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The value of (private) investor relations during the COVID-19 crisis

Daniel Neukirchen*, Nils Engelhardt, Miguel Krause, Peter N. Posch
TU Dortmund University, Faculty of Business and Economics, Chair of Finance, Otto-Hahn-Str. 6, Dortmund 44227, Germany

**Abstract**

We investigate the value of investor relations (IR) and find firms with strong IR to experience between five and eight percentage points higher stock returns than those with weak IR during the COVID-19 crisis. Firms with better-quality IR are also associated with higher investor loyalty and appear to have attracted significantly more institutional investors over the crisis period. This suggests that a firm’s IR contributes to value generation by enhancing credibility with shareholders and by diversifying its shareholder base. After decomposing IR into public and private transmission channels, we find the private IR function to be the main driver of our results.

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1. Introduction

Communication with investors has become increasingly important due to the globalization of capital markets and the large amount of unvetted news and opinions about firms on the internet. The latter shape investors’ perceptions and can significantly influence the firms’ valuation (Bartov et al., 2018; Chapman et al., 2019; Lee et al., 2015; Schmidt, 2020). Helping investors and analysts to evaluate information and communicating the firm’s strategy in order to reduce uncertainty and information frictions is a key task, typically carried out by the firms’ investor relations (IR) departments. Accordingly, the US National Investor Relations Institute (NIRI) defines IR as a strategic management responsibility supposed “[... ] to enable the most effective two-way communication between a company, the financial community, and other constituencies, which ultimately contributes to a company’s securities achieving fair valuation” (NIRI, 2020). Although some studies have already highlighted that firms with strong IR have better capital market outcomes (see e.g., Brennan and Tamarowski, 2000; Brochet et al., 2021; Bushee and Miller, 2012; Chapman et al., 2019; Karolyi et al., 2020; Kirk and Vincent, 2014), our understanding of whether this is particularly true or even stronger during times when uncertainty among investors is high, is still limited. In this paper, we therefore use a large sample of European firms to investigate whether firms with strong IR outperformed firms with weak IR when stock markets collapsed as a result of the COVID-19 pandemic.

The COVID-19 pandemic and the subsequent economic lockdown in many European countries can be seen as a perfect example of an exogenous and unexpected shock, which led to enormous uncertainty on capital markets (see e.g., Altig et al., 2020; Baker et al., 2020; Engelhardt et al., 2020a; Zhang et al., 2020). While European stock markets were thriving until mid-February 2020, the markets dropped by roughly 30% until the end of March 2020 (see Fig. 1). Consequently, a lot of rumors appeared in press and online about firms’ ability to manage the crisis. This might have overburdened market participants with limited information processing capabilities and led to information frictions (see e.g., Hirshleifer and Teoh, 2003; Merton, 1987; Peng and Xiong, 2006). We hypothesize that if a firm’s IR helps to alleviate uncertainty and to reduce information frictions, it should particularly pay off during times when market participants are unsettled. The COVID-19 pandemic provides us with such an opportunity and thus allows to examine the relation between the quality of a firm’s IR and its market valuation.

To do so, we use the 2020’s IR rankings for roughly 1,000 European firms from 16 different countries provided by Institutional
Institutional Investor\textsuperscript{1} and stock and accounting data from Compustat/\textsuperscript{2}Capital IQ and Thomson Reuters Eikon. In univariate tests, we find High IR firms, i.e., those having an IR score above the country median, to experience 7.09 percentage points higher cumulative returns after the crisis unfolded in mid-March 2020. We also find that this difference holds until the end of our observation period in October 2020, which is a first indication of IR being valuable for firms during times of crisis.

To further test whether IR might have paid off during the COVID-19 crisis, we estimate various multivariate specifications. In our baseline specifications, we use either the cumulative raw stock returns or the cumulative abnormal stock returns over the period from February 3 to March 23, 2020, which is the collapse period as defined in Fahlenbrach et al. (2021)\textsuperscript{2}, as the dependent variable and both dummy variables and the raw IR scores as the main independent variables. The results from these tests are consistent with our hypothesis and provide evidence of a positive association between a firm’s IR quality and its stock performance during the collapse period. For instance, we find that firms with strong IR experienced at least 4.72 percentage points higher cumulative returns when stock markets collapsed. Our results are robust to controlling for industry and country-fixed effects, a variety of firm and governance characteristics used in related settings (see e.g., Albuquerque et al., 2020; Fahlenbrach et al., 2021; Lemmon and Lins, 2003; Lins et al., 2013; 2017; Mitton, 2002), as well as to using an entropy balanced sample.

However, while the inclusion of industry and country-fixed effects and the use of entropy balancing helps us to condition out time-invariant unobservable systematic differences between firms in different industries and countries as well as observable systematic differences between firms with strong IR and those with weak IR, there may also be time-invariant unobservable firm characteristics as well as time-varying economy and industry traits (e.g., policy reactions to the crisis) affecting our results. To account for this, we estimate regressions similar to Ding et al. (2021) where the dependent variable is the firm’s weekly stock return over the entire year 2020 and where we interact each independent variable, including our measures for the firm’s level of IR, with the weekly growth in confirmed COVID-19 cases. This setting has the advantage that it allows us to include firm, industry-time, and economy-time-fixed effects and thus to rule out these potential concerns. But despite employing this different setting, the results from these regressions strengthen our previous findings.

To support our hypothesis and to specifically examine whether having better-quality IR became even more valuable as the crisis unfolded, we also perform two further tests. Following Albuquerque et al. (2020) and Ramelli and Wagner (2020), we first estimate daily cross-sectional regressions of the firms’ cumulative abnormal returns during the first quarter of 2020 on our measures for a firm’s IR quality and find that the loading on the coefficient increases late-February to mid-March. Thereafter, the loading on the coefficient stagnates.

Second, we follow Lins et al. (2017) and Albuquerque et al. (2020) by using a difference-in-differences analysis. Specifically, we construct a panel of daily abnormal returns and estimate a difference-in-differences regression where the dependent variable is the daily abnormal return and the main independent variable of interest is the interaction between our dummy variable High IR and an event date dummy equaling one for all dates in the crisis period, and zero otherwise. We also include an interaction between High IR and an event date dummy equaling one for all dates after the initial shock to capture the impact of IR during the recovery period. But consistent with our previous findings, we also find firms with strong IR to experience higher crisis returns in this test.

We next seek to identify which functions of a firm’s IR caused the outperformance of strong IR firms compared to weak IR firms during the crisis period. To do so, we follow Brochet et al. (2021) and decompose a firm’s IR score into a public and a private component. Repeating our previous analyses with these scores shows that a firm’s private IR is positively associated with the stock performance during the crisis period, whereas
a firm’s public IR does not appear to contribute to the outperformance of firms with better-quality IR. This finding is striking given that Brochet et al. (2021) stress that both functions contribute to better capital market outcomes. However, we interpret our result in the context of the crisis. An article in the IR Magazine (2020), for example, provides some anecdotal evidence that private IR functions, such as organizing meetings with senior management, have been of particular importance to investors during the crisis. Besides, the COVID-19 crisis posed great challenges to a firms public IR activities due to the potential risk of infection, which might also explain this result.

While our main tests focus on providing evidence that firms with better-quality (private) IR outperformed those with lower-quality (private) IR, we also examine how a firm’s IR functions might have boosted its firm value. One explanation for the return premium could be that (private) IR helps to enhance a firm’s credibility with its shareholders. Another explanation could be related to IR helping to diversify a firm’s shareholder base, which could have also led to lower stock volatility during the crisis. To test the first explanation, we regress the fraction of incumbent institutional investors staying loyal to the firm over the crisis period on our measures for IR quality. Our results provide evidence that institutional investor loyalty is higher at firms with better-quality (private) IR. This suggests strong IR to enhance a firm’s credibility. To examine the second explanation, we regress the change in the number of institutional investors over the crisis period as well as the idiosyncratic stock volatility on our measures for IR quality. We find the change in the number of institutional investors to be more positive and volatility decreasing during the crisis period to be indeed slightly lower for strong (private) IR firms. Collectively, these findings therefore highlight that a firm’s IR function might have boosted its firm value by both enhancing its credibility with its shareholders and by diversifying its shareholder base.

In some additional tests, we also check whether firms in industries particularly affected by the COVID-19 pandemic benefited even more from having better IR and whether there is a link between the value of IR during the crisis and the countries the firms are headquartered in. While we do not find that IR payed off more in industries particularly affected by the crisis, we find considerable variation in the value of IR depending on certain country characteristics. Following Karolyi et al. (2020), we investigate this by splitting the sample based on the median scores on several country characteristics and rerunning our baseline regression on the respective subsamples. Our results show that, consistent with Karolyi et al. (2020), firms with strong IR domiciled in countries, where lower-quality legal institutions prevail, experienced significantly higher abnormal returns during the collapse period compared to those domiciled in countries with higher-quality legal institutions. Further, we find that better-quality IR was even more valuable in countries where the level of societal trust is weak and where people have difficulties in dealing with uncertainty. We also rerun these analyses using the decomposed scores and find, consistent with our previous findings, a firm’s private IR function to be the main driver of the results.

The remainder of this paper is structured as follows: Section 2 provides a literature review. Section 3 describes the data and variables. Section 4 presents our empirical analysis and the results, while Section 5 presents additional tests. In Section 6, we check the robustness of our results. Section 7 concludes.

2. Literature review and contribution

Our contribution to the literature is twofold. First, we contribute to the literature on the impact of IR on corporate outcomes. In this regard, prior studies primarily focusing on the US market have shown a positive association between a firm’s IR and its capital market outcomes. For instance, employing IR magazine ratings of investor relations, Agarwal et al. (2008) show higher-rated firms to experience higher abnormal returns surrounding their rating announcements. Bushee and Miller (2012) use a sample of US small and mid-cap firms, which have initiated an IR program, to show a positive association between a firm’s IR activities and its market value (in terms of reductions in the book-to-price ratio). They also highlight that these firms attract more institutional investors. Similar findings are provided by Kirk and Vincent (2014), who focus on US firms having initiated internal professional IR. Chapman et al. (2019) study whether IR officers are valuable to firms since they might help investors and analysts to evaluate information. Their findings indicate that US firms with IR officers have better capital market outcomes, i.e., lower stock volatility and lower forecast dispersion. Further, Chahine et al. (2020) show that hiring IR consultants prior to going public increases news coverage and is associated with higher first-day returns, while Hope et al. (2021) show that hiring Wall Street analysts as IR officers is beneficial. Besides, there is also evidence by Crifo et al. (2019) and Hockerts and Moir (2004) linking the firm’s corporate social responsibility (CSR) performance to IR. Karolyi et al. (2020) use survey data of IR officers from 59 countries to show a positive relation between a firm’s IR efforts and its market valuation measured by Tobin’s Q. They highlight that a firm’s IR efforts are related to legal protection, disclosure standards, and media visibility, Brochet et al. (2021) use the IR rankings provided by Institutional Investor (formerly called Exel) for the period from 2014 through 2018 and find a positive association between a firm’s IR efforts and its market valuation. Also, they document that firms with strong IR have greater firm visibility and that the overall benefits of IR vary between insider and outsider-oriented markets. Recently, Chapman et al. (2021) also show that IR appears to deter shareholder activism.

