors in a medium IP environment and finally, Level 2 and Level 3 net FV assets were value relevant for investors in a weak IP environment. Taken together, our results imply that implementation challenges had been resolved only in an environment offering strong protection for investors. These findings provide valuable information for those developing enforcement mechanisms. The findings suggest that regulators should address investor protection environment aspects such as 'strength of auditing and reporting standards' or 'regulation of securities exchanges' to improve the usefulness of FV estimates. The weaknesses in the investor protection environment may explain, for example, why FVs are not value-relevant in a medium IP environment. Overall, to improve the usefulness of FV information, one should not only pay attention to enforcement by regulators but also other enforcement mechanisms that create incentives for different actors (managers, auditors, boards, regulators, courts, analysts, press, educators) to ensure successful implementation of financial reporting standards (see e.g. Ball, 2016).

While only Level 1 assets were value relevant for investors in a weak IP environment and none of the FV assets and liabilities were value relevant for investors in a medium IP environment, the study only analysed further the firms from countries with a strong IP environment to find out whether investors price so called mark-to-model and mark-to-market assets and liabilities differently to the FV estimates. The study provides valuable information for standard setters and contributes to the literature by showing that in a strong IP environment, investors do not place less weight on Level 3 estimates than Level 1 and Level 2 FV assets and liabilities but they value Level 3 assets higher than Level 2 assets and Level 3 liabilities higher than Level 1 and 2 liabilities. The results indicate that in a strong IP environment, investors are not concerned that Level 3 estimates are less reliable than Level 1 and Level 2 FV assets and liabilities. Studying US banks between 2008 and 2011, Altamuro and Zhang (2013, 833) also found that Level 3 FVs of MSRs 'better reflects the cash flow and risk characteristics of the underlying asset' than Level 2 FVs of MSRs do. Most previous studies (e.g., Song et al., 2010; Goh et al., 2015; Lawrence et al., 2016; Siekkinen, 2016, 2017; Mechelli and Cimini, 2019) found that Level 3 FVs have been priced lower than or equally to Level 1 and Level 2 FVs since the 2008 financial crisis. The results of the present study imply that investors placed more weight on Level 3 FVs between 2014 and 2021 in Europe (in the countries with a strong IP environment). As described here, the time period was special in Europe and therefore, investors might have paid special attention to these estimates that are based on managerial views and not otherwise available to capital markets (see also, e.g., Goh et al., 2015; Altamuro and Zhang; Fiechter et al., 2022). One can argue that the finding is also in line with the study by Filip et al. (2021b), which suggests that the work of preparers and auditors has improved over time and that auditors have better opportunities to evaluate the reliability of L3 FV estimates than a decade ago. If 'both expertise and the available information and analytical tools have greatly improved in recent years', it is easier for capital markets to trust in Level 3 FVs (Filip et al., 2021b, 277).

We acknowledge that the paper is limited by its sample size. The sample period is marked by several notable events (e.g., Brexit and COVID-19). Because the number of yearly observations is small (and the results from annual regressions would not be reliable), we could not examine how each of these events has impacted the value relevance of bank fair values. In addition, value relevance studies often suffer from correlated omitted variables (see e.g., Lawrence et al., 2016; Filip et al., 2021b). As Lawrence et al. (2016) define, a potential confounding

factor in studies examining the FV measurement hierarchy is that 'only a small fraction of the underlying firms' assets are measured at fair value'. Lawrence et al. define that, for example, Song et al. (2010) studied a sample of 431 banks and on average, 15 per cent of the total assets (and on average, 0.37 per cent of the total liabilities) were measured at fair value in their sample. As Lawrence et al. define, earlier literature (e.g., Ahmed and Takeda; 1995) suggests that 'concurrent changes in the value of assets recorded at amortized cost can cause a correlated omitted variables problem that biases the value relevance estimates' (p. 208). In our sample, on average, 34 percent of the total assets (and 14 percent of the total liabilities) are measured at fair value (see also 3.3 Descriptive statistics). More precisely, in strong, medium and weak clusters on average, 44, 25 and 28 percent of the total assets (and 15, 9 and 6 percent of the total liabilities) are measured at fair value. Therefore, the correlated omitted variable problem is not necessarily as serious as it was in the study by Song et al. (2010). In addition, by contrast to Song et al., we do not study the 2008 financial crisis period, during which off-balance sheet net assets might have caused a similar correlated omitted variables problem (Lawrence et al., 2016; Ahmed and Takeda, 1995). Future research could collect a global sample and analyse whether the IP environment is associated with the value relevance of the FV estimates disclosed by firms outside the EU. Siekkinen (2016) analysed a sample of firms from 34 countries between 2012 and 2014. However, IP environments have evolved over the past decade and firms that adopted IFRS 13 ten to fifteen years ago are also likely to be more experienced in reporting under the standard today than ten to fifteen years ago. One could evaluate whether the same learning effect, that is probably explaining the value-relevance of the FVs in the strong IP environment in Europe, has happened in other parts of the world. One could expect that the same learning effect would have occurred in other parts of the world where an environment provides strong protection for investors.

