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A Behavioural Appraisal of Regulatory Financial Reforms and Implications for Corporate Management

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Financial markets play a vital role in shaping corporate behaviour, impacting corporate financial decisions ranging from investment and mergers/acquisitions to payout policies and management remuneration. Financial markets, however, are prone to irrational sentiments to trade, driving prices away from fundamental values, with the potential to distort corporate decisions and, hence, corporate efficiency. It is important, therefore, to examine the extent to which regulatory reforms help mitigate the influence of irrationality in financial markets. To this end, we examine the consequences of the mandatory adoption of International Financial Reporting Standards (IFRS) in Europe through the behavioural lens of investor sentiment. In country-level analyses, we find the impact of irrational sentiment on stock markets to have significantly diminished post-IFRS. In global pooled analyses, we compare the change in the sentiment–return relationship in countries adopting IFRS with the change in a set of non-adopting countries to account for stock market trends: weakening of the impact of irrational sentiment on stock prices is greater in IFRS-adopting countries. Results are robust to a battery of alternative tests and explanations. We provide strong support, therefore, for the success of IFRS in its aim of improving market efficiency, with important implications for corporate management.

Introduction

Financial markets play a vital role in corporate decision-making, with market prices indirectly guiding financial decisions; hence, stock prices not only reflect the expected cash flows generated by firms but also affect those cash flows (Bond *et al.*, 2012; Dow *et al.*, 2017). Information on the behaviour of stock markets feeds into a range of crucial managerial decisions, including equity issuance, mergers and acquisitions, payout policy, investment decisions, costs of equity calculation, management remuneration, etc. However, markets can be driven by both hard facts and irrational investor sentiment (Baker and Wurgler, 2006;

Caporin *et al.*, 2019); therefore, it is crucial for corporate decision-making to understand which of these forces is predominantly at play. Indeed, irrational movements in stock prices (e.g. Baker and Wurgler, 2004; Simpson, 2013) are known to impede corporate efficiency by, *inter alia*, distorting firms' investment decisions (Malmendier and Tate, 2005; Xiao, 2020). This potential adverse impact of market irrationality prompted calls for policy interventions, and the impact of resulting regulatory reforms, especially in the context of corporate performance, has long interested management scholars, be it governance-related (Mees and Smith, 2019; Shaw *et al.*, 2021), political (Meyer and Stensaker, 2009),

economic (Hatun and Pettigrew, 2006) or financial (Behr *et al.*, 2018; Bruno *et al.*, 2016; Duffie, 2018; Trebbi and Xiao, 2019) reform. In this study, we investigate whether a pivotal financial market reform, namely the mandatory adoption of International Financial Reporting Standards (IFRS) in the European Union (EU), resulted in the aimed-for shift from irrationality-driven to information-driven financial markets; such a result would make markets less volatile and more credible as a source of rational company valuation, thus supporting prudent decision-making within companies.

A goal of mandatory IFRS adoption in the EU was to improve information availability for investors, with the intention that financial decisions be increasingly based on high-quality information, thus improving the aggregate information efficiency of stock markets (Regulation 1606/2002). However, conclusive evidence of the success or otherwise of mandatory IFRS adoption remains elusive (Ball, 2016), with often contradictory findings and implications.¹ Even if such evidence was conclusive, however, an improved information environment in and of itself is not a sufficient condition for investors to make better decisions and, as a result of their actions, for stock markets to become more efficient: as numerous studies demonstrate (see Costa *et al.*, 2019, for historical overview), investors tend to suffer from biases in information processing (including framing effects, see Hillenbrand *et al.*, 2022) and decision-making, which lead them to irrational actions, potentially resulting in financial markets being inefficient and corporate decisions distorted.

Our aim is, therefore, not to look for potential direct improvements in the quality and comparability of accounting information (i.e. first-order effects as per Cascino and Gassen, 2015), but to evaluate, through a behavioural lens, the end-goal of the regulatory reform in terms of the second-order capital-market consequences, that is, the improved informational efficiency of stock markets. To this end, we consider whether the behaviour of stock markets became less prone to irrational motives to trade; specifically, to investors acting on irrational sentiment rather than on fundamental information (Firth, Wang and Wong, 2015). While we

¹See the section ‘Hypotheses development’, along with reviews by De George *et al.* (2016) and Leuz and Wysocki (2016).

are not the first to examine the capital-market consequences of mandatory IFRS adoption in Europe (see e.g. Daske *et al.*, 2008; Armstrong *et al.*, 2010; Li, 2010; Li *et al.*, 2021), we are the first to do so through a behavioural lens by examining shifts in the sentiment–return relationship. Adopting a behavioural lens allows us to depart from rationality-focused approaches looking at companies’ and analysts’ behaviours under IFRS and to extend the analytical framework to include irrational factors widely documented to affect the relevant decision-makers.²

There are solid theoretical underpinnings for the expectation that IFRS could limit the impact of irrational investor sentiment on stock prices. As Baker and Wurgler (2006) observe, irrational sentiment can affect asset valuation through two channels, namely the difficult-to-value stocks (Hribar and McInnis, 2012; Seybert and Yang, 2012) and limits to arbitrage. Improved information provision due to an effective reform such as IFRS could therefore strengthen the rational component in asset pricing, as agents’ abilities to value stocks would be expected to improve owing to a reduction in income smoothing and earnings management by firms, earlier loss recognition, or improved analysts’ forecasts brought about by IFRS. Additionally, IFRS-induced improvements in the information environment and the resulting reduction in valuation uncertainty would strengthen arbitrage forces in a number of ways: some incumbent investors would utilize more abundant information post-IFRS and switch from prior noise-based to information-based trading (Firth *et al.*, 2015), while other investors with previously limited market presence due to noise-trader risk (De Long *et al.*, 1990) would increase their trading post-IFRS (e.g. institutional investors, as per Florou and Pope, 2012). Thus, an effective regulatory reform should be expected to lead to better asset valuation and stronger corrective arbitrage forces, thereby reducing the impact of irrational sentiment on asset prices.

We provide evidence from 18 European markets and a global control sample in a unified

²Related studies do not address the aggregate market efficiency issue directly but investigate market reactions to IFRS-related announcements (e.g. Armstrong *et al.*, 2010; Joos and Leung, 2013; Prather-Kinsey and Tanyi, 2014) and liquidity changes post-IFRS (e.g. Barth and Israeli, 2013; Christensen *et al.*, 2013; Li *et al.*, 2021), with mixed results.

framework, which makes our results comparable across countries. Overall, our findings indicate that mandatory IFRS adoption has been effective in improving aggregate stock market efficiency by reducing the impact of irrational sentiment. Our findings are robust to the choice of empirical approaches, return horizons, IFRS timing, econometric specifications, and are not driven by the 2007–2009 crisis nor confined to a few select countries with specific characteristics or a narrow sample period. As such, our results provide strong support for the effectiveness of IFRS in its ultimate aim of improving the informational environment and market efficiency in the EU. We provide a detailed discussion of the implications of these findings for management research and practice in the concluding section.

Our study contributes to various streams of business management research. Firstly, management scholars have long studied behavioural insights on organizational theory and decision-making (Cyert and March, 1963; Greve, 2003). We contribute to this discussion by examining the influence of irrational investor behaviour in financial markets; this issue is of importance to management scholars and corporate managers, as the functioning of these markets is known to have real efficiency consequences via corporate behaviour and managerial decision-making (Bond *et al.*, 2012; Dow *et al.*, 2017; Xiao, 2020). How markets function impacts managerial decisions, including initial purchase orders (IPOs; Latham and Braun, 2010), mergers and acquisitions (Bozos *et al.*, 2014), payout policies (Polk and Sapienza, 2009), share repurchases (Babenko *et al.*, 2012; D'Mello and Shroff, 2000; Dittmar and Field, 2015), equity issuance (Baker and Wurgler, 2002) and cash holdings (Guo *et al.*, 2022). Hence, an understanding of stock market irrationality can lead to an understanding of corporate structures and behaviours.

More broadly, the application of behavioural insights in the management literature continues undiminished, including examples relating to accountability (Huse, 2005; Ishaque *et al.*, 2022), auditing (Fairchild *et al.*, 2019), and investment/divestment (Kolev, 2016; Zona, 2012). Insights from behavioural finance are applied more widely too. This is true of investor sentiment, including in the contexts of earnings disclosure, management and forecast bias (Bergman and Roychowdhury, 2008; Brown *et al.*, 2012; Hurwitz,

2018; Simpson, 2013) and audit decisions (Amin *et al.*, 2021).³ Hence, there is growing evidence that irrational sentiment and organizational decision-making are interrelated. Our study of the effects of IFRS on the sentiment–return relationship offers a novel and complementary contribution to this developing discussion, as we demonstrate how market irrationality, an important factor affecting managerial decision-making, has been curtailed. With the globalization of the world's financial market and enhanced cross-border financial flows, corporate managers need greater insights concerning the efficient versus irrational functioning of countries' capital markets.