Although all of these studies provide evidence indicating a positive association between IR and a firm’s capital market outcomes, our study is the first to test the link during a crisis period. Our results imply that only a firm’s private IR activities are positively associated with a firm’s stock performance during the crisis and that a firm’s IR functions appear to boost its firm value through both enhancing credibility with its shareholders and through diversifying its shareholder base.

Second, we contribute to the ongoing literature on characteristics making firms more immune and resilient during times of crisis, and in particular during the COVID-19 crisis. Most of the recent studies, however, focus on the US stock market. For instance, Fahlenbrach et al. (2021) find US firms with high financial flexibility to experience higher returns during the crisis. Ramelli and Wagner (2020) find that this was particularly true for non-financial firms. A paper by Albuquerque et al. (2020), which we closely relate to in terms of methodology, shows US firms with higher environmental and social ratings to experience higher stock returns and less volatility. Further, Landier and Theismar (2020) highlight that the decline in stock prices during the COVID-19 crisis can be explained by analysts’ forecast revisions. Acharya and Steffen (2020) document that US firms with a lower credit-rating were particularly affected during the COVID-19 crisis, while Pagano et al. (2020) show that US firms more resilient to social distancing are associated with higher stock returns. Finally, Alfaro et al. (2020) demonstrate that US firms were less affected by the crisis if they were able to shed costs.

One of the few studies focusing on cross-country data is Ding et al. (2021). Similar to Fahlenbrach et al. (2021) and Ramelli and Wagner (2020), they demonstrate that firms with high financial flexibility are associated with a lower decline in stock prices. Besides, they show that the drop in a firm’s stock price was lower if the firm was more active in CSR and had less en-
trenched executives. Finally, Cheema-Fox et al. (2020) also employ cross-country data to show that stock price reactions are associated with the sentiment around firms’ responses (in terms of layoffs, supply chain, products, and services).

We contribute to this strand of literature by showing that, in a cross-country setting, firms with strong IR experienced higher stock returns and were thus more resilient during the COVID-19 crisis.

3. Data and variables

3.1. Sample construction

We obtain information on IR rankings for over 1,000 publicly-traded companies from 16 European countries for the year 2020. These rankings, provided by Institutional Investor (historically called Extel), are based on a large survey where buy and sell-side institutions were asked to rate on the perceived quality of the firms’ IR programs. The respondents, which are almost evenly distributed between the buy and sell-side, were particularly asked to evaluate the firms’ communication with investors (i.e., the productivity of road shows and meetings, the quality of conference calls, the access to senior management, the firms’ responsiveness, the authority and credibility of the IR team and its business and market knowledge, the quality of investor events, and the quality of the firms’ Environmental and Social (ES) reporting) as well as the firms’ financial disclosure practices (i.e., the time to market, the granularity as well as the comparability and consistency of financial disclosures). Unfortunately, there is no data on the different sub-dimensions of the IR activities available, but Institutional Investor provides scores as well as ranks for each firm within a country based on the percentage of respondents voting for a particular firm. We then merge these scores with stock and accounting data from Compustat/Capital IQ and with ownership data, governance data, data on a firm’s information environment, and ES ratings for the year 2019 from Thomson Reuters Eikon. Additionally, we obtain data on a firm’s news environment from Dow Jones Factiva.

3.2. Key variables

Our main independent variable of interest is High IR, which is a dummy variable equaling one if the firm's IR score is larger than the median score within the respective country, and zero otherwise. We thereby account for the fact that the scores provided by Institutional Investor are scaled on country-level. In additional regressions, we also employ the natural logarithm of the raw IR score as the main independent variable of interest.

For a more detailed view on our main variable of interest High IR, we report the number and the proportion of High IR and Low IR firms in the respective industry sectors based on the Global Industry Classification Standards (GICS) 11 sectors in Fig. 2. For instance, we observe 201 firms located in the Industrials sector, where we find that 47% of the firms are classified as High IR firms and 53% of the firms are classified as Low IR firms. Furthermore, it is noteworthy that 75% of the firms in the Utilities sector are High IR firms.

Since we are interested in studying whether firms with strong IR had better stock performance during the COVID-19 crisis, we mainly employ the cumulative raw stock returns as well as the cumulative abnormal stock returns based on a market model estimation as our dependent variables. Following Fahlenbrach et al. (2021), we specifically calculate cumulative returns for the period from February 3 through March 23, 2020, which is the so-called “collapse period” where stock prices declined dramatically. Although Fahlenbrach et al. (2021) focus on the US stock market, we find the same pattern on European stock markets. While mean daily stock returns are negative during the collapse period, we find a positive mean return of 7.32% on March 24, 2020, which is the day the market was informed that the approval of the two trillion US dollar coronavirus stimulus bill was likely. So, European markets also reacted strongly to the news about the US government’s policy response.

In terms of control variables, we mainly follow the existing literature (see e.g., Albuquerque et al., 2020; Brochet et al., 2021; Fahlenbrach et al., 2021; Glossner et al., 2020; Lins et al., 2017; Karolyi et al., 2020). We describe the construction of these variables in detail in Table A.1 in the appendix.

3.3. Summary statistics

Our final sample consists of 947 firms from 16 European countries for which we have stock data available. Table A.2 in the appendix holds a list of countries covered. However, some of the control variables are missing for certain observations. This is why we estimate different regression models in our analysis. Taking this into account, Table 1 provides basic summary statistics for the variables in our sample and Table A.3 in the appendix reports the respective correlations.

The descriptive statistics show that mean and median cumulative raw returns over the collapse period are highly negative amounting to approximately −45.58% and −43.38%, respectively. The standard deviation is 26.72%; thus cumulative returns exhibit large variation. In fact, the numbers are almost identical to those reported in Fahlenbrach et al. (2021). Also, mean and median cumulative abnormal returns are negative. The mean of the natural logarithm of the IR score amounts to −3.90. Regarding control variables, we find that the average firm size in terms of total sales amounts to $11.31 billion. Further, the average firm in our sample has a return on equity of 3.89%, a market-to-book ratio of 3.94, and a cash-to-assets ratio of 12.13%.

4. Empirical analysis and results

4.1. Baseline results

To study whether firms with better IR had higher stock returns during the COVID-19 crisis, we first perform a univariate analysis. Similar to Fahlenbrach et al. (2021), we compare the evolution of cumulative raw stock returns between groups of firms with strong IR and those with weak IR. To classify firms, we use our dummy variable High IR. Figure 3 shows the results.

Figure 3 indicates that the difference in cumulative returns widens when stock markets collapsed in mid-March 2020 and that this difference holds until the end of our observation period in October 2020. While the difference in mean cumulative returns between firms with strong IR and those with weak IR is almost zero at the beginning of the year, we find firms with strong IR to experience on average 6.42 percentage points higher cumulative returns (as of September 30, 2020) after the COVID-19 crisis unfolded. This suggests that reducing uncertainty and information frictions among investors through effective IR appears to be valuable.

Footnotes:

1 Institutional Investor does not provide a pre-selected company list to the institutions that participate in the survey.

4 The expected returns used to calculate the abnormal returns are based on a market model estimation. We estimate betas using the firm’s stock returns for the year 2019 and the returns of the respective national stock market index. To ensure robustness, we also calculate abnormal returns based on the capital asset pricing model (CAPM) as well as the Fama-French three factor model.
To test whether these first results also hold in multivariate specifications, we perform various ordinary least squares (OLS) regressions as defined below:

\[ \text{Stock Performance}_i = \beta_0 + \beta_1 \times \text{High IR}_i + \beta' \times X_{i,t-1} + \alpha_k + \alpha_j + \varepsilon_i \] (4.1)

where \(i\) denotes the firm. We measure stock performance using either the cumulative raw stock returns or the cumulative abnormal stock returns for the period from February 3 to March 23, 2020, which is the collapse period as defined in Fahlenbrach et al. (2021). The main independent variable of interest in our regressions is the dummy variable \(\text{High IR}\). We also control for a variety of firm characteristics denoted by the vector \(X_{i,t-1}\). The terms \(\alpha_k\) and \(\alpha_j\), respectively, denote industry-fixed effects (based on the GICS 11 sectors) and country-fixed effects. \(\varepsilon_i\) stands for the error term. Following Lins et al. (2013) and Petersen (2009), we cluster standard
In Panel A, we use the firms cumulative raw stock return as the dependent variable and High IR as our independent variable of interest. Across all columns, we find positive and highly statistically significant coefficients on High IR. The coefficients are also comparable in size regardless of whether we control for industry-fixed effects only (column (1)), industry and country-fixed effects (column (2)), or industry and country-fixed effects as well as for further firm (column (3)) and governance characteristics (column (4)). The two reasons why we control for governance characteristics are that (I) a firm’s IR activities could complement or substitute some aspects of corporate governance, and that (II) recent research suggests well-governed firms to perform better during times of crisis (Lins et al., 2013; Nguyen et al., 2015). Considering that we still find a positive and statistically significant association after controlling for all of these factors, we can conclude that firms with strong IR experienced on average at least 4.72 percentage points higher returns when stock markets collapsed. This is an economically sizeable effect. In terms of control variables, we also find positive and statistically significant coefficients on Momentum, Tobin’s Q, US Listing and High ES, and negative and statistically significant coefficients on Historical Volatility, Long-term Debt / Assets and Board Governance Score. These results are mainly in line with the related literature showing firms with stronger ES performance, higher financial flexibility, and better past performance to experience higher returns during the COVID-19 crisis (see e.g., Albuquerque et al., 2020; Ding et al., 2021; Fahlenbrach et al., 2021). Interestingly, we also find that well-governed firms appear to have performed worse and that there is no significant relationship between a firm’s stock performance during the crisis and its cash holdings, ownership structure, or its informational environment.\footnote{In unreported regressions, we also cluster standard errors by country and industry. Nonetheless, we find qualitatively similar results.}

In Panel B, we run the same regressions using a firms cumulative abnormal stock return (based on a market model estimation) as the dependent variable and High IR as our independent variable of interest. Again, we find positive and highly statistically significant coefficients on High IR across all columns; thus strengthening our findings from Panel A. As a matter of fact, adjusting for firm risk leads to larger magnitudes of the coefficients on High IR. Firms with better-quality IR are associated with at least 6.89 percentage points higher abnormal returns compared to those with lower-quality IR. Regarding our control variables, the results show a similar picture to the one found in Panel A, except for the negative coefficient on Momentum and the positive and statistically significant coefficient on Analyst Following in column (4). Also, statistical significance vanishes to some extent regarding the Board Governance Score.