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Appendix A
Descriptive statistics of the strong IP cluster of countries.

	N	MEAN	STD	MIN.	Q1	MEDIAN	Q3	MAX.
Price	359	0.019	0.021	0.000	0.006	0.012	0.024	0.095
FVA1	359	0.029	0.039	0.000	0.002	0.013	0.042	0.188
FVA2	359	0.030	0.082	0.000	0.000	0.004	0.020	0.541
FVA3	359	0.010	0.041	0.000	0.000	0.001	0.003	0.316
FVL12	359	0.034	0.080	0.000	0.000	0.008	0.028	0.501
FVL3	359	0.007	0.041	0.000	0.000	0.000	0.000	0.325
Net non-FV	359	-0.008	0.034	-0.142	-0.018	-0.001	0.003	0.099
NI	359	0.004	0.013	-0.001	0.000	0.001	0.003	0.093
LNTA	359	16.141	2.848	10.385	14.251	15.708	18.454	21.526
L	359	0.072	0.260	0	0	0	0	1

This table presents descriptive statistics of the variables that are used in this study. The table shows means, medians, standard deviations (Std), minimums, maximums, and quartiles of the test variables on a share basis. All variables are defined in the text.

Appendix B
Descriptive statistics of the medium IP cluster of countries.

	N	MEAN	STD	MIN.	Q1	MEDIAN	Q3	MAX.
Price	253	0.031	0.042	0.000	0.002	0.009	0.050	0.185
FVA1	253	0.057	0.093	0.000	0.003	0.012	0.067	0.399
FVA2	253	0.188	0.341	0.000	0.000	0.010	0.184	1.451
FVA3	253	0.013	0.039	0.000	0.000	0.000	0.006	0.227
FVL12	253	0.084	0.144	0.000	0.000	0.010	0.087	0.593
FVL3	253	0.009	0.034	0.000	0.000	0.000	0.000	0.254
Net non-FV	253	0.089	0.274	-0.177	-0.004	0.001	0.026	1.199
NI	253	0.012	0.025	-0.003	0.000	0.001	0.006	0.107
LNTA	253	17.759	2.140	13.965	16.237	17.312	19.640	21.091
L	253	0.107	0.309	0	0	0	0	1

This table presents descriptive statistics of the variables that are used in this study. The table shows means, medians, standard deviations (Std), minimums, maximums, and quartiles of the test variables on a share basis. All variables are defined in the text.

Appendix C
Descriptive statistics of the weak IP cluster of countries.

	N	MEAN	STD	MIN.	Q1	MEDIAN	Q3	MAX.
Price	303	0.690	3.765	0.000	0.002	0.007	0.026	25.200
FVA1	303	1.037	6.364	0.000	0.002	0.010	0.038	48.555
FVA2	303	0.242	1.222	0.000	0.000	0.002	0.013	9.194
FVA3	303	0.045	0.253	0.000	0.000	0.000	0.002	1.895
FVL12	303	0.271	1.652	0.000	0.000	0.001	0.008	13.544
FVL3	303	0.003	0.018	0.000	0.000	0.000	0.000	0.143
Net non-FV	303	0.112	2.837	-12.867	-0.014	-0.002	0.001	14.393
NI	303	0.086	0.472	-0.013	0.000	0.000	0.003	3.490
LNTA	303	16.554	1.732	12.854	15.369	16.744	17.923	20.572
L	303	0.208	0.406	0	0	0	0	1

This table presents descriptive statistics of the variables that are used in this study. The table shows means, medians, standard deviations (Std), minimums, maximums, and quartiles of the test variables on a share basis. All variables are defined in the text.