Secondly, we also contribute to a broader literature on regulatory reforms (Hatun and Pettigrew, 2006; Mees and Smith, 2019; Meyer and Stensaker, 2009; Shaw *et al.*, 2021), which shape the external environment for corporate decision-making, and more specifically with respect to IFRS, in a number of ways. First, rather than looking at average firm-level effects, we adopt a market-level perspective. Owing to the dynamics of financial markets and associated complex human interactions (Knorr Cetina and Preda, 2006), the overall consequences of a reform can be greater than the sum of firm-specific consequences (Sornette, 2017). Evidence, therefore, of firm-level effects might be insufficient to judge the overall impact of IFRS – hence the need for an aggregate perspective. Second, while second-order capital-market consequences of IFRS are unlikely to materialize in the absence of first-order effects, including enhanced financial reporting quality and cross-country comparability (Cascino and Gassen, 2015), it does not necessarily follow that more information is better than less (see discussion of 'noise' in Ball, 2006, p. 14) nor that such information will be used more intensively or effectively by investors (Lerman, 2020), owing to behavioural factors and limited cognitive ability (Blankespoor *et al.*, 2020). Our market-orientated analysis addresses the question of whether an enhanced information environment deriving from IFRS is reflected in the function of financial markets, thus complementing firm-level benefits documented elsewhere (Hung *et al.*, 2015). Third, reflecting our behavioural approach,

³Such studies examine how investor sentiment influences the information environment, via its impact on earnings disclosure/management, etc., and thus their focus is the reverse of ours.

we use the sentiment–return relationship (see the section ‘Hypotheses development’) to examine the effects of regulatory reform on information asymmetry between firms and investors, which can result in sentiment-driven trades causing irrational pricing, with associated implications for corporate decision-making as identified above. Regulatory reforms aimed at improving the quality and quantity of information available to investors might reduce information asymmetry, thereby moderating the sentiment–return relationship (Firth *et al.*, 2015) and thus removing a distortion to corporate decision-making. There are consequences, too, for corporate governance, with regulatory reform impacting institutional equity demand (Florou and Pope, 2012), and hence shaping ownership structure. Here, a growing literature demonstrates the impact of institutional ownership on corporate behaviours, including corporate social reporting (Dyck *et al.*, 2019), organizational culture (Andreou *et al.*, 2022) and executive compensation (Stathopoulos and Voulgaris, 2016).

Finally, our study can be seen as an empirical evaluation of a specific business policy measure and, hence, it responds to calls for a move towards systematic, evidence-based policy-making (Leuz, 2018).

Hypotheses development

Investor sentiment and stock market returns

The systematic impact of irrational sentiment on stock markets is a manifestation of market inefficiency that can be linked to the quality of information available to investors. Sentiment can be defined as the prevailing market optimism or pessimism (Baker and Wurgler, 2006). The impact of sentiment on the aggregate market can be derived from the theoretical model of De Long *et al.* (1990): the trading decisions of (sentiment-driven) noise traders push prices away from their fundamental values, and their unpredictability deters arbitrageurs from fully and immediately correcting this mispricing. Therefore, mispricing persists for a period of time, after which price correction occurs. This future price correction is represented by a (relative) return reversal, giving rise to a negative relationship between current sentiment and future stock returns. In support of this prediction, Brown and Cliff (2005) find a significant negative long-run association between senti-

ment, proxied by Investor Intelligence survey results, and future aggregate stock returns, as do Lemmon and Portniaguina (2006) for the size premium using a measure of excessive sentiment and Huang *et al.* (2015) with their aligned sentiment index. Using the consumer confidence index (CCI) as a sentiment proxy, Schmeling (2009) and Wang *et al.* (2021) also document a negative sentiment–return relationship, with samples of 18 industrialized countries and globally across 50 countries, respectively. Overall, the evidence strongly suggests that stock markets, even in highly developed countries, can be systematically driven by irrational investor sentiment, giving rise to market inefficiency and hence creating room for improvements by, for example, administering appropriate regulatory reforms. Therefore, our first hypothesis is that markets in the EU prior to IFRS adoption were showing signs of informational inefficiency:

H1: There was a systematic impact of sentiment on stock markets prior to IFRS adoption.

IFRS, stock markets and investor sentiment

IFRS aims to reduce the amount of reporting discretion in comparison with local Generally Accepted Accounting Principles (GAAP) and to improve the quality and quantity of information revealed in financial reports. Accounting quality can be defined as the degree to which accounting information provided by firms reflects the current operating performance and its usefulness in assessing firms’ values (Dechow and Schrand, 2004). Previous studies evaluate the change in quality of accounting information after the adoption of IFRS by analysing changes in various aspects of accounting practices, such as income smoothing (Ahmed *et al.*, 2013; Barth *et al.*, 2012), earnings management (Jeanjean and Stolowy, 2008; Zeghal *et al.*, 2012), loss recognition (Sun *et al.*, 2011) and earnings persistence (Gebhardt and Novotny-Farkas, 2011). Overall, empirical evidence is somewhat mixed (see, De George *et al.*, 2016; Leuz and Wysocki, 2016), with some studies supporting improved earnings/accounting quality owing to IFRS (Barth *et al.*, 2012; Gebhardt and Novotny-Farkas, 2011; Houqe *et al.*, 2012; Sun *et al.*, 2011), but others (Ahmed *et al.*, 2013; Doukakis, 2014) failing to find systematic support.

Prior research also documents improvements in analysts’ forecasting abilities following IFRS

adoptions (e.g. Panaretou *et al.*, 2013; Preiato *et al.*, 2015). However, these studies highlight the complementary role of enforcement, attention from preparers of financial reports, law protection levels, and other reform packages in enhancing IFRS effectiveness (Horton *et al.*, 2013). Moreover, evidence of the impact of IFRS on the value relevance of accounting reports is also mixed (e.g. Barth *et al.*, 2012, 2014; Zeghal *et al.*, 2012). In addition, Lang and Stice-Lawrence (2015) argue that IFRS has increased the amount of disclosure as well as its quality, with Li *et al.* (2021) showing that improvements in market liquidity are at least partially attributable to disclosure improvements following mandatory IFRS adoption. In contrast, Christensen *et al.* (2013) find that the impact of IFRS on liquidity is minor and concentrated in a small number of countries. Comparative, cross-country studies show mixed evidence on IFRS effectiveness, too. Overall, therefore, there is a considerable variability in results across and within countries, making generalizations regarding the effectiveness of IFRS difficult.⁴

At this stage, we link our previous considerations of market (in)efficiency epitomized by the sentiment–return relationship with the discussion of information asymmetry and the effect of IFRS adoption. Namely, we conjecture that the impact of sentiment on stock market returns could arise owing to information asymmetry between companies and shareholders regarding access to high-quality, firm-specific information, resulting in market participants partially relying on the aggregate market mood (i.e. sentiment) rather than on their own valuations (the difficulty-to-value channel) (e.g. Firth *et al.*, 2015; Seybert and Yang, 2012). In this context, Baker and Wurgler (2006) demonstrate that the stocks that are hardest to value are also the most susceptible to sentiment changes. If IFRS adoption has improved accounting information quality and availability (Barth *et al.*, 2012; Gebhardt and Novotny-Farkas, 2011; Sun *et al.*, 2011), investors might be expected to trade less on sentiment and rely more on the information disclosed (Bushee and Friedman, 2015).⁵ In addition,

⁴IFRS remains an active and important research field across a range of disciplines from accounting to finance to management (e.g. Agarwal and Chakraverty, 2021; Banker *et al.*, 2021; Bhat *et al.*, 2016; Dargenidou *et al.*, 2021; Kreß *et al.*, 2019; Mazzi *et al.*, 2019).

⁵Enforcement levels differ across countries/jurisdictions, and thus changes in the sentiment–return relationship

the improved quality of financial reports resulting from IFRS adoption might be expected to attract a larger number of rational traders, who might otherwise have been reluctant to trade owing to information asymmetry and noise trader risk (De Long *et al.*, 1990). Consequently, the proportion of rational traders might increase after IFRS adoption, leading to a reduced impact of irrational sentiment on stock markets in aggregate. Additionally, these rational traders could act as arbitrageurs, hence increasing the arbitrage pressure should sentiment drive prices away from their fundamental values (the limits-to-arbitrage channel). Accordingly, our second hypothesis is:

H2: The impact of sentiment on stock market returns in aggregate is moderated (specifically: reduced) by IFRS adoption.