To ensure that our results also hold when we use alternative measures for a firm’s IR quality, we rerun the same regressions as in Panel B of Table 2 but use the natural logarithm of the raw IR scores, dummy variables for each IR quartile, and the residuals from a first stage regression as our main independent variables of interest. Table 3 presents the results where we do not report the coefficients on the control variables for reasons of brevity.

In Panel A, we report the results from regressions where we use the firms’ cumulative abnormal stock return as the dependent variable and the natural logarithm of the raw IR scores as the main independent variable. Similar to our previous results, we find firms with higher-quality IR to be associated with higher abnormal stock returns during the crisis. Interestingly, controlling for country-fixed effects (columns (2) to (4)) does not only lead to an improvement in terms of fit but also to a significant increase in magnitude of the coefficient on \( \log(\text{IR Score}) \). However, controlling for further

\footnote{We note that in comparison to Ramelli and Wagner (2020) and Fahlenbrach et al. (2021), there is less variation in cash holdings in our sample consisting of (relatively large) European firms. This might explain that we do not find a significant coefficient on Cash / Assets.}
Table 2
IR and crisis-period returns.
This table presents the results from OLS regressions. In Panel A, the dependent variable is a firm's cumulative raw stock return for the period from February 3, 2020 to March 23, 2020, which is the collapse period as defined in Fahlenbrach et al. (2021). The main independent variable of interest is High IR, which equals one if the firm's IR score is larger than the median IR score within the respective country. Across all columns, we control for industry-fixed effects based on the Global Industry Classification Standard's (GICS) 11 sectors. In columns (2) to (4), we include country-fixed effects. In columns (3) and (4), we additionally include controls for a variety of firm characteristics. Finally, in column (4) we also include several board characteristics and the dummy variable High ES to control for firms with high ES ratings. All variables are described in detail in Table A1 in the appendix. In Panel B, the dependent variable is a firm's cumulative abnormal return (based on market model estimations) for the period from February 3, 2020 to March 23, 2020. The regression specifications are similar to those in Panel A. Across all panels, we report robust standard errors clustered by country in parentheses, with ∗∗∗, ∗∗, ∗ denoting statistical significance at the 1%, 5%, and 10% level.

Panel A:
Dependent Variable: Raw returns

|                | (1)    | (2)    | (3)    | (4)    |
|----------------|--------|--------|--------|--------|
| High IR        | 0.0579*** | 0.0626*** | 0.0803*** | 0.0472* |
|                | (0.0189) | (0.0205) | (0.0199) | (0.0275) |
| Size           | −0.0080 | −0.0111 | (0.0107) | (0.0139) |
| ROE            | 0.2763  | 0.3699  | (0.2860) | (0.2749) |
| Tobin’s Q      | 0.0227*** | 0.0213*** | 0.0057) | (0.0062) |
| Market-to-Book | −0.0016 | −0.0033 | (0.0020) | (0.0026) |
| Historical Volatility | −0.3634*** | −0.3051**  | (0.1260) | (0.1512) |
| Cash / Assets  | 0.0488  | 0.0973  | (0.0830) | (0.0921) |
| Long-term Debt / Assets | −0.3198*** | −0.2673*** | (0.0196) | (0.2282) |
| Momentum       | 0.0343** | 0.0551*** | (0.0143) | (0.0150) |
| Analyst Following | −0.0283  | 0.0135  | (0.0285) | (0.0257) |
| Blockholder    | 0.0422  | 0.0675  | (0.0501) | (0.0525) |
| Institutional Ownership | 0.0268  | 0.0327  | (0.0448) | (0.0456) |
| US Listing     | 0.0990*** | 0.0660*** | (0.0213) | (0.0282) |
| High ES        | 0.0698  | 0.0385  | (0.0035) | 0.0182  |
| Board Size     | −0.0040 | 0.0351  | (0.0315) | 0.0182  |
| Board Independence | 0.17     | 0.33     | 0.31     | 0.33     |
| Board Governance Score | −0.1067*** | −0.0291*** | (0.0291) | 0.058    |

Panel B:
Dependent Variable: Abnormal returns

|                | (1)    | (2)    | (3)    | (4)    |
|----------------|--------|--------|--------|--------|
| High IR        | 0.1186*** | 0.1248*** | 0.0996*** | 0.0689*** |
|                | (0.0200) | (0.0216) | (0.0208) | (0.0261) |
| Size           | 0.0103  | 0.0064  | (0.0127) | (0.0117) |
| ROE            | 0.3741  | 0.3490  | (0.2763) | (0.3214) |
| Tobin’s Q      | 0.0275*** | 0.0235*** | (0.0056) | (0.0067) |
| Market-to-Book | −0.0012 | −0.0012 | (0.0017) | (0.0023) |
| Historical Volatility | −0.0925  | −0.0326 | (0.1399) | (0.1632) |
| Cash / Assets  | 0.0815  | 0.1032  | (0.0689) | (0.0812) |
| Short-term Debt / Assets | −0.2268  | −0.4126* | (0.1882) | (0.2187) |
| Long-term Debt / Assets | −0.2875*** | −0.2397*** | (0.0640) | (0.0660) |

(continued on next page)
firm and governance characteristics (columns (3) and (4)) does not change the magnitude of the coefficient significantly.

In Panel B, we show the results from regressions where the dependent variable is the firms cumulative abnormal stock return and where we divide firms into IR quartiles. This approach helps us to analyze whether the positive association between a firm’s IR quality and the abnormal stock returns during the crisis is more pronounced at very high or very low levels. In each regression, we therefore include the dummy variables IR Score Q2 (taking the value of one if the firm is in the second IR quartile), IR Score Q3 (taking the value of one if the firm is in the third IR quartile), and IR Score Q4 (taking the value of one if the firm is in the fourth IR quartile). The intercept captures the effect of firms in the first quartile. Consistent with our previous findings, we find firms with better IR to experience higher abnormal returns during the crisis. Particularly, the results show that the difference in abnormal returns between firms in the best quartile and those in the worst quartile is at least 13.73 percentage points. This is an economically sizeable effect considering that mean cumulative abnormal returns amount to -14.44%. Furthermore, it is noteworthy that although the relation between IR and the cumulative abnormal returns during the collapse period is monotonic, it is not completely linear when we control for further governance characteristics. For instance, we find firms in the second quartile to experience almost 6 percentage points higher abnormal returns compared to those in the first quartile. However, the results show only a 2.91 percentage points improvement when firms are in the third quartile (compared to those in the second quartile), and another 4.94 percentage points improvement when firms are in the best quartile. We can therefore conclude that those firms with very weak IR were particularly affected during the COVID-19 crisis.

Finally, in Panel C, we use the residuals from a first stage regression as the main independent variable of interest. In the first stage regression, the dependent variable is the natural logarithm of the raw IR score, and the independent variables are measures for firm performance, firm age, and media coverage. The first stage regression also includes industry and country-fixed effects and exhibits an R-squared of roughly 70%. By employing this approach, we aim to address the issue that the IR score might be primarily driven by past performance and firm visibility and not by the firm’s IR activities. However, the results remain robust even when using the residuals, i.e., the part that is not explained by the above-mentioned characteristics.\footnote{The results also remain robust when we include the number of analysts following the firm in the first stage regression.}

4.2. Addressing endogeneity concerns

Although our baseline regressions provide consistent evidence that firms with better-quality IR had higher crisis-period returns, we cannot completely rule out that a firm’s IR and its performance are endogenously determined. For instance, firms with better-quality IR might be systematically different from firms with lower-quality IR in terms of other observable firm characteristics such that these differences are affecting our results. We alleviate this concern by employing entropy balancing, which is a data preprocessing method where weights are calculated to achieve covariate balance between treatment and control groups (Hainmueller, 2012). As opposed to propensity score matching, which is also commonly used in these contexts, entropy balancing provides the added benefit of not reducing the sample size. We display the results employing this approach in Table 4.

In Panel A, we show the means of the covariates from column (3) of Table 2 of the treatment and control group as well as the respective differences before and after entropy balancing.\footnote{We balance the covariates on all three moment conditions, namely mean, variance, and skewness.} We find that before balancing, firms with higher-quality IR indeed differ substantially from those with lower-quality IR. They are on average significantly larger in terms of firm size, have a higher return on equity, and have significantly lower historical stock volatility and a lower cash-to-assets ratio. Additionally, more analysts are following firms with better-quality IR, the percentage of shares held by blockholders is lower, and they are more likely listed on US exchanges as well. However, all of these differences vanish once the algorithm is implemented.
Table 3
Alternative IR measures and crisis-period returns.

This table presents the results from OLS regressions. In Panel A, the dependent variable is a firm’s cumulative abnormal stock return for the period from February 3, 2020 to March 23, 2020, which is the collapse period as defined in Fahlenbruch et al. (2021). The main independent variable of interest is log(IR Score), which is the natural logarithm of the raw IR score. In Panel B, we use the cumulative abnormal return as the dependent variable and dummy variables for the IR quartiles per country. IR Score Q2 takes the value of one if the firm is in the second IR quartile and zero otherwise. IR Score Q3 takes the value of one if the firm is in the third IR quartile and zero otherwise, and IR Score Q4 takes the value of one if the firm is in the fourth IR quartile and zero otherwise. In Panel C, the dependent variable is the cumulative abnormal return and the main independent variable is IR Residuals, which is the residual from a first stage regression where the dependent variable is the log(IR Score) and the main independent variables are measures for firm performance, firm age, and firm visibility. Across all panels, we control for industry-fixed effects based on the Global Industry Classification Standard’s (GICS) 11 sectors in all regressions. We include country-fixed effects in columns (2) to (4). In columns (3) and (4), we additionally include controls for a variety of firm and board characteristics (not reported but similar to those used in Table 2). All variables are described in detail in Table A1 in the appendix. Across all panels, we report robust standard errors clustered by country in parentheses, with “∗”, “∗∗”, “∗∗∗” denoting statistical significance at the 1%, 5%, and 10% level.