Appendix D
Variable definitions

VARIABLE	DEFINITION	DATA SOURCE
Price	the price of a share of firm i four months after the fiscal year-end	Orbis
FVA1	Level 1 FV assets scaled by common shares outstanding at the fiscal year-end	Annual report
FVA2	Level 2 FV assets scaled by common shares outstanding at the fiscal year-end	Annual report
FVA3	Level 3 FV assets scaled by common shares outstanding at the fiscal year-end	Annual report
FVL12	Level 1 + Level 2 FV liabilities scaled by common shares outstanding at the fiscal year-end	Annual report
FVL3	Level 3 FV liabilities scaled by common shares outstanding at the fiscal year-end	Annual report
Net FV1	Level 1 FV assets minus Level 1 FV liabilities scaled by common shares outstanding at the fiscal year-end	Annual report
Net FV2	Level 2 FV assets minus Level 2 FV liabilities scaled by common shares outstanding at the fiscal year-end	Annual report
Net FV3	Level 3 FV assets minus Level 3 FV liabilities scaled by common shares outstanding at the fiscal year-end	Annual report
Net non-FV	BE - FVA1 - FVA2 - FVA3 + FVL12 + FVL3	Annual report
BE	Book value of equity scaled by common shares outstanding at the fiscal year-end	Orbis
NI	Net income scaled by common shares outstanding at the fiscal year-end	Orbis
LNTA	Natural logarithm of a firm's total assets at the fiscal year-end	Orbis
L	Dummy variable equal to 1 if earnings are negative and 0 otherwise	Orbis

Appendix E
Value relevance of FVs in the medium and weak IP clusters.

PRICE	MEDIUM PROTECTION	WEAK PROTECTION
FVA1	0.018 (0.19)	0.114*** (2.81)
FVA2	-0.009 (-0.23)	-0.060 (-0.14)
FVA3	-0.174 (-1.49)	-2.135 (-1.27)
FVL12	0.087 (1.25)	0.838 (1.51)
FVL3	0.021 (0.18)	9.940 (0.96)
Net non-FV	0.015 (0.94)	0.797*** (4.38)
NI	0.715 (1.05)	3.871*** (3.16)
cons	0.013 (1.77)	0.314 (1.20)
Observations	253	303
R-squared	0.367	0.921

This table presents the results of the regression analysis using the medium and weak IP clusters of countries. All variables are winsorised at the 1st and 99th percentiles. The t-statistics (in parentheses) test whether the coefficient estimates are different from 0. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

Appendix F
Correlation matrix

	PRICE	*NET FV1*	*NET FV2*	*NET FV3*	*NET NON-FV*	*NI*	*LNTA*	*L*
Price	1.00							
Net FV1	0.81***	1.00						
Net FV2	0.35***	0.41***	1.00					
Net FV3	0.60***	0.76***	0.30***	1.00				
Net non-FV	0.53***	0.37***	0.62***	0.22***	1.00			
NI	0.80***	0.88***	0.41***	0.69***	0.42***	1.00		
LNTA	0.01	0.07	-0.00	0.03	-0.04	-0.01	1.00	
L	-0.01	-0.03	-0.06	-0.01	-0.02	-0.08	0.01	1.00

This table presents the Pearson correlations among the variables used in the regression analyses. *, **, *** indicate statistical significance at the 0.10, 0.05 and 0.01 levels, respectively. Variables are defined in the text.

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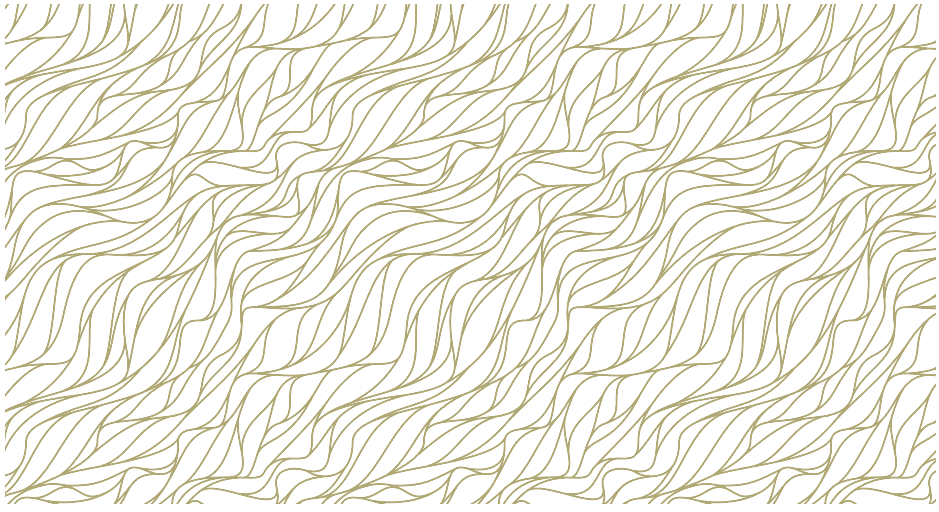

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