Finally, if mandatory IFRS adoption in the EU was successful, one might expect not only a relative improvement in efficiency (i.e. a reduction in market inefficiency postulated by H2); rather, post-IFRS markets might display informational efficiency, which would manifest itself by the absence of, rather than a mere reduction in, the impact of irrational sentiment on stock prices. To this end, we investigate whether IFRS adoption was able to eliminate the negative sentiment–return relationship:

H3: The impact of sentiment on stock market returns in aggregate was eliminated following IFRS adoption.

Data and methodology

Data

In common with prior studies of mandatory IFRS adoptions (e.g. DeFond *et al.*, 2011; Li, 2010; Wu and Zhang, 2019), we focus on European adopting countries (countries included in our sample are listed in Table 1). We employ monthly data, and our sample covers 2000–2010 (1990–2019 in extended analysis), resulting in a symmetrical

might result from actual or perceived improvements in information environments, and so transmission channels might differ. We thank an anonymous reviewer for this point. While our data are not suited to differentiating between these transmission channels, we provide empirical evidence in support of actual improvements in information environments (see the section ‘Further analyses’).

Table 1. Descriptive statistics

Country	Mean CCI	SD CCI	Mean Orth. CCI	SD Orth. CCI	$q(1)$ Orth. CCI	Mean 6-m return	SD 6-m return	ADF p-value
Austria	1.0523	7.7360	0	5.7518	0.7502	0.5768	3.5709	0.0280
Belgium	-4.5061	8.9628	0	7.8543	0.8905	0.0483	3.1233	0.0007
Czech Rep.	-8.9817	7.8991	0	6.4109	0.7911	0.7620	2.9277	0.0021
Denmark	9.7970	5.6479	0	4.7647	0.6095	0.4069	2.9781	0.0999
Estonia	-11.9015	13.1854	0	8.7694	0.8104	0.8245	5.1281	0.0023
Finland	13.7826	5.4069	0	4.2900	0.7150	-0.6601	3.6169	0.0001
France	-15.5394	8.6653	0	6.3169	0.5763	0.1820	2.6000	0.0001
Germany	-11.9015	9.9076	0	6.6869	0.6786	-0.1537	2.8506	0.0036
Greece	-35.0939	13.4092	0	6.6367	0.6427	-0.9418	3.7486	0.0032
Hungary	-31.6439	15.8645	0	11.4899	0.8757	0.2842	3.6363	0.0423
Ireland	-17.2864	17.9438	0	13.0036	0.8251	-0.4204	3.5653	0.0010
Italy	-15.4879	7.0910	0	4.9140	0.7494	-0.4387	2.6358	0.0035
The Netherlands	0.5712	12.4378	0	9.9210	0.7716	-0.3358	3.2529	0.0006
Portugal	-25.5530	9.2014	0	6.3522	0.7857	0.2298	2.7133	0.0017
Slovenia	-18.5288	6.6824	0	5.0851	0.7735	0.4137	3.6093	0.0177
Spain	-14.2502	10.8191	0	7.1997	0.8483	-0.0187	2.4882	0.0000
Sweden	10.5273	8.4948	0	6.9038	0.7802	-0.0350	3.1663	0.0800
UK	-7.3750	7.3983	0	4.5845	0.6605	0.0346	2.1193	0.0000

Note: This table displays the descriptive statistics for all European countries with compulsory IFRS adoption included in the study, based on 132 monthly observations per country. Specifically, it shows the mean and the standard deviation (SD) of raw and orthogonalized consumer confidence indices (CCI). It also displays the first-order autocorrelation $q(1)$ for the orthogonalized sentiment. This table also provides the mean and standard deviation (SD) of the average 6-month future overlapping returns (in %). The last column shows the p-values of the augmented Dickey–Fuller unit root test for the orthogonalized sentiment.

window around the IFRS adoption date.⁶ In our main analyses we make use of a control sample of non-adopting countries (see ‘Main empirical model’).⁷

We employ the Consumer Confidence Index (CCI) as a measure of investor sentiment. While CCI comprises both rational (economic fundamentals) and irrational components (Schmeling, 2009; Bathia *et al.*, 2016), in line with our theorizing, to isolate the irrational component of CCI, we follow prior literature (e.g. Baker and Wurgler, 2006; Lemmon and Portniaguina, 2006; Wang *et al.*, 2021) and orthogonalize our sentiment variables by regressing CCI on a set of macroeconomic variables (inflation, the change in indus-

trial production, term spread and unemployment rate); the resulting residuals from these country-specific regressions then serve as our proxies of irrational sentiment (see the on-line Appendix for a formal exposition). Values of the CCI for each country were obtained from the Directorate General for Economic and Financial Affairs, which ensures cross-country comparability owing to a unified methodological and measurement framework. To capture stock market movements, DataStream stock market indices expressed in local currencies (to separate out the impact of foreign exchange movements on measured market values of locally traded stocks) are used.

Preliminary approach: Country-level effects

Before investigating the aggregate effect of IFRS on the entirety of adopting countries, we examine its effect on a country-by-country basis; this allows for insights about whether potential IFRS effects were widespread or rather concentrated in a few select markets. As our interest is in assessing the change in the impact of irrational sentiment on stock market behaviour due to the adoption of IFRS, we estimate the following model for each

⁶Regulation 1606/2002 required preparation of consolidated accounts in accordance with IFRS with effect from accounting periods ending on or after 31 December 2005.

⁷IFRS regulations continue to be widely adopted, and thus the number of non-adopting countries for inclusion in the control sample diminishes over time. Therefore, we initially restrict our analyses to 2000–2010 to ensure a control sample of reasonable size, though we later extend this to 1990–2019. Our initial shorter sample also offers enhanced precision in focus on the ‘event’ date, that is, the IFRS adoption date, which might be at risk with a wider data window owing to potentially confounding events.

IFRS-adopting country:

$$\frac{1}{k} \sum_{j=1}^k R_{t+j} = \beta_1 + \beta_2 SENT_t + \beta_3 IFRS_t + \beta_4 SENT_t * IFRS_t + \varepsilon_t, \quad (1)$$

where the dependent variable is the average future stock market return over k months, and $SENT_t$ is our investor sentiment measure, CCI, orthogonalized to remove the impact of macroeconomic variables. $IFRS_t$ is a dummy variable that takes the value of zero in the pre-IFRS period (2000–2004) and equals one in the post-IFRS period (2006–2010).⁸ The effect of irrational sentiment on the stock market pre-IFRS is captured by the coefficient β_2 , with a negative and significant coefficient value reflecting market irrationality pre-IFRS in support of H1. Furthermore, the change in the effect of sentiment on stock market returns, pre-versus post-IFRS, is reflected by the coefficient β_4 : a positive and significant β_4 represents a weakening (assuming negative β_2) in the sentiment effect due to the adoption of IFRS, in support of H2.⁹ Moreover, if IFRS adoption was effective in eliminating the impact of irrational sentiment on the stock market, we would expect the effect of sentiment post-IFRS to be equal to zero, as encapsulated by H3. Empirically, this would be represented by the sum of β_2 and β_4 being insignificant ($\beta_2 + \beta_4 = 0$).

The choice of the exact future return horizon k depends on the time it takes the stock mispricing to reverse owing to the corrective actions of arbitrageurs. Some studies analyse the short-term effects of sentiment over periods of several months (Brown and Cliff, 2004; Fisher and Statman, 2000; Otoo, 1999), while others examine this effect in the long-run (Neal and Wheatley, 1998; Brown and Cliff, 2005; Schmeling, 2009). As we do not have any a priori expectations regarding the market correction timing in our sample, we adopt both

approaches: while our baseline results are constructed for 6-month-ahead average returns ($k = 6$), we also conduct several sensitivity checks using three alternative return horizons, namely $k = 1, 3$ and 12 months.

In regressions such as model (1), a high degree of persistency in regressors can induce a bias in coefficient point-estimates as well as in their estimated standard errors (Stambaugh, 1999). To account for this, we employ Newey-West standard errors for ordinary least squares (OLS) estimates (as per Brown and Cliff, 2004) and the feasible generalized least squares (FGLS; Westerlund and Narayan, 2012) procedure.

The main empirical model

Our core analysis simultaneously utilizes the entire panel dataset of IFRS-adopting (treated sample) and non-adopting (control sample) countries within the difference-in-difference (DiD) framework. While the results of preliminary, country-specific analyses are valuable in allowing heterogeneity in the relevant effects to be revealed, as mandatory IFRS adoption was an EU-wide policy, EU-level policymakers and business decision-makers will likely also be interested in its general effectiveness across all EU stock markets, thus providing a rationale for a pooled analysis to obtain an aggregate perspective, to which we now turn.