Panel A:
Dependent Variable: Abnormal returns

| log(IR Score)   | (1)     | (2)     | (3)     | (4)     |
|-----------------|---------|---------|---------|---------|
| Observations    | 947     | 947     | 710     | 558     |
| Firm Characteristics | no     | no     | yes     | yes     |
| Board Characteristics | no     | no     | no     | yes     |
| Industry Fixed Effects | yes    | yes    | yes     | yes     |
| Country Fixed Effects | no     | yes    | yes     | yes     |
| Adjusted R-Squared | 0.13    | 0.18    | 0.29    | 0.29    |

Panel B:
Dependent Variable: Abnormal returns

| IR Score 2   | (1)     | (2)     | (3)     | (4)     |
|--------------|---------|---------|---------|---------|
| Observations | 947     | 947     | 710     | 558     |
| Firm Characteristics | no     | no     | yes     | yes     |
| Board Characteristics | no     | no     | no     | yes     |
| Industry Fixed Effects | yes    | yes    | yes     | yes     |
| Country Fixed Effects | no     | yes    | yes     | yes     |
| Adjusted R-Squared | 0.15    | 0.19    | 0.29    | 0.28    |

Panel C:
Dependent Variable: Abnormal returns

| IR Residuals | (1)     | (2)     | (3)     | (4)     |
|--------------|---------|---------|---------|---------|
| Observations | 900     | 900     | 684     | 535     |
| Firm Characteristics | no     | no     | yes     | yes     |
| Board Characteristics | no     | no     | no     | yes     |
| Industry Fixed Effects | yes    | yes    | yes     | yes     |
| Country Fixed Effects | no     | yes    | yes     | yes     |
| Adjusted R-Squared | 0.13    | 0.16    | 0.29    | 0.29    |

In Panel B, we report the results from regressions similar to those in columns (3) and (4) of Panel B of Table 2 using our weighted sample. The results are consistent with those found in the previous section and help us rule out that observable systematic differences between firms with higher-quality IR and those with lower-quality IR are driving stock performance during the crisis.

However, while the inclusion of industry and country-fixed effects and the use of entropy balancing helps us to condition out time-invariant unobservable systematic differences between firms in different industries and countries as well as observable systematic differences between firms with strong IR and those with weak IR, there may also be time-invariant unobservable firm characteristics as well as time-varying economy and industry traits affecting our results. To account for this as well, we estimate regressions similar to Ding et al. (2021), where the dependent variable is the firm’s weekly stock return over the entire year 2020 and where we interact each independent variable, including our measures for the firm’s level of IR, with the weekly growth in confirmed COVID-19 cases in the country. This setting has the advantage that it allows us to include firm, industry-time, and economy-time-fixed effects. As Ding et al. (2021) notes, “With these fixed effects, we condition out all time-varying and time-invariant economy traits, such as differences in legal and political systems, policy reactions to the crisis, institutions and cultural norms, demographic, geographic, and population density characteristics, and
other cross-country traits, as well as all time-varying and time-invariant industry differences, such as differences in the intensity of required in-person contact with customers, suppliers, and co-workers, that might influence stock price reactions to the pandemic” (p. 803). We report the results from these regressions in Table 5.

In Panel A, the main independent variable of interest is the interaction term between Weekly Growth and High IR. Column (1) shows the results from a regression where we only include this interaction term, Weekly Growth, as well as firm and industry-month-fixed effects. We find that the coefficient on Weekly Growth is negative and significant, whereas the coefficient on the interaction...
Table 5
weekly COVID-19 growth rates, and weekly returns over the crisis-period.

This table presents the results from OLS regressions similar to Ding et al. (2021). Across both panels, the dependent variable is a firm’s weekly stock return for the year 2020. In Panel A, the main independent variable of interest is High IR, which equals one if the firm’s IR score is larger than the median IR score within the respective country, and zero otherwise. We interact High IR with the variable Weekly Growth, which is the weekly growth rate of confirmed COVID-19 cases in the respective country, calculated as log((1+confirmed cases in week (t)) / (1 + confirmed cases in week (t − 1))). In Panel B, the main independent variable of interest is log(IR score), which is the natural logarithm of the raw IR score. Similar to Ding et al. (2021) we control for firm characteristics (in columns (2) to (5)) and economy characteristics (in column (3)) in terms of annual GDP growth rate, log(GDP), and Population (age > 65), which is the fraction of people aged above 65 years in a country. In column (3), we also include several legal origin dummy variables, which equal one if the country’s legal origin is English, French, or German. Across all columns, except for column (5), we include industry-month and firm-fixed effects. In column (5), we include industry-week fixed effects and firm-fixed effects instead. In columns (4) and (5), we additionally include economy-week fixed effects. We report robust standard errors clustered by firm in parentheses, with ***, **, * denoting statistical significance at the 1%, 5%, and 10% level.

### Panel A:

| Dependent Variable: Weekly returns | (1) | (2) | (3) | (4) | (5) |
|-----------------------------------|-----|-----|-----|-----|-----|
| Weekly Growth                     | −0.0320** | −0.0167*** | −0.4475*** | (0.0017) | (0.0057) | (0.0673) |
| High IR × Weekly Growth           | 0.0034*  | 0.0065*** | 0.0054*** | 0.0042*** | 0.0041*** | (0.0019) |
| Size × Weekly Growth              | −0.0023** | −0.0012** | −0.0001 | −0.0001 | −0.0001 | (0.0006) |
| ROE × Weekly Growth               | 0.0073  | 0.0012  | 0.0073 | 0.0100 | 0.0100 | (0.0132) |
| Tobin’s Q × Weekly Growth         | 0.0001  | 0.0011*  | 0.0010*  | 0.0011** | 0.0011** | (0.0007) |
| Market-to-Book × Weekly Growth    | 0.0000  | 0.0001  | 0.0001 | 0.0001 | 0.0001 | (0.0002) |
| Cash / Assets × Weekly Growth     | 0.0094  | −0.0052  | −0.0034 | −0.0017 | −0.0017 | (0.0090) |
| Short-term Debt / Assets × Weekly Growth | 0.0129 | −0.0174 | −0.0173 | −0.0167 | −0.0167 | (0.0028) |
| Long-term Debt × Weekly Growth    | −0.0070  | −0.0141** | −0.0159** | −0.0155*** | −0.0155*** | (0.0068) |
| GDP Growth × Weekly Growth        | 0.0833  | 0.0952  | 0.0297*** | 0.0054 | 0.0054 | (0.0060) |
| log(GDP) × Weekly Growth          | 0.0265*** | 0.0044 | 0.0371*** | 0.0040*** | 0.0040*** | (0.0007) |
| Population (age > 65) × Weekly Growth | 0.0041 | 0.0041 | 0.0041 | 0.0041 | 0.0041 | (0.0039) |

| Observations                      | 36,850 | 36,850 | 36,850 | 36,850 | 36,850 |
| Firm Fixed Effects                | yes    | yes    | yes    | yes    | yes    |
| Industry-Month Fixed Effects     | yes    | yes    | yes    | no     | no     |
| Industry-Week Fixed Effects      | no     | no     | no     | yes    | yes    |
| Economy-Week Fixed Effects       | no     | no     | no     | yes    | yes    |
| Adjusted R-Squared               | 0.11   | 0.11   | 0.12   | 0.40   | 0.43   |

### Panel B:

| Dependent Variable: Weekly returns | (1) | (2) | (3) | (4) | (5) |
|-----------------------------------|-----|-----|-----|-----|-----|
| Weekly Growth                     | −0.0146*  | 0.0165  | −0.4102*** | (0.0086) | (0.0117) | (0.0679) |
| log(IR Score) × Weekly Growth     | 0.0041** | 0.0071*** | 0.0085*** | 0.0073*** | 0.0073*** | (0.0017) |
| Size × Weekly Growth              | −0.0025** | −0.0015*** | −0.0006  | −0.0007 | −0.0007 | (0.0006) |
| ROE × Weekly Growth               | 0.0102  | 0.0007  | 0.0082 | 0.0108 | 0.0108 | (0.0135) |
| Tobin’s Q × Weekly Growth         | 0.0000  | 0.0011*  | 0.0009*  | 0.0010* | 0.0010* | (0.0007) |
| Market-to-Book × Weekly Growth    | −0.0000  | 0.0000  | 0.0001 | 0.0001 | 0.0001 | (0.0002) |
| Cash-to-Assets × Weekly Growth    | 0.0089  | −0.0052  | −0.0048 | −0.0032 | −0.0032 | (0.0089) |
| Short-term Debt × Weekly Growth   | 0.0122  | −0.0152  | −0.0157 | −0.0152 | −0.0152 | (0.0234) |
| Long-term Debt × Weekly Growth    | −0.0071  | −0.0144** | −0.0168*** | −0.0165*** | −0.0165*** | (0.0066) |
| GDP Growth × Weekly Growth        | 0.0347  | 0.0057  | 0.0050 | 0.0050 | 0.0050 | (0.0963) |

(continued on next page)
term is positive and significant. This suggests that while an increase in the growth of COVID-19 cases is associated with lower stock returns of firms, the effect is dampened for firms with better-quality IR. This finding persists when we add additional firm characteristics (column (2)), economy characteristics (column (3)), or when we include economy-week-fixed effects (columns (4) and (5)).

In Panel B, we repeat the analysis from Panel A, but we employ our raw IR scores instead of our dummy variable High IR. Overall, the results are very similar to those discussed earlier since we find that firms with better-quality IR appear to experience higher stock returns in reaction to an increase in an economy’s exposure to the pandemic.

### 4.3. The importance of IR during and after the crisis

To further test whether investors favored firms with better IR particularly during the crisis period, we also perform daily cross-sectional regressions with the same model specifications as in column (3) of Panel B (Table 2). This test allows us to study whether the importance of IR increased when the COVID-19 crisis unfolded. Similar to Albuquerque et al. (2020), we choose January 2, 2020 as our starting point and calculate abnormal returns for this particular trading day. From this point on, we gradually expand the window by one additional trading day, calculate the respective cumulative abnormal returns for the time window, and run the regression. Figure 4 displays the results. For better orientation, we show the evolution of the coefficients on our variable of interest High IR as well as on Cash / Assets and Long-term Debt / Assets.