In addition, it can be argued that the improvement in market efficiency represented by the decrease in sentiment impact could be due to a global trend fostering arbitrage activities (Lim and Brooks, 2011) such as technological advances reducing transaction costs, automated trading, increased liquidity, etc., rather than being due to mandatory IFRS adoption. Hence, the question emerges if sentiment-related market inefficiency in the EU would not have improved anyway, even without the IFRS implementation. We account for this potential issue by using a DiD approach, where we compare our sample countries (treated sample) with a set of countries that have not adopted IFRS (control sample).¹⁰ The DiD

⁸Following DeFond *et al.* (2011) and Dhaliwal *et al.* (2019), etc., we initially exclude the transitional year 2005 to mitigate confounding effects resulting from voluntary IFRS adoptions by some companies. Additionally, to ensure the robustness of our results, we also perform analyses including 2005 in pre- and post-IFRS periods.

⁹Our interpretations of β_2 and β_4 follow from setting $IFRS_t=0$ and $IFRS_t=1$, respectively, for the pre- and post-IFRS periods in model (1).

¹⁰For inclusion in the control sample, countries had to be non-adopting of IFRS during 2000–2010 and also to have available data on consumer confidence and stock market indices. We identified eight countries satisfying these conditions (Argentina, Brazil, Canada, China, Colombia, Indonesia, Japan, USA). For reasons of data availability,

approach allows us to investigate the change in market efficiency that is specific to countries adopting IFRS and to pool all relevant countries in one dataset to obtain an overarching answer to the question of IFRS effectiveness across all EU adopting countries. In the following, we concentrate on H2, as it is the hypothesis which best addresses the core question of the impact of mandatory IFRS adoption on market efficiency. To that end, we estimate the following model:

$$\begin{aligned} \frac{1}{k} \sum_{j=1}^k R_{t+j,i} = & \gamma_1 + \gamma_2 SENT_{t,i} \\ & + \gamma_3 IFRS_t + \gamma_4 TREAT_i + \gamma_5 SENT_{t,i} * IFRS_t \\ & + \gamma_6 SENT_{t,i} * TREAT_i + \gamma_7 SENT_{t,i} * IFRS_t \\ & * TREAT_i + \varepsilon_{t,i}. \end{aligned} \quad (2)$$

The dependent variable in model (2) is defined as above; $SENT_{t,i}$ represents the sentiment variable¹¹ in country i at time t ; $IFRS_t$ is the IFRS time dummy, which is equal to one in the post-IFRS period starting in 2006 for all treated and control countries, and zero otherwise; and $TREAT_i$ is a country dummy, being equal to one for all countries in the treated group (IFRS adopters) and to zero in the control group (IFRS non-adopters).

Based on model (2), the change in the sentiment–return relationship that proxies for the effectiveness of IFRS in adopting countries is captured by $(\gamma_5 + \gamma_7)$, whereas the change in the sentiment–return relationship for the non-treated group of countries (non-adopters) is captured by γ_5 . Hence, γ_7 represents the change in market efficiency (i.e. the shift in the irrational sentiment–return relationship) which is unique to the treated sample and is not just due to any potential global trends in market efficiency. Following H2, the originally negative sentiment effect in IFRS-adopting

countries is expected to lessen in absolute magnitude, on average, after adoption, and more so than among non-adopters, and hence we expect γ_7 to be positive and significant.¹²

Preliminary empirical results

Descriptive statistics

Table 1 displays the descriptive statistics for the raw CCI, the orthogonalized CCI, and the 6-month average returns for the period 2000–2010. While raw CCI values vary across countries and are not necessarily directly comparable in the cross-section (see Schmeling, 2009, for a similar result), the orthogonalized indices are comparable and their means are approximately zero by construction. Table 1 also shows that some countries tend to generate positive 6-month average returns (e.g. Czech Republic: 0.7620%), whereas others witness an average loss (e.g. Finland: –0.6601%), potentially reflecting heterogeneous countries' responses to the 2007–2009 financial crisis. For the first-order autocorrelations of the orthogonalized sentiment measures, Table 1 shows values that exceed 0.5 for all countries. This persistency is expected, as investor sentiment tends to be highly persistent across time, as documented in previous studies (e.g. Schmeling, 2009; Wang *et al.*, 2021). Table 1 also documents that our orthogonalized sentiment indices are individually stationary for all sampled countries. Further descriptive statistics by pre- and post-IFRS subperiods are available in the on-line Appendix.

Preliminary evidence from the time-varying approach

To obtain preliminary evidence on the time-variation in the impact of irrational sentiment on stock markets, we follow Antoniou *et al.* (2015) and estimate an auxiliary regression of the form:

$$\frac{1}{k} \sum_{j=1}^k R_{t+j} = \alpha_1 + \alpha_2 SENT_t + \varepsilon_t \text{ for each country}$$

in the rolling window framework, with $k = 6$ months and a window length of 36 months. The resulting estimates for the sentiment coefficient, α_2 , and associated 95% confidence interval boundaries

samples for Argentina, Colombia and Indonesia start on 28 February 2001, 30 November 2001 and 30 June 2000, giving 118, 110 and 127 monthly observations, respectively.

¹¹Owing to concerns regarding consistency and comparability of data for economic variables, especially for the control sample, the main panel analysis employs raw, non-orthogonalized sentiment measures. This tilts our chances against finding an impact of IFRS on the sentiment–return relationship, thus making any significant results even more convincing. Results using orthogonalized sentiment are presented in the on-line Appendix and fully support the conclusions based on raw sentiment data.

¹²For reasons discussed earlier in relation to Ball (2006), Lerman (2020) and Blankespoor *et al.* (2020), for comparability with prior research (e.g. Baker *et al.*, 2012) and for increased stringency, all tests of hypotheses are two-sided.

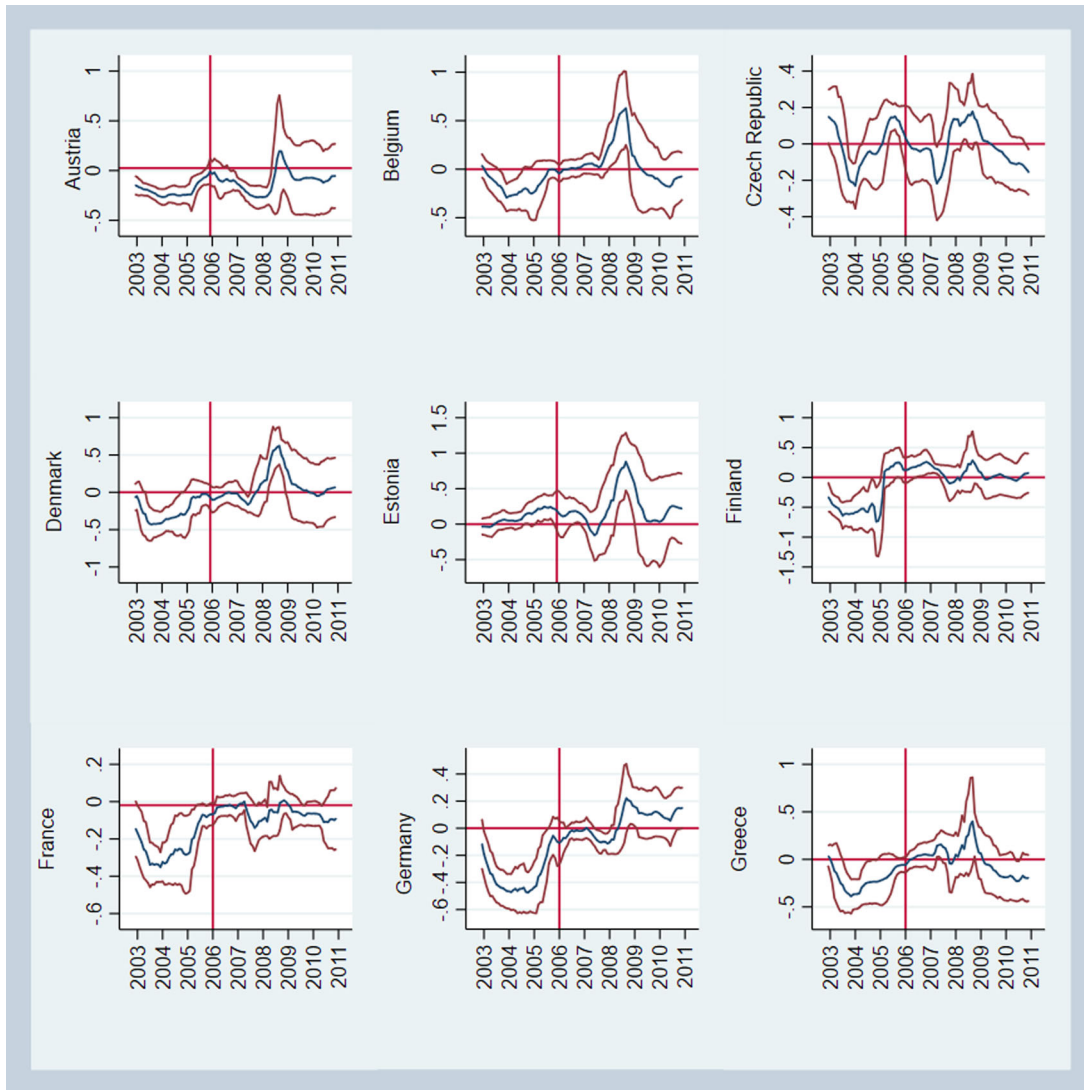


Figure 1. The time-varying sentiment–return relationship

Notes: For each country, we estimate the following regression over a 3-year (36-month) rolling window, starting in year 2000:

$$\frac{1}{k} \sum_{j=1}^k R_{t+j} = \alpha_1 + \alpha_2 \text{SENT}_t + \varepsilon_t$$

where the dependent variable is the average of future 6-month returns, that is, $k = 6$, and SENT_t is investor sentiment measured by orthogonalized CCI values. The charts depict the moving window parameter estimates for α_2 (blue lines) and the associated 95% confidence interval boundaries (red lines). The vertical line indicates the date of compulsory IFRS adoption (end-2005). The horizontal axis indicates the end-date of each rolling window.