We find that the loading of the coefficients on High IR increases and that the coefficients become statistically significant when stock markets collapsed beginning in late-February. While the coefficients on High IR are almost zero and mostly statistically insignificant at the beginning of the year, the coefficient is largest (10.96%) and highly statistically significant (1% level) using the time window from January 2 to March 23, 2020. This provides support for our hypothesis stating that firms with better two-way communication performed significantly better during the COVID-19 crisis since they may have reduced uncertainty and information frictions among market participants. It is also noteworthy that we find the coefficient on Cash / Assets to increase as well, while the coefficient on Long-term Debt / Assets decreases. As already mentioned before, this is in line with the findings from Albuquerque et al. (2020), Ding et al. (2021), and Fahlenbrach et al. (2021).

Next, we perform difference-in-differences estimations similar to Lins et al. (2017) and Albuquerque et al. (2020) as an identification strategy to establish an even tighter link between the stock performance of firms with strong IR and the COVID-19 crisis. Specifically, we construct a panel of daily abnormal returns for all firms in our sample for the period from January 1 to October 6, 2020. Using this panel, we estimate the following regression:

\[
\text{Abnormal return}_{it} = \beta_0 + \beta_1 \times \text{High IR}_i \times \text{crisis}_t + \beta_2 \times \text{High IR}_i \times \text{post crisis}_t + \alpha_k + \alpha_t + \epsilon_{it}
\] (4.2)

where \(i\) is the firm, \(t\) is the trading day, and \(\epsilon_{it}\) denotes the error term. We use High IR as our treatment variable and interact it with the variables crisis and post crisis. The variable crisis is a dummy variable equaling one for all dates between February 24 and March 23, 2020, and zero otherwise. As outlined in Ramelli and Wagner (2020), this is the period where stock markets fell dramatically. The variable post crisis is also a dummy variable, which equals one for all dates from March 24, 2020 onwards, and zero otherwise. Thus, this variable covers the period where stock markets were recovering. The terms \(\alpha_k\) and \(\alpha_t\), respectively, denote firm-fixed effects and day-fixed effects. We report the results from these regressions in Table 6 where standard errors are clustered by firm and day. To ensure that the parallel trends assumption is not violated, we also perform the same formal test as in Albuquerque et al. (2020). Hence, we run a regression of daily abnormal returns on High IR for the period from January 1 to February 23, 2020. Although not reported for reasons of brevity, we can assure that there is no statistically significant relation between High IR and the daily abnormal returns.

In column (1) of Table 6, we show the results from a regression where we include all interactions and individual effects but omit fixed effects. In column (2), we report the results from a regression where we include the interactions and firm and day-fixed effects; thus we omit the individual effects. Regardless of the specification, we find positive and statistically significant coefficients on the interaction between High IR and crisis, and negative but statistically insignificant coefficients on the interaction between High IR and post crisis. The positive coefficients indicate that firms with strong IR experienced on average 0.40 percentage points higher daily abnormal returns during the period where stock markets collapsed. Cumulating these daily gains over the entire crisis period yields an average abnormal return surplus of approximately 8.80 percentage points, which is comparable to the results from our baseline estimations. It may appear surprising that we do not find a

| Panel B: | Dependent Variable: Weekly returns | (1) | (2) | (3) | (4) | (5) |
|---------|-----------------------------------|-----|-----|-----|-----|-----|
| log(GDP) × Weekly Growth | 0.0283*** | 0.0055 | 0.0046*** | | |
| Population (age > 65) × Weekly Growth | | (0.0007) | | | |
| Legor(English) × Weekly Growth | 0.0346*** | 0.0048 | 0.0390*** | 0.0043 | |
| Legor(French) × Weekly Growth | 0.0100** | 0.0042 | | | |
| Legor(German) × Weekly Growth | | | | | |
| Observations | 36,850 | 36,850 | 36,850 | 36,850 | 36,850 |
| Firm Fixed Effects | yes | yes | yes | yes | yes |
| Industry-Month Fixed Effects | yes | yes | yes | no | |
| Industry-Week Fixed Effects | no | no | no | yes | |
| Economy-Week Fixed Effects | no | no | no | yes | |
| Adjusted R-Squared | 0.11 | 0.11 | 0.12 | 0.40 | 0.43 |
IR score into a public and a private component. While the public component aims at capturing the impact of those IR activities primarily related to public events and disclosure quality on our IR score, the private component aims at capturing the impact of activities primarily related to private interactions between a firm and its investor base (e.g., meetings with senior management). In their analysis, Brochet et al. (2021) highlight that both functions of IR contribute significantly to better capital market outcomes. It is, however, questionable whether this finding persists during the COVID-19 crisis. This is because the COVID-19 crisis did not only cause significant uncertainty about a firm’s future cash flows but also posed additional challenges for public investor events due to the potential risk of infection. Furthermore, survey results published in an article in the IR magazine suggest that “... investors remain[ed] eager for continued access to company management teams, expressing a unanimous view that continuing to hold virtual one-on-one meetings with investors amid the pandemic was either important or very important” (IR Magazine, 2020). Hence, this might imply that investors put more emphasis on private IR activities during the crisis.

To investigate the relationship between the public and private components of IR and firms’ crisis returns, we use a two-stage regression approach. In the first stage, we run a regression of the natural logarithm of the IR score on three variables related to a firm’s public IR functions, namely Guidance, Conferences, and US Listing; and we additionally include industry and country-fixed effects. Similar to Brochet et al. (2021), we find all three variables to be positively and statistically significantly related to the IR score. We then use the fitted values from this first stage regression as the firms’ Public IR Score, while we use the residuals, i.e., the part that is not explained by a firm’s public IR activities, as the firms’ Private IR Score. Additionally, we construct the dummy variables Public IR and Private IR, which equal one if the respective score is larger than the sample median, and zero otherwise. In the second stage, we then run regressions similar to those in the previous sections replacing the variable High IR with the respective scores and

4.4. Differentiating between public and private IR

After having shown that IR is generally valuable during the crisis, we next examine which functions of IR particularly drive our results. We follow Brochet et al. (2021) and decompose a firm’s
Table 7 Public vs. private IR and crisis-period returns.

This table presents the results from OLS regressions. The dependent variable is a firm's cumulative abnormal return (based on market model estimations) for the period from February 3, 2020 to March 23, 2020, which is the collapse period as defined in Fahlenbrach et al. (2021). In column (1), the main independent variables of interest are a firm's Public IR Score and the respective Private IR Score. To construct the public and private components of IR, we run a regression of the natural logarithm of the IR score on three variables related to a firm's public IR functions, namely Guidance, Conferences, and US Listing. We employ the fitted values as firms' Public IR Score and the residuals as firms' Private IR Score. In column (2) we use the dummy variables Public IR and Private IR, which equal one if the respective score is larger than the sample median, and zero otherwise. Across all columns, we control for country-fixed effects and industry-fixed effects based on the Global Industry Classification Standard's (GICS) 11 sectors and a variety of firm characteristics. All variables are described in detail in Table A.1 in the appendix. We report robust standard errors clustered by country in parentheses, with ‘∗∗∗’, ‘∗∗’, ‘∗’ denoting statistical significance at the 1%, 5%, and 10% level.

| Dependent Variable: Abnormal returns | (1) | (2) |
|--------------------------------------|-----|-----|
| Public IR Score                     | 0.0487 | (0.0924) |
| Private IR Score                    | 0.1512** | (0.0217) |
| Public IR                           | −0.0095 | (0.0236) |
| Private IR                          | 0.0905*** | (0.0113) |
| Size                                | 0.0080 | (0.0141) |
| ROE                                 | 0.3093 | (0.2793) |
| Tobin's Q                           | 0.0287*** | (0.0059) |
| Market-to-Book                      | −0.0020 | (0.0016) |
| Historical Volatility               | −0.1054 | (0.1484) |
| Cash / Assets                       | 0.0592 | (0.0770) |
| Short-term Debt                     | 0.1900 | (0.1868) |
| Long-term Debt                      | −0.2944*** | (0.0641) |
| Momentum                            | −0.0991*** | (0.0105) |
| Analyst Following                   | 0.0179 | (0.0281) |
| Blockholder                         | −0.0263 | (0.0532) |
| Institutional Ownership             | 0.0003 | (0.0480) |
| US Listing                          | 0.1168*** | (0.0373) |

| Observations                        | 710 |
| Industry Fixed Effects              | yes |
| Country Fixed Effects               | yes |
| Adjusted R-Squared                 | 0.29 |

Table 8 Public vs. private IR and abnormal returns surrounding the crisis-period.

This table presents the results from difference-in-differences regressions. The dependent variable is a firm's daily abnormal return for the period from January 1, 2020 to October 6, 2020. The main independent variables of interest are Public IR and Private IR. To construct the public and private components of IR, we run a regression of the natural logarithm of the IR score on three variables related to a firm's public IR functions, namely Guidance, Conferences, and US Listing. We employ the fitted values as firms' Public IR Score and the residuals as firms' Private IR Score and construct the dummy variables Public IR and Private IR, which equal one if the respective score is larger than the sample median, and zero otherwise. We then use Public IR and Private IR as our treatment variables and we interact them with the variables crisis and post crisis. The variable crisis is a dummy variable equaling one for all dates between February 24, 2020 and March 23, 2020, and zero otherwise. The variable post crisis is a dummy variable equaling one for all dates after March 24, 2020, and zero otherwise. In column (1) we do not include any fixed effects, while in column (2) we include firm and day-fixed effects. Thus, we omit the individual terms. All variables are described in detail in Table A.1 in the appendix. We report robust standard errors clustered by firm and day in parentheses, with ‘∗∗∗’, ‘∗∗’, ‘∗’ denoting statistical significance at the 1%, 5%, and 10% level.

| Dependent Variable: Abnormal returns | (1) | (2) |
|--------------------------------------|-----|-----|
| Public IR × crisis                   | 0.0015 | (0.0013) |
| Private IR × crisis                  | 0.0032** | (0.0009) |
| Public IR × post crisis              | −0.0005 | (0.0003) |
| Private IR × post crisis             | −0.0005 | (0.0003) |
| Public IR                            | 0.0001 | (0.0003) |
| Private IR                           | 0.0007*** | (0.0003) |
| crisis                               | −0.0078*** | (0.0023) |
| post crisis                          | 0.0010 | (0.0006) |

| Observations                        | 189,400 |
| Firm Fixed Effects                  | no |
| Day Fixed Effects                   | no |
| Adjusted R-Squared                  | 0.01 |

During the crisis period those with weak private IR. This effect is almost similar in size compared to the one we observe using our dummy variable High IR.