[Colour figure can be viewed at wileyonlinelibrary.com]

are shown in Figure 1. The horizontal axis represents the end of each 36-month-long window. The vertical reference line represents the timing of the mandatory adoption of IFRS (end-2005). Because the rolling windows consist of three years, some of the changes in the sentiment coefficient (α_2) that are due to IFRS adoption may be reflected in periods post-adoption.

Figure 1 shows that most countries experience a negative sentiment–return relationship prior to IFRS adoption, in support of H1 that markets suffered from inefficiencies in the pre-reform period. In addition, the majority of countries witness a positive change in values of α_2 around the date of IFRS adoption, which is in line with H2 of a reduction in the impact of irrational

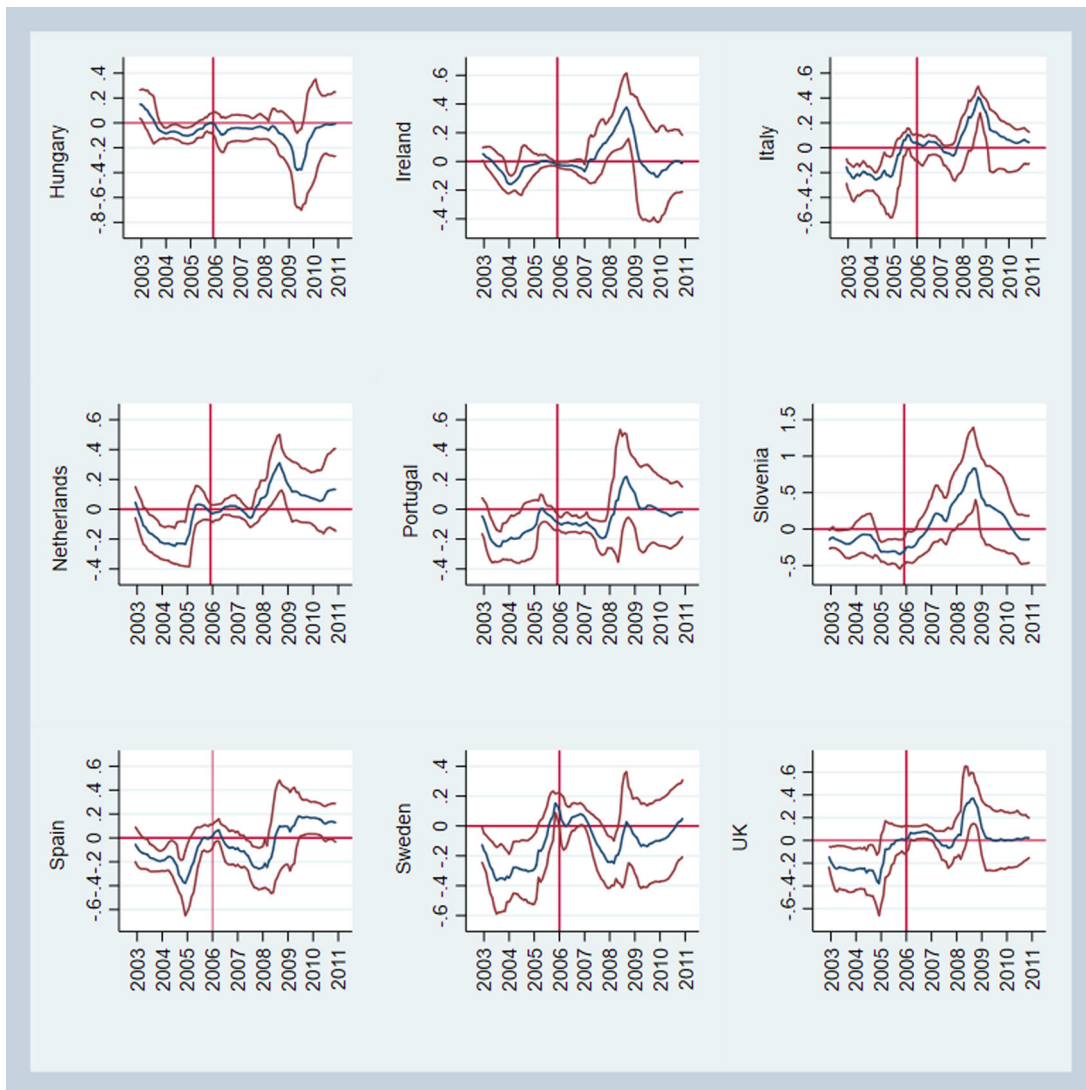


Figure 1. Continued

sentiment on stock markets owing to this regulatory change. Lastly, in most countries the post-IFRS α_2 values appear to be insignificant most of the time, yielding support for H3 that the reform has been successful in enhancing stock market efficiency by eliminating the impact of irrational (sentiment-based) motives to trade on stock prices.

Preliminary evidence from the country-level analysis

Notwithstanding the support the graphical approach above provides for our hypotheses, in what

follows we estimate the change in the impact of irrational sentiment using model (1) for each country in our sample to obtain formal test results. Table 2 shows that 16 of 18 countries witness a negative irrational sentiment impact on future returns prior to IFRS adoption ($\beta_2 < 0$), indicating market inefficiency. Moreover, in 11 of these 16 countries (69%) this irrational sentiment impact is statistically significant, in support of H1. This result is consistent with previous findings by, for example, Lemmon and Portniaguina (2006), Schmeling (2009), Huang *et al.* (2015) and Wang *et al.* (2021).

For all 11 countries with a significant negative sentiment effect pre-IFRS, we note positive

Table 2. Country-level results

	Constant (β_1)	SENT (β_2)	IFRS (β_3)	SENT*IFRS (β_4)	SENT-Post ($\beta_2 + \beta_4$)
Austria	1.2728*** (0.000)	-0.2402*** (0.000)	-1.7863 (0.219)	0.1711 (0.253)	-0.0691 (0.635)
Belgium	0.5648 (0.419)	-0.0690 (0.110)	-1.0391 (0.395)	0.0851 (0.516)	0.0161 (0.896)
Czech Rep.	1.3627 (0.102)	0.0605 (0.614)	-1.3341 (0.249)	-0.0747 (0.579)	-0.0142 (0.816)
Denmark	0.0436 (0.948)	-0.2314** (0.011)	0.0647 (0.960)	0.3323* (0.099)	0.1009 (0.486)
Estonia	2.1830*** (0.001)	0.0392 (0.425)	-4.0658** (0.024)	0.2702 (0.118)	0.3094* (0.063)
Finland	-2.1085*** (0.000)	-0.5054*** (0.000)	1.6663* (0.097)	0.5762*** (0.001)	0.0708 (0.557)
France	-0.0461 (0.934)	-0.2090*** (0.001)	-0.3590 (0.720)	0.1446* (0.051)	-0.0644 (0.143)
Germany	-0.5683 (0.124)	-0.2636*** (0.000)	0.6666 (0.261)	0.3651*** (0.000)	0.1014 (0.125)
Greece	-0.7272 (0.488)	-0.0375 (0.776)	-1.1232 (0.477)	-0.0039 (0.982)	-0.0414 (0.721)
Hungary	0.6034 (0.554)	-0.0380 (0.443)	-0.9527 (0.535)	0.0048 (0.949)	-0.0331 (0.562)
Ireland	0.2391 (0.691)	-0.0031 (0.907)	-1.7434 (0.227)	0.0331 (0.742)	0.0300 (0.758)
Italy	-0.1459 (0.795)	-0.2058*** (0.000)	-0.5436 (0.566)	0.3026** (0.016)	0.0969 (0.387)
The Netherlands	-0.6968 (0.284)	-0.0628 (0.286)	0.4726 (0.687)	0.1676 (0.115)	0.1048 (0.235)
Portugal	-0.5739 (0.312)	-0.1432*** (0.005)	0.2179 (0.851)	0.1041 (0.343)	-0.0391 (0.689)
Slovenia	1.5698*** (0.000)	-0.2071*** (0.003)	-2.0470** (0.045)	0.4721*** (0.004)	0.2650* (0.068)
Spain	0.4639 (0.322)	-0.1679*** (0.000)	-0.6251 (0.461)	0.2203** (0.029)	0.0524 (0.586)
Sweden	-1.4010*** (0.002)	-0.2761*** (0.000)	1.7683* (0.061)	0.2419** (0.027)	-0.0342 (0.726)
UK	-0.5801 (0.271)	-0.1956*** (0.006)	0.6526 (0.479)	0.2079 (0.106)	0.0123 (0.908)

Notes: This table shows the estimation results of model (1): $\frac{1}{k} \sum_{j=1}^k R_{t+j} = \beta_1 + \beta_2 SENT_t + \beta_3 IFRS_t + \beta_4 SENT_t * IFRS_t + \varepsilon_t$, estimated for each of the 18 countries, where future average 6-month returns ($k = 6$) are the dependent variable. The independent variables are the orthogonalized sentiment (SENT), IFRS dummy (IFRS) and the interaction term between sentiment and the IFRS dummy (SENT*IFRS). The last column (SENT-Post) represents the effect of sentiment on future returns in the post-IFRS period ($\beta_2 + \beta_4$). The p-values, reported in parentheses, are estimated using Newey–West standard errors. *p < 0.1; **p < 0.05; ***p < 0.01.

changes in market efficiency, or a reduction in the impact of irrational sentiment, around the IFRS adoption date, as indicated by positive β_4 estimates. The effect is significant in eight cases, indicating a reduced impact of irrational sentiment on stock returns due to IFRS adoption, in support of H2. We interpret this finding as indicative of market participants relying more on firm-related information instead of following the aggregate market sentiment, thus supporting the view that IFRS adoption improved information avail-

ability and quality, leading to a shift towards market efficiency.¹³

The last column of Table 2 shows the magnitude and significance of the irrational senti-

¹³Of the 11 countries exhibiting irrational sentiment effects pre-IFRS, eight countries witness a statistically significant ($\leq 10\%$ level) positive shift in the sentiment–return relationship post-IFRS. It is highly unlikely that this result is due to chance. Additionally, none of the β_4 estimates are negative, an outcome highly unlikely if IFRS adoption had a nil or negative systematic effect.

ment effect in the post-IFRS period ($\beta_2 + \beta_4$). It can be observed that the effect of sentiment becomes insignificant in the vast majority of countries exhibiting a negative sentiment–return relationship pre-IFRS. In fact, all but one of those countries that revealed market inefficiency pre-IFRS show evidence supporting H3 that markets are not systematically affected by changes in irrational investor sentiment in the post-IFRS period.¹⁴

Overall, these country-level results overwhelmingly support H1–H3. Specifically, most countries suffer from inefficiency in financial markets owing to irrational sentiment affecting asset prices pre-IFRS (H1), there is a significant reduction in the effect of sentiment on stocks returns around the adoption date of IFRS (H2), leading to the elimination of the sentiment effect and to enhanced market efficiency in the post-IFRS period (H3). These results indicate that IFRS reforms were effective in their aims, in that there was a reduction in information asymmetry between companies and shareholders as the latter started relying less on aggregate market sentiment and more on information in their investment decisions post-IFRS. In the on-line Appendix we document the robustness of our country-level findings to (i) different time horizons, k , in model (1); (ii) different IFRS adoption threshold dates to account for, for example, voluntary adoptions; (iii) different measures of investor sentiment; and (iv) an alternative estimation method to account for the persistency of explanatory variables.

Main empirical results: Pooled estimations

Our analysis so far has been based on results obtained independently for individual countries; when considered holistically, this set of results yields support for H1–H3. Now we turn to a more robust, if less detailed, pooled analysis, based on the DiD model (2) while still utilizing country-level

results from model (1) to guide our approach (see Cases 1–4 below).

Empirical identification

The overall sample consists of 26 countries: 18 treated (IFRS sample) and 8 control (non-IFRS sample) countries. Firstly, we include all countries when estimating model (2) and we denote this by ‘Case 1’. Further, in order to reduce the noise potentially stemming from inclusion of EU countries where there was no significant sentiment effect pre-IFRS and hence no need for a reform from this perspective, we include only those treated countries that have witnessed a significant sentiment effect pre-IFRS [$\beta_2 < 0$ in model (1)] and a lessened effect of sentiment post-IFRS [$\beta_4 > 0$ in model (1)]; we denote this by ‘Case 2’. If the change in the sentiment–return relationship was driven by IFRS implementation due to market inefficiency, Case 2 should provide a stronger result than Case 1. Thirdly, we include only those EU countries that have witnessed significant sentiment effects pre-IFRS but no changes in individual sentiment effects after the adoption of IFRS [insignificant β_4 in model (1)]; we denote this by ‘Case 3’. Here, we hypothesize that individual β_4 might have been estimated inefficiently when estimated for each country separately, and a panel estimation utilizing a larger data sample might reveal the significance of these effects; hence, given that there was initial market inefficiency as documented by negative β_2 , we expect the result for market efficiency improvement to be significant as well (if IFRS worked). Finally, we compare countries with no significant sentiment-related effects [insignificant β_2 and β_4 in model (1)] with the control sample: we denote this by ‘Case 4’. For this subset of countries (Belgium, Czech Republic, Estonia, Greece, Hungary, Ireland, The Netherlands), there does not appear to have been any sentiment–return evidence indicative of market inefficiency at the individual market level, and, hence, we should not expect any superior improvements in market efficiency in our treated versus control group.

Panel estimation results

Table 3 shows the estimation results of model (2) for Cases 1–4, with Driscoll and Kraay (1998) heteroskedasticity- and autocorrelation-consistent

¹⁴Hence, we document efficiency with respect to the impact of sentiment on prices; markets could have remained inefficient with respect to other forms of efficiency (Fama, 1970), for example utilization of private information or reactions to public information announcements, or when viewed from the perspective of patterns in stock prices (De Bondt and Thaler, 1985, Jegadeesh and Titman, 1993) or return volatilities (Lo and MacKinlay, 1988).

Table 3. Panel estimation results

Variable	Coefficient	Case (1)	Case (2)	Case (3)	Case (4)
Constant	γ_1	2.4266*** (0.001)	-0.0029 (0.998)	2.3894*** (0.002)	0.5034 (0.723)
SENT	γ_2	0.0013 (0.918)	0.0022 (0.856)	0.0016 (0.897)	-0.0021 (0.873)
IFRS	γ_3	-0.5638 (0.596)	-0.3433 (0.726)	-0.4875 (0.658)	-1.3828 (0.207)
TREAT	γ_4	-1.5406*** (0.003)	0.8359 (0.472)	-1.6014*** (0.004)	0.2616 (0.895)
SENT*IFRS	γ_5	0.0004 (0.931)	-0.0018 (0.656)	-0.0004 (0.933)	0.0087 (0.121)
SENT*TREAT	γ_6	-0.0830*** (0.000)	-0.1546*** (0.000)	-0.1144*** (0.001)	-0.0034 (0.869)
SENT*TREAT*IFRS	γ_7	0.0524** (0.016)	0.0987*** (0.000)	0.0532** (0.026)	-0.0074 (0.804)
Fixed effects		Country	Country	Country	Country
Standard errors		Driscoll-Kraay	Driscoll-Kraay	Driscoll-Kraay	Driscoll-Kraay
R-squared		0.083	0.113	0.103	0.069
Observations		3,391	1,807	1,939	1,675
Number of groups		26	14	15	13

Note: This table shows estimation results for model (2):

$\frac{1}{k} \sum_{j=1}^k R_{t+j,i} = \gamma_1 + \gamma_2 SENT_{t,i} + \gamma_3 IFRS_t + \gamma_4 TREAT_i + \gamma_5 SENT_{t,i} * IFRS_t + \gamma_6 SENT_{t,i} * TREAT_i + \gamma_7 SENT_{t,i} * TREAT_i * IFRS_t + \varepsilon_{t,i}$, where future average 6-month returns ($k = 6$) are the dependent variable, $SENT_{t,i}$ represents sentiment in country i , $TREAT_i$ is a dummy equal to one for EU countries with compulsory IFRS adoptions, and $IFRS_t$ is the IFRS dummy equal to one post-2005 and zero otherwise. The p-values, reported in parentheses, are computed using Driscoll–Kraay standard errors. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