In Table 8, we present the results from the difference-in-differences regressions replacing High IR with the respective dummy variables for the IR functions. Same as in the baseline regression, we find firms with better-quality private IR to perform significantly better during the crisis period. In both columns, the coefficients on the interaction between Private IR and crisis are positive and statistically significant, while the coefficients on the interaction between Public IR and crisis are positive but not statistically significant at conventional levels. Also, we cannot observe a sign of reversal in the post-crisis period.

Overall, the results in this section suggest that a firm's private IR functions are the main driver of the valuation effects during the COVID-19 crisis. A reason for this result may be that firms with better-quality private IR were particularly able to alleviate investors' uncertainty about a firm's prospects (e.g., through the use of meetings with senior management). Further, considering that the COVID-19 crisis posed great challenges to a firm's public IR activities, especially public investor events, it is not surprising that public IR activities are not associated with higher returns during the collapse period.

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9 The regression specification is similar to the one used in column (3) of Panel B of Table 2.
4.5. Enhancement of credibility or diversification of shareholder base

We next examine how a firm’s IR functions and particularly private IR functions have boosted its firm value during the crisis period. One potential explanation may be that (private) IR helps to enhance credibility with its (incumbent) institutional investors, who are the main targets of a firm’s IR activities. Another explanation may be that IR helps to diversify a firm’s shareholder base, which in fact could also reduce stock volatility.

To test the first explanation, we run several fractional generalized linear models (GLM)\(^{10}\) where we regress our variable % Staying Inst. Investors, i.e., the fraction of those incumbent institutional investors who stayed loyal to the firm during the crisis period, on our measures for a firm’s IR quality and a variety of control variables. If a firm’s IR quality helps to enhance credibility with its incumbent institutional investors, we can expect that a large proportion of them stayed invested in firms with better-quality IR over the crisis period. Table 9 reports our results.

In column (1), we measure a firm’s IR quality using our dummy variable High IR. Consistent with our hypothesis, we find positive and statistically significant coefficients on High IR. In terms of marginal effects, we find that firms with better-quality IR are associated with an almost 0.5 percentage points higher fraction of incumbent institutional investors staying loyal to the firm during the market collapse compared to firms with lower-quality IR. This is an economically sizeable effect considering that the mean of % Staying Inst. Investors is roughly 95%. Regarding the control variables, we also find the proportion of institutional investors staying loyal to the firm to be larger at firms with better prior firm performance and a higher proportion of institutional ownership.

In columns (2) and (3), we replace High IR with our raw scores and the dummy variables for the public and private components of a firm’s IR. While a firm’s private IR quality appears to be positively associated with the proportion of institutional investors staying loyal to the firm over the crisis period, there is some slight indication that the association is negative for a firm’s public IR quality (column (2)), but statistical significance vanishes when using the dummy variables (column (3)). However, it is important to mention that the magnitude of the coefficient on the dummy variable Private IR is even larger than the magnitude of the coefficient on High IR. This suggest that a firm’s private IR activities, such as meetings with senior management, are of significant importance for institutional investors since they might reduce uncertainty and information frictions and enhance a firm’s credibility.

In Table 10, we split the incumbent institutional investors by their countries of origin and repeat the analysis using the two dummy variables Public IR and Private IR as our main independent variables. The rationale is that IR activities might focus on domestic institutional investors since a firm’s shareholder base is originally domestic (Karolyi et al., 2020). Differentiating between domestic and foreign institutional investors, however, leaves our findings qualitatively unchanged. Although the results are slightly more pronounced regarding domestic institutional investors, we find that a firm’s private IR quality is positively associated with institutional investor loyalty in both regressions.

To test the second explanation, which suggests that IR could also help to diversify a firm’s shareholder base, we perform several OLS regressions where the dependent variable is the change in the number of all institutional owners during the crisis period and the main independent variables are our measures for IR quality. If IR helps to diversify a firm’s shareholder base, we expect to find positive coefficients on our variables of interests. Table 11 displays our results.

In column (1), we employ High IR as our main independent variable of interest and find a positive and highly statistically significant association with the change in the number of institutional owners. This is in line with the notion of IR activities helping to diversify a firm’s shareholder base and thus to increase firm value during the crisis. Our results also show that the change in the number of institutional owners during the crisis period was more positive for firms with better prior firm performance and a larger proportion of institutional ownership and more negative for firms with higher ratios of debt to assets.

In columns (2) and (3), we again replace High IR with our raw scores and the dummy variables for the public and private components of a firm’s IR. Similar to the picture found in the fractional GLM regressions, we find a firm’s private IR quality to be positively associated with the change in the number of institutional owners over the crisis period, while there is some slight indication that the association is negative for a firm’s public IR quality.

In columns (4) to (7), we present the results from regressions similar to those in columns (2) and (3), but where we again split the institutional investors by their country of origin. Yet, this does not influence our main findings. A firm’s private IR activities still appear to have helped significantly diversifying a firm’s shareholder base during the COVID-19 collapse.

In unreported regressions, we also examine whether there are considerable differences between firms with strong IR and those with weak IR concerning the change in the proportion of shares held by (incumbent) institutional investors during the crisis period. Although the coefficients on our measures for IR quality are positive throughout all regressions, i.e., the change in the proportion of shares held by (incumbent) institutional investors is more positive for firms with better-quality IR, they are not statistically significant at conventional levels. Thus, we cannot confirm sizeable differences. Nonetheless, the set of tests presented above provides some indication that a firm’s credibility as well as the diversification of its shareholders base through effective (private) IR were boosting its value during the crisis period.

4.6. Stock volatility

Since the findings in the last section indicate that better-quality (private) IR has helped to diversify a firm’s shareholder base, we test whether this has also helped to reduce stock volatility during the crisis. The argument is that as the number of financially sophisticated investors, especially institutional and foreign investors, increases, there is a substantial improvement in the amount and accuracy of the information about the firm; and thus stock volatility decreases (Jankensgård and Vilhelmsen, 2018; Holmström and Tirole, 1993; Li et al., 2011; Merton, 1987). In fact, this argument may be particularly viable during times of crisis when the level of uncertainty is high.

To examine this relationship, we perform regressions where the dependent variable is the stock’s idiosyncratic volatility during the collapse period and the main independent variables of interest are our measures for a firm’s IR quality. Control variables and fixed effects are similar to those used in Table 2. We report our results in Table 12.

Consistent with previous literature (see e.g., Brochet et al., 2021; Chapman et al., 2019) and with our hypothesis, we find some weak evidence that firms with better-quality IR had also lower stock volatility during the COVID-19 stock market crash. Although the coefficients on our IR measures are negative throughout all regressions, statistical significance vanishes after controlling for a variety of firm characteristics. As for the control variables, the results are similar to related studies (see e.g., Albuquerque et al.,

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\(^{10}\) To ensure robust estimation results, we employ a fractional generalized linear model (GLM) because our response variable is a fraction (for an overview, see e.g., Papke and Wooldridge, 1996). In unreported regression, we also employ OLS regressions and obtain qualitatively similar results.
Table 9
IR and institutional investor loyalty over the crisis-period.
This table shows the results from fractional GLM regressions. The dependent variable % Staying Inst. Investors is the fraction of those incumbent institutional investors who stayed loyal to the firm during the crisis period (i.e., the first quarter of 2020). In column (1), the main independent variable of interest is High IR, which equals one if the firm’s IR score is larger than the median IR score within the respective country. In column (2), the main independent variables of interest are a firm’s Public IR Score and the respective Private IR Score. To construct the public and private components of IR, we run a regression of the natural logarithm of the IR score on three variables related to a firm’s public IR functions, namely Guidance, Conferences, and US Listing. We employ the fitted values as firms’ Public IR Score and the residuals as firms’ Private IR Score. In column (3) we use the dummy variables Public IR and Private IR, which equal one if the respective score is larger than the sample median, and zero otherwise. We report the marginal effects (ME) of the respective coefficients next to each regression specification. Across all columns, we control for country-fixed effects and industry-fixed effects based on the Global Industry Classification Standard’s (GICS) 11 sectors and a variety of firm characteristics. All variables are described in detail in Table A1 in the appendix. We report robust standard errors clustered by country in parentheses, with ***, **, * denoting statistical significance at the 1%, 5%, and 10% level.

| Dependent Variable: % Staying Inst. Investors | (1) ME | (2) ME | (3) ME |
|-----------------------------------------------|-------|-------|-------|
| High IR                                       | 0.1050*** (0.0415) | 0.0042* (0.0017) | 0.1050*** (0.0415) |
| Public IR Score                               | −0.4000*** (0.1820) | −0.0160** (0.0073) | −0.0160** (0.0073) |
| Private IR Score                              | 0.1390* (0.0762) | 0.0056* (0.0031) | 0.1390* (0.0762) |
| Public IR                                     | −0.0459 (0.0912) | −0.0029 (0.0037) | −0.0459 (0.0912) |
| Private IR                                    | 0.1130* (0.0585) | 0.0045** (0.0023) | 0.1130* (0.0585) |
| Size                                          | 0.0168 (0.0193) | 0.0090 (0.0008) | 0.0168 (0.0193) |
| ROE                                           | (0.0185) (0.0185) | (0.0077) (0.0077) | (0.0121) (0.0121) |
| Tobin’s Q                                     | 0.0220 (0.0140) | 0.0106 (0.0046) | 0.0220 (0.0140) |
| Market-to-Book                                | (0.0387) (0.0387) | (0.0016) (0.0016) | (0.0387) (0.0387) |
| Historical Volatility                         | (0.0173) (0.0173) | (0.0173) (0.0173) | (0.0173) (0.0173) |
| Cash / Assets                                 | 0.2650 (0.2510) | 0.0106 (0.0101) | 0.2650 (0.2510) |
| Short-term Debt / Assets                      | 0.0090 (0.0180) | 0.0073 (0.0241) | 0.0090 (0.0180) |
| Long-term Debt / Assets                       | (0.0084) (0.0084) | (0.0051) (0.0051) | (0.0084) (0.0084) |
| Momentum                                      | 0.1970 (0.1970) | 0.0090 (0.0241) | 0.1970 (0.1970) |
| Analyst Following                             | 0.2850 (0.2850) | 0.0088 (0.0098) | 0.2850 (0.2850) |
| Blockholder                                   | −0.0696 (0.0489) | −0.0029 (0.0020) | −0.0696 (0.0489) |
| Institutional Ownership                       | 0.2050*** (0.1450) | 0.0008*** (0.0058) | 0.2050*** (0.1450) |
| US Listing                                    | −0.0696 (0.0448) | −0.0029 (0.0018) | −0.0696 (0.0448) |
| Observations                                  | 710 710 710 710 710 710 710 |
| Industry Fixed Effects                        | yes yes yes yes yes yes |
| Country Fixed Effects                         | yes yes yes yes yes yes |
| R-Squared                                     | 0.01 0.01 0.01 0.01 0.01 0.01 0.01 |

While volatility is lower for larger firms and those with lower historical volatility, volatility is higher for firms with higher ratios of long-term debt to assets.