(HAC) standard errors and country fixed effects.¹⁵ Table 3 shows that for the whole set of countries (Case 1) and Cases 2–3, where sentiment has a significant negative effect on stock market returns pre-IFRS, the estimates of γ_7 are positive and significant in all cases. This result implies that, when compared with the control group, countries that have adopted IFRS have, on average, witnessed an additional and unique decline in the impact of irrational sentiment on their stock markets post-adoption. Further strengthening support for the impact of IFRS adoption on the sentiment–return relationship, Case 2, which includes only treated countries with a significant sentiment effect pre-

IFRS and a reduced effect post-IFRS, generates stronger results (higher values of γ_7) across all cases. Moreover, the last column of Table 3 (Case 4) shows that those EU countries with no sentiment effect in the pre-IFRS period did not witness any difference in the effect of sentiment on stock markets when compared with the control group (γ_7 insignificant and much lower in value compared with Cases 1–3). This result further supports the notion that IFRS adoptions were the driving force behind improvements in sentiment-related market efficiency, as an improvement is observed (γ_7 significant) in those instances where reform was needed (Cases 1–3), but not where there was no pre-reform sentiment-induced inefficiency and, hence, no room for improvements (Case 4). Overall, the DiD estimation results provide strong additional support for H2 that the IFRS adoption had a unique beneficial effect on market efficiency in adopting countries.

In the on-line Appendix, we document the robustness of our panel DiD findings to (i) alternative methods of estimating standard errors, namely employing country fixed effects and allowing for

¹⁵The Breusch and Pagan (1980) test suggests a model with random effects over a pooled regression, while the Hausman test suggests a model with country fixed effects over a random effects specification. The Lagrange multiplier (LM) test (Breusch and Pagan, 1980) further indicates cross-sectional dependence, while the Wooldridge (2002) test suggests significant autocorrelation in panel residuals; hence, Driscoll and Kraay (1998) standard errors are estimated. Results are not reported here but are available on request.

time clusters in error terms (Petersen, 2009), White (1980) standard errors with no fixed effects, and bootstrapping of standard errors; (ii) the impact of the Global Financial Crisis; (iii) alternative return horizons; (iv) using the CCI component not driven by common macroeconomic variables, as a means of extracting the irrational part of the overall sentiment; (v) the capital market effects of important reforms such as the Markets Abuse Directive (MAD), the Markets in Financial Instruments Directive (MiFID), and the Transparency Directive (TD); (vi) the inclusion of controls for the state of financial markets (proxied by four volatility measures); and (vii) the exclusion of China and Japan from our control sample. We further document that a significant beneficial effect of compulsory IFRS adoption was observed regardless of (viii) whether earlier voluntary adoptions were taking place or not (although it was stronger where prior voluntary adoptions were not allowed); (ix) by how much adoptions were delayed; and (x) the pre-adoption GAAP-IFRS difference. Lastly, our results are demonstrated (xi) via placebo analyses to stem from the IFRS reform and not be due to other effects, and (xii) to not be sensitive to whether, and to what extent, there were concurrent changes in the enforcement of rules across countries.

Further analyses

Persistency of the IFRS effect

In the analyses above, our initial sample period is set to be 11 years around the 2005 event date to capture the effect of the mandatory adoption of IFRS with an adequate number of observations but also to exclude confounding events as much as possible. It could be argued, however, that the effect of IFRS we captured could be only temporary, maybe even spurious, as the sentiment-fuelled inefficiency could reappear in the markets of IFRS adopters as a result of other aggregate developments.

To test this possibility, we estimate model (2) for Cases 1–4 as above over a longer period, namely 1990–2019 (we do not extend our sample beyond year 2019 to avoid potential confounding effects from the COVID-19 pandemic). To isolate the contaminating effect of those control countries that adopted IFRS post-2010 we exclude Ar-

gentina, Brazil and Canada from our control sample.¹⁶ Table 4 shows that our previous conclusions about IFRS being effective in reducing the impact of sentiment on stock markets remain intact, as the coefficient γ_7 remains significant and positive across all cases, except for Case 4 as expected.

Catch-up versus hysteresis hypothesis

We conclude by taking a closer look at how the IFRS effect varies across countries and the determinants of this heterogeneity. This phenomenon is encapsulated by two competing hypotheses: the *catch-up* and the *hysteresis* hypotheses (Abramovitz, 1986). Under the catch-up hypothesis, implementing standardized reforms across countries with different institutional characteristics would level up the field and lead the (institutionally) underperforming countries to catch up with their more advanced peers. The hysteresis hypothesis, on the other hand, stresses the persistence of country-specific institutions and corresponding social norms and resulting behaviours, and implies that implementing standardized international rules may be less effective in countries with historically low institutional quality.

The empirical evidence on the hysteresis versus catch-up controversy is mixed,¹⁷ and our study's setup offers an apt opportunity to contribute to this discussion. In line with this literature, we test whether the effect of IFRS on the sentiment–return relationship varies between country groups with different institutional, market and informational quality characteristics, as described in Table A1 in the Appendix. If the hysteresis (catch-up) hypothesis is correct, we should observe the beneficial impact of IFRS adoptions to be more pronounced, firstly, among countries with better (worse) pre-IFRS institutional quality (proxied by: regulatory quality, rule of law and control of corruption); secondly, in more (less) developed stock markets (proxied by market capitalization/GDP

¹⁶These countries mandated IFRS in 2012, 2010 and 2011, respectively.

¹⁷For instance, Cumming *et al.* (2013), Christensen *et al.* (2016) and Hung *et al.* (2015) report results in support of the hysteresis hypothesis, but Florou and Kosi (2015) find support for the catch-up hypothesis.

Table 4. Panel estimation results: Extended sample period (1990–2019)

Variable	Coefficient	Case (1)	Case (2)	Case (3)	Case (4)
Constant	γ_1	0.0829 (0.881)	-0.1818 (0.760)	-0.2664 (0.656)	1.6406*** (0.002)
SENT	γ_2	0.0007 (0.936)	0.0036 (0.705)	0.0045 (0.643)	-0.0010 (0.914)
IFRS	γ_3	-0.5171 (0.318)	0.0522 (0.924)	0.2342 (0.639)	-0.8589 (0.118)
TREAT	γ_4	0.4151 (0.433)	0.1013 (0.862)	0.1957 (0.729)	-1.1991 (0.138)
SENT*IFRS	γ_5	0.0025 (0.560)	-0.0035 (0.517)	-0.0054 (0.312)	0.0062 (0.136)
SENT*TREAT	γ_6	-0.0462* (0.065)	-0.1168*** (0.001)	-0.1080*** (0.000)	-0.0149 (0.592)
SENT*TREAT*IFRS	γ_7	0.0517** (0.034)	0.1116*** (0.002)	0.1140*** (0.003)	0.0256 (0.286)
Fixed effects		Country	Country	Country	Country
Standard errors		Driscoll-Kraay	Driscoll-Kraay	Driscoll-Kraay	Driscoll-Kraay
R-squared		0.037	0.047	0.047	0.036
Observations		7,464	3,105	4,185	4,769
Number of groups		23	10	13	15

Note: This table shows estimation results for model (2):

$$\frac{1}{k} \sum_{j=1}^k R_{t+j,i} = \gamma_1 + \gamma_2 \text{SENT}_{t,i} + \gamma_3 \text{IFRS}_t + \gamma_4 \text{TREAT}_i + \gamma_5 \text{SENT}_{t,i} * \text{IFRS}_t + \gamma_6 \text{SENT}_{t,i} * \text{TREAT}_i + \gamma_7 \text{SENT}_{t,i} * \text{TREAT}_i * \text{IFRS}_t + \varepsilon_{t,i},$$

where future average 6-month returns ($k = 6$) are the dependent variable, $\text{SENT}_{t,i}$ represents sentiment in country i , TREAT_i is a dummy equal to one for EU countries with compulsory IFRS adoptions, and IFRS_t is the IFRS dummy equal to one post-2005 and zero otherwise. The p-values, reported in parentheses, are computed using Driscoll–Kraay standard errors. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

and stock market turnover/GDP); and thirdly, for countries with better overall (i.e. not just reform-induced) information availability pre-IFRS [proxied by: newspaper circulation (Lai, Ng and Zhang, 2014), average number of analysts per company and average number of analysts' estimates and revisions per company (Griffin *et al.*, 2010). To examine how country characteristics influence IFRS effectiveness, we split our sample of IFRS adopting countries based on the median value of each country characteristic, one at a time, thus dividing the treated countries into above- and below-median groups.¹⁸ We then re-estimate

model (2) for each group and inspect estimates of γ_7 .

The results in Table 5 show the heterogeneity, and determinants, of countries' responses to IFRS adoption, and support the hysteresis hypothesis across a number of country characteristics. Firstly, countries with a relatively higher level of regulatory quality witness a higher magnitude of the beneficial IFRS effect, represented by a higher magnitude of γ_7 for the above- versus below-median group of regulatory quality, where this difference is statistically significant at the 1% level. Similarly, countries with higher levels of rule of law and better control of corruption witness significantly stronger IFRS effects. Secondly, countries with higher levels of market development display a stronger IFRS effect. Lastly, countries with a better-informed public and a higher corporate financial information quality benefit more from compulsory IFRS adoption. These results support the hysteresis hypothesis. Moreover, across all groupings there remains a strong and robust support for H2 that mandatory IFRS adoption was generally beneficial, rather

¹⁸More specifically, the country scores for rule of law, government effectiveness, control of corruption, market capitalization/GDP and stock market turnover/GDP are based on the three-year averages of each variable for each country over the immediate pre-IFRS period, that is, 2003–2005. Country scores for newspaper circulation are the 2003–2004 averages owing to the unavailability of data for 2002 and 2005. The analyst coverage and the average number of estimate revisions per company is the 1994–2005 average figure from Griffin *et al.* (2010).

Table 5. Panel cross-country analysis

	Low	High	High – Low
Panel A: Institutional quality			
	Regulatory quality		
γ_7	0.0404*** (0.003)	0.0729*** (0.000)	0.0325*** (0.005)
	Rule of law		
γ_7	0.0340** (0.011)	0.0583*** (0.000)	0.0243** (0.035)
	Control of corruption		
γ_7	0.0435*** (0.002)	0.0637*** (0.000)	0.0202* (0.085)
Panel B: Market development			
	MKT/GDP		
γ_7	0.0272** (0.032)	0.0633*** (0.000)	0.0361*** (0.001)
	Turnover/GDP		
γ_7	0.0274** (0.019)	0.0681*** (0.000)	0.0407*** (0.0004)
Panel C: Information availability			
	Newspaper circulation		
γ_7	0.0023 (0.904)	0.0661*** (0.001)	0.0637*** (0.000)
	Average number of analysts per firm		
γ_7	0.0447*** (0.010)	0.0620** (0.011)	0.0173* (0.064)
	Average number of estimates and revisions per company		
γ_7	0.0375** (0.012)	0.0612*** (0.009)	0.0237** (0.010)

Note: This table reports the estimated values of the coefficient γ_7 from model (2):

$$\frac{1}{k} \sum_{j=1}^k R_{t+j,i} = \gamma_1 + \gamma_2 SENT_{t,i} + \gamma_3 IFRS_t + \gamma_4 TREAT_i + \gamma_5 SENT_{t,i} * IFRS_t + \gamma_6 SENT_{t,i} * TREAT_i + \gamma_7 SENT_{t,i} * TREAT_i * IFRS_t + \varepsilon_{t,i},$$

where future average 6-month returns ($k = 6$) are the dependent variable, $SENT_{t,i}$ represents sentiment in country i , $TREAT_i$ is a dummy equal to one for EU countries with compulsory IFRS adoptions, and $IFRS_t$ is the IFRS dummy equal to one post-2005 and zero otherwise. The last column reports the difference in the effect of IFRS between country-groups scoring relatively high versus low on each country characteristic. The p-values, reported in parentheses, are estimated using standard errors clustered by month. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

than being concentrated in countries with specific characteristics.

Summary and implications for corporate management

Management scholars have long studied the influence of regulatory reforms (e.g. Hatum and Pettigrew, 2006; Meyer and Stensaker, 2009; among others) and applied behavioural insights to organizational theory and decision-making (Cyert and March, 1963; Greve, 2003), continuing to do so (e.g. Huse, 2005; Kolev, 2016; Zona, 2012). In this paper, we contribute to recent develop-

ments witnessing the application of behavioural finance insights, specifically investor sentiment, to issues of importance to corporations and managers (Amin et al., 2021; Hurwitz, 2018; Simpson, 2013). We examine the impact of the mandatory adoption of IFRS on markets' information efficiency, employing a market-level, behavioural perspective in which we focus on the impact of IFRS regulatory changes in terms of their second-order capital-market consequences. To this end, we investigate the sentiment–return relationship pre- and post-mandatory adoption of IFRS in 18 European countries. In preliminary country-level analyses, we find that the impact of irrational sentiment on aggregate stock markets is

reduced after the mandatory adoption of IFRS for a majority of countries. Our country-level results are robust to various sensitivity tests. In our main empirical approach, using a global pooled DiD analysis, we examine changes in the sentiment–return relationship across countries adopting versus those not adopting IFRS. We find a significant difference in the pre-versus-post IFRS change in the sentiment–return relationship between the adopting and non-adopting countries, providing strong support for the notion that regulatory reform in the guise of IFRS adoption drives improvements in sentiment-related market efficiency. This beneficial effect of IFRS is not driven by concurrent improvements in enforcement, is observed when voluntary early adoptions or sluggish roll-outs of compulsory adoptions took place, and prevails regardless of countries' institutional quality, capital market development level and information availability.

Our behavioural perspective supports the view that accounting rules and regulatory policies can help make better-informed decisions, in part by reducing behavioural limitations (Hirshleifer and Teoh, 2009). By documenting the ability of IFRS reform to help curtail the negative and destabilizing impact of investor sentiment (Siegel, 1992; Berger and Turtle, 2015; Zouaoui *et al.*, 2011), we demonstrate the importance of disclosure and reporting regulation for the stability of financial markets (Leuz and Wysocki, 2016). The functioning of such markets is known to have real efficiency consequences (Xiao, 2020), and so our study has important implications for corporations and their managers. Firstly, for companies already listed or considering going public via IPOs and concerned about irrational sentiment potentially negatively affecting the valuation of their shares, our results indicate that in post-IFRS Europe the impact of sentiment on stock markets is largely diminished, and, hence, markets are better able to correctly value financial assets. This is an important insight, especially in the context of negative investor sentiment, because bearish capital markets influence managerial IPO decisions (Latham and Braun, 2010). Furthermore, top management will be less likely to suffer from accusations of destroying shareholder value when in reality it might have been the negative irrational market sentiment, not poor managerial decisions per se, driving stock prices down. Indeed, contrary to agency perspectives that managers' diversification strategies are

value-decreasing, evidence of increased share purchases by corporate insiders when corporate diversification is high (Ataullah *et al.*, 2014) suggests that managers believe their diversification strategies to be value-increasing. Directly related to our IFRS results, Bozos *et al.* (2014) find that merger premiums are lower post-IFRS, particularly so where targets are mandatory adopters and in countries with lower-quality reporting environments, supporting the view that increased value relevance post-IFRS helps managers to avoid costly merger mistakes. Our finding of a reduced sentiment–return relationship post-IFRS further supports the view that managers will be better equipped with more accurate listed target valuations to inform their merger and acquisition decisions.

Furthermore, reduced information opacity brought about by successful IFRS adoption is also beneficial for shareholders, as it implies that insider trading may become less pronounced, hence limiting the effective expropriation of shareholders by insiders and reducing costs of capital owing to a lower risk of trading against a better-informed insider (Seyhun, 1998). In addition, the post-IFRS reduction in the impact of irrational market sentiment would allow managers to shape firms' long-term payout and investment decisions more optimally, rather than having to cater (Polk and Sapienza, 2009) to irrational investors' fast-shifting appetites for dividends or otherwise rationally unjustifiable investment spending. In a similar vein, an IFRS-induced reduction in market irrationality would affect share repurchases and equity financing decisions, as otherwise, facing irrational stock mispricing, managers must attempt to strategically time share repurchases (Babenko *et al.*, 2012; D'Mello and Shroff, 2000; Dittmar and Field, 2015) and equity issuance (Baker and Wurgler, 2002). Another consequence of the IFRS effect would be that the structure of companies' shareholders would have shifted towards a larger proportion of fundamentals-focused investors, especially institutional ones, which could enable more effective communication, longer-term planning and investment, but also necessitate changes to investment and payout policies (e.g. to cater for the dividend payout preferences of pension funds and life insurers). Thus, our findings link to a growing literature demonstrating the importance of institutional investors in shaping corporate behaviour, with far-reaching implications across a wide range of corporate features, including

corporate social reporting (Dyck *et al.*, 2019), organizational culture (Andreou *et al.*, 2022) and executive compensation (Stathopoulos and Voulgaris, 2016). Note also that our evidence suggests that the impact of irrational sentiment on stock markets is diminished in countries with higher institutional quality, better developed capital markets and enhanced information availability, irrespective of the presence or absence of voluntary adoptions, and hence the managerial implications we highlight need not be limited merely to Europe.

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Supporting Information

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