5. Additional tests

5.1. Results for industries strongly affected by the COVID-19 pandemic and policy responses

In our main tests, we have documented a positive association between a firm’s (private) IR quality and its crisis returns using our entire sample. We now focus on a subsample of firms in industries particularly affected by the COVID-19 pandemic and the respective policy responses. Given that investors in these industries were confronted with even greater uncertainty during the collapse period, we may expect to find that the association between a firm’s (private) IR quality and its stock performance is even more pronounced. Using a similar classification as in Fahlenbrach et al. (2021), we identify the following industries based on the GICS 69-industry classification: Auto Components; Automobiles; Leisure Products; Textiles, Apparel & Luxury Goods; Hotels, Restaurants & Leisure; Diversified Consumer Services; Distributors; Multiline Retail; Specialty Retail; Beverages; Food Products; Construction Materials; Construction & Engineering; Machinery; Air Freight & Logistics; Airlines; Marine; Road & Rail; Transportation Infrastructure; Media; and Entertainment.

As expected, we find that these industries were strongly affected by the COVID-19 pandemic. For instance, the mean cumulative return of −51.40% is considerably lower compared to our entire sample. Besides, the cumulative abnormal return is also about 5.14 percentage points lower, and volatility is 0.81 percentage points higher.
To test the assumption of IR being even more valuable in these industries, we perform the same baseline regressions using our subsample. Table 13 displays the results.

In all three columns, we find a positive association between a firm’s (private) IR quality and the crisis returns.\(^{11}\) Compared to the estimates for the entire sample, the coefficients’ magnitudes are, however, slightly lower (even when calculating standardized regression coefficients). Based on these results, we cannot confirm that firms in these industries have benefited even more from having better-quality (private) IR during the crisis period.

To validate our findings, we also run the difference-in-differences regressions using this subsample. But these tests, though not reported, leave our findings qualitatively unchanged.

### 5.2. Country characteristics and the value of IR

In this next subsection, we investigate whether our results from the baseline models may differ depending on the countries the firms are headquartered in. Although our findings indicate that firms with strong IR experienced on average at least 6.89 percentage points higher cumulative abnormal returns during the crisis period, there are several reasons why this effect may be more or less pronounced in certain countries depending on the countries’ characteristics. As Karolyi et al. (2020) show, firms profit even more from engaging in IR activities when they are domiciled in countries with lower-quality legal institutions and security market regulations, in countries with lower disclosure standards, and in countries where legal protection of minority shareholders is weak. Therefore, we also test whether we find similar results when stock markets collapsed during the COVID-19 crisis.

We obtain data on a country’s level of trust from the World Values Survey’s (WVS) latest wave (2017–2020), and data on certain cultural characteristics, i.e., Uncertainty Avoidance and Long-Term Orientation, from Hofstede’s website. The rationale behind testing for the latter characteristics is that (I) the level of societal trust within a country is associated with the stock market volatility during the COVID-19 crisis (Engelhardt et al., 2020b) and that (II) reduces uncertainty during the crisis through effective communication with

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11 In fact, statistical significance slightly vanishes in column (2).
Table 11
IR and the diversification of the shareholder base over the crisis-period.

This table shows the results from OLS regressions. The dependent variable in columns (1) to (3) is # Inst. Ownership Change which is the change in the number of all institutional owners during the crisis period (i.e., the first quarter of 2020). In columns (4) to (5) to (7) the dependent variable is # Domestic Inst. Ownership Change (# Foreign Inst. Ownership Change) which is the change in the number of all domestic (foreign) institutional owners. In column (1), the main independent variable of interest is High IR, which equals one if the firm’s IR score is larger than the median IR score within the respective country. In columns (2), (4) and (6) the main independent variables of interest are a firm’s Public IR Score and the respective Private IR Score. To construct the public and private components of IR, we run a regression of the natural logarithm of the IR score on three variables related to a firm’s public IR functions, namely Guidance, Conferences, and US Listing. We employ the fitted values as firms’ Public IR Score and the residuals as firms’ Private IR Score. In columns (3), (5), and (7) we use the dummy variables Public IR and Private IR, which equal one if the respective score is larger than the sample median, and zero otherwise. Across all columns, we control for country-fixed, industry-fixed effects based on the Global Industry Classification Standard’s (GICS) 11 sectors, and a variety of firm characteristics. All variables are described in detail in Table A1 in the appendix. We report robust standard errors clustered by country in parentheses, with ***, **, * denoting statistical significance at the 1%, 5%, and 10% level.

| Dependent Variable: | # Inst. Ownership Change | # Domestic Inst. Ownership Change | # Foreign Inst. Ownership Change |
|---------------------|--------------------------|----------------------------------|----------------------------------|
| High IR             | 2.8355***                | 5.4227**                         | –4.4891*                        |
| (0.9836)            | (2.5891)                 | (0.8372)                         | (2.3020)                         |
| Public IR Score     | –5.1312                  | –4.8005***                       | –4.8319***                      |
|                    | (1.2152)                 | (0.2972)                         | (0.0557)                         |
| Private IR Score    | 2.4443*                  | 0.8052***                        | 1.2159*                         |
|                    | (1.3175)                 | (0.2972)                         | (1.1297)                         |
| Public IR           | –1.1685                  | 0.1785                           | –1.3930                          |
|                    | (1.4632)                 | (0.3823)                         | (1.3964)                         |
| Private IR          | 2.4443*                  | 0.8052***                        | 1.2152*                         |
|                    | (1.3175)                 | (0.2972)                         | (1.1297)                         |
| Size                | –0.9021***               | –0.8471***                       | –0.8319***                      |
|                    | (0.1212)                 | (0.2868)                         | (0.0413)                         |
| ROE                 | 2.2603                   | 1.2108                           | –1.4864                         |
|                    | (4.2599)                 | (4.3713)                         | (3.8032)                         |
| Tobin’s Q           | 0.7741                   | 0.8225***                       | 0.6677                          |
|                    | (0.2942)                 | (0.2617)                         | (0.0268)                         |
| Market-to-Book      | 0.0072                   | 0.0070                           | 0.0197                          |
|                    | (0.0840)                 | (0.0784)                         | (0.0840)                         |
| Historical Volatility| –3.4019                  | –3.6721                         | –6.2947***                      |
|                    | (4.0909)                 | (4.0021)                         | (4.2380)                         |
| Cash / Assets       | 5.5442                   | 5.8245                           | 4.4841                          |
|                    | (3.8565)                 | (3.7320)                         | (3.1144)                         |
| Short-term Debt / Assets| –17.084**                | –15.2037**                      | –15.6759**                      |
|                    | (8.3741)                 | (8.9527)                         | (6.9876)                         |
| Long-term Debt / Assets| –4.8436**                | –4.9855**                       | –5.5355**                       |
|                    | (2.3672)                 | (2.2673)                         | (2.3040)                         |
| Momentum            | 5.9995***                | 5.7123***                        | 4.9733***                       |
|                    | (0.7889)                 | (0.7720)                         | (0.7370)                         |
| Analyst Following   | –0.0007                  | 0.5083                           | 0.3475                          |
|                    | (0.0769)                 | (0.0968)                         | (0.0927)                         |
| Blockholder         | –0.2345                  | –0.4255                          | –0.6855                         |
|                    | (2.3567)                 | (2.2402)                         | (0.8795)                         |
| Institutional Ownership| 5.4395***                | 5.7071**                        | 4.7209**                        |
|                    | (2.0894)                 | (2.1956)                         | (2.2540)                         |
| US Listing          | 3.6259                   | 4.6869**                        | 6.0124**                        |
|                    | (2.2721)                 | (2.5822)                         | (2.8262)                         |

Observations: 710
Industry Fixed Effects: yes
Country Fixed Effects: yes
Adjusted R-Squared: 0.25

investors may be even more valuable in cultures which feel un-comfortable with uncertainty and prefer long-term relationships.

Following Karolyi et al. (2020), we examine these aspects by first splitting the sample based on the indices’ median scores for the countries we investigate, and then by performing the same baseline regressions on the different subsamples. Although our entire sample consists solely of European countries, we find considerable variation in the respective scores, which is why we believe our approach is feasible. Table 14 reports the results from the regressions where the main independent variable of interest is High IR.

Consistent with the results in Karolyi et al. (2020), we find a positive and highly statistically significant coefficient on High IR in the regression for the subsample of firms headquartered in countries where lower-quality legal institutions and security market regulations prevail (column (1)). We also find that the coefficient on High IR is considerably lower and statistically insignificant for the subsample of firms headquartered in high rule of law countries (column (2)).

In columns (3) and (4), we split the sample by a country’s disclosure standards. Our results show that in countries with low disclosure standards as well as in countries with high disclosure standards having strong IR has a significant positive effect on crisis returns. As a matter of fact, the coefficient is significantly higher in countries with high disclosure standards. This is an important difference compared to the findings of Karolyi et al. (2020) as they stress that firms benefit significantly more from engaging in IR in countries with weak disclosure standards. However, while a firm’s IR might not be associated with its market valuation in countries with high disclosure standards during stable economic conditions, IR might be important during times of uncertainty. This might be especially true considering that a firm’s private IR functions, which
Table 12
IR and crisis-period volatility.
This table presents the results from OLS regressions. The dependent variable is a firm's idiosyncratic volatility (based on market model estimations) for the period from February 3, 2020 to March 23, 2020, which is the collapse period as defined in Fahlenbrach et al. (2021). In columns (1) and (2), the main independent variable of interest is High IR, which equals one if the firm’s IR score is larger than the median IR score within the respective country. In columns (3) and (4), the main independent variables of interest are a firm’s Public IR Score and the respective Private IR Score. To construct the public and private components of IR, we run a regression of the natural logarithm of the IR score on three variables related to a firm’s public IR functions, namely Guidance, Conferences, and US Listing. We employ the fitted values as firms’ Public IR Score and the residuals as firms’ Private IR Score. Across all columns, we control for country-fixed effects and industry-fixed effects based on the Global Industry Classification Standard’s (GICS) 11 sectors. In columns (2) and (4) we also control for a variety of firm characteristics. All variables are described in detail in Table A1 in the appendix. We report robust standard errors clustered by country in parentheses, with ***, **, * denoting statistical significance at the 1%, 5%, and 10% level.

| Dependent Variable: Idiosyncratic Volatility | (1)          | (2)          | (3)          | (4)          |
|---------------------------------------------|--------------|--------------|--------------|--------------|
| High IR                                     | -0.0067***   | -0.0024      | -0.0167***   | -0.0013      |
| (0.0017)                                    | (0.0020)     | (0.0005)     | (0.0009)     | (0.0008)     |
| Public IR Score                             | -0.0167***   | -0.0013      | -0.0060***   | -0.0018*     |
| (0.0045)                                    | (0.0030)     | (0.0009)     | (0.0009)     | (0.0008)     |
| Private IR Score                            | -0.0060***   | -0.0018*     | -0.0006      | -0.0006      |
| (0.0012)                                    | (0.0009)     | (0.0005)     | (0.0005)     | (0.0005)     |
| Size                                        | -0.0012*     | -0.0012      | -0.0006      | -0.0006      |
| (0.0007)                                    | (0.0008)     | (0.0005)     | (0.0005)     | (0.0005)     |
| ROE                                         | -0.0039      | -0.0043      | -0.0006      | -0.0006      |
| (0.0072)                                    | (0.0067)     | (0.0049)     | (0.0049)     | (0.0049)     |
| Tobin’s Q                                   | -0.0006      | -0.0006      | -0.0006      | -0.0006      |
| (0.0005)                                    | (0.0005)     | (0.0005)     | (0.0005)     | (0.0005)     |
| Market-to-Book                              | -0.0000      | -0.0000      | -0.0000      | -0.0000      |
| (0.0001)                                    | (0.0001)     | (0.0001)     | (0.0001)     | (0.0001)     |
| Historical Volatility                       | 0.0483***    | 0.0484***    | 0.0116       | 0.0116       |
| (0.0116)                                    | (0.0116)     | (0.0049)     | (0.0049)     | (0.0049)     |
| Cash / Assets                               | -0.0054      | -0.0054      | -0.0054      | -0.0054      |
| (0.0049)                                    | (0.0051)     | (0.0051)     | (0.0051)     | (0.0051)     |
| Short-term Debt / Assets                    | 0.0056       | 0.0052       | 0.0085       | 0.0090       |
| (0.0085)                                    | (0.0090)     | (0.0085)     | (0.0085)     | (0.0085)     |
| Long-term Debt / Assets                     | 0.0158***    | 0.0198***    | 0.0072       | 0.0071       |
| (0.0072)                                    | (0.0071)     | (0.0072)     | (0.0072)     | (0.0072)     |
| Momentum                                    | 0.0001       | 0.0001       | 0.0001       | 0.0001       |
| (0.0005)                                    | (0.0005)     | (0.0005)     | (0.0005)     | (0.0005)     |
| Analyst Following                           | 0.0002       | -0.0001      | 0.0017       | 0.0017       |
| (0.0017)                                    | (0.0017)     | (0.0017)     | (0.0017)     | (0.0017)     |
| Blockholder                                 | 0.0042       | 0.0043       | 0.0028       | 0.0028       |
| (0.0028)                                    | (0.0028)     | (0.0028)     | (0.0028)     | (0.0028)     |
| Institutional Ownership                     | 0.0019       | 0.0020       | 0.0018       | 0.0018       |
| (0.0018)                                    | (0.0018)     | (0.0018)     | (0.0018)     | (0.0018)     |
| US Listing                                  | -0.0033***   | -0.0034***   | -0.0003***   | -0.0003***   |
| (0.0011)                                    | (0.0011)     | (0.0011)     | (0.0011)     | (0.0011)     |

Observations 947  710  947  710
Industry Fixed Effects yes yes yes yes
Country Fixed Effects yes yes yes yes
Adjusted R-Squared 0.15 0.30 0.16 0.29

do not relate to the disclosure practices, appear to drive our results as shown later in Table 15.

When we split the sample by a country’s ASDI (columns (5) and (6)), we also find different results compared to those in Karolyi et al. (2020). While they show that firms benefit significantly more from engaging in IR in countries with weak legal protection of minority shareholders, we find that firms with strong IR experienced higher returns during the COVID-19 crisis in both countries with weak legal protection and in countries with strong legal protection of minority shareholders.

In columns (7) and (8), we show the results from regressions where we split the sample by the level of societal trust. Similar to the results in columns (1) and (2), we find firms with strong IR to experience significantly higher crisis returns if they are domiciled in countries with low levels of societal trust. In the regression for the subsample of firms headquartered in countries with high levels of societal trust (column (8)), the magnitude of the coefficient on High IR is lower and the coefficient is not significant.12 In line with Engelhardt et al. (2020b), who show stock market volatility to be higher (in reaction to case announcements) in countries with low levels of societal trust, these results may indicate that reducing uncertainty through effective communication with investors may have been even more valuable.

Moreover, we also test whether we find similar results using Hofstede’s cultural dimension Uncertainty Avoidance to split the sample. The argument is that having strong IR may be particu-

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12 In unreported regressions, where we only include industry-fixed effects but omit country-fixed effects, we find that the coefficient is slightly higher (5.46%) and remains statistically significant. However, this is the only noteworthy difference that we find when we rerun the same regressions as in Table 14 using industry-fixed effects only.
larly valuable in cultures which have difficulties in dealing with uncertainty. The results presented in columns (9) and (10) support this notion. While we find positive and statistically significant coefficients on High IR in both subsamples, the magnitude is significantly higher in the regression for the subsample consisting of firms headquartered in countries with high scores on this dimension.

Finally, we use the scores on Hofstede’s cultural dimension Long-Term Orientation to split the sample. We find positive and highly statistically significant coefficients for both subsamples (columns (11) and (12)).

In Table 15, we show the results where we employ our dummy variables Private IR and Public IR as the main independent variables of interest. Throughout all subsamples, we find positive and statistically significant coefficients on Private IR, while the coefficients on Public IR remain statistically insignificant (except for column (2)). This is in line with our baseline results and suggests that, despite of any country characteristics, a firm’s private IR activities might have boosted a firm’s stock performance during the crisis period. The only noteworthy difference compared to the findings in Table 14 is that a firm’s private IR activities were even more valuable in countries scoring high on the dimension Long-Term Orientation, which is consistent with the notion that private IR activities enhance credibility and are thus more valuable in cultures putting emphasis on long-lasting relationships.

Overall, the results in this subsection indicate that the value of having high-quality IR during the COVID-19 crisis is dependent on country characteristics. Firms in high rule of law countries and high-trust countries do not appear to have benefited from having strong IR. These findings persist even after using the dummy variables based on the decomposed scores.

5.3. Operating performance

Before turning to our robustness checks, we also perform a preliminary analysis investigating whether firms with better IR had better operating performance over the year 2020 since this could be a channel explaining the return premium aside from merely establishing an effective communication with shareholders. We do so by conducting OLS regressions of the quarterly change of various operating performance measures (e.g., the operating profit margin, the return on assets, and asset turnover) on our measures for IR quality, a set of firm controls similar to Albuquerque et al. (2020), and both country and industry-fixed effects. We find no consistent evidence supporting the notion that firms with strong IR had better operating performance over the year 2020. In fact, we rather find negative and slightly statistically significant coefficients on our IR measures in some regressions. Hence, we can conclude that firms with strong IR had, if at all, weaker operating performance. This finding is, however, consistent with the assumption that firms with better-quality IR are simply better at establishing an effective communication with investors and achieving a somewhat fairer valuation during times of crisis, but they do not necessarily have better operating performance.

### Table 14
IR and crisis-period returns depending on country characteristics.

This table shows the results from OLS regressions of the firm’s cumulative abnormal stock return over the period from February 3, 2020 to March 23, 2020 on High IR, firm controls, and country and industry-fixed effects for various subsamples. We split the entire sample based on the median score of the countries in our sample. The subsamples are based on the following characteristics: the Rule of Law index from the World Bank’s World Governance Indicators for the year 2019 (columns (1) and (2)), the Disclosure index provided by La Porta et al. (2006) (columns (3) and (4)), the Anti-Self-Dealing index (ASDI) provided by Djankov et al. (2008) (columns (5) and (6)), the level of societal trust from the World Values Survey’s latest wave (columns (7) and (8)), and Hofstede’s cultural dimensions Uncertainty Avoidance (columns (9) and (10)) and Long-Term Orientation (columns (11) and (12)). All variables are described in detail in Table A1 in the appendix. We report robust standard errors that are clustered by country in parentheses, with ***, **, * denoting statistical significance at the 1%, 5%, and 10% level.

| Dependent Variable: Abn. returns | Low Rule of Law | High Rule of Law | Low Disclosure | High Disclosure |
|----------------------------------|-----------------|-----------------|----------------|-----------------|
|                                  | (1)             | (2)             | (3)            | (4)            |
| High IR                          | 0.1260***       | 0.0291          | 0.0596***      | 0.1310***      |
|                                  | (0.0176)        | (0.0283)        | (0.0212)       | (0.0489)       |
| Observations                     | 510             | 200             | 459            | 251             |
| Firm Characteristics             | yes             | yes             | yes            | yes             |
| Industry Fixed Effects           | yes             | yes             | yes            | yes             |
| Country Fixed Effects            | yes             | yes             | yes            | yes             |
| Adjusted R-Squared              | 0.26            | 0.37            | 0.28           | 0.32            |

| Dependent Variable: Abn. returns | Low ASDI | High ASDI | Low Trust | High Trust |
|----------------------------------|----------|-----------|-----------|------------|
|                                  | (5)      | (6)       | (7)       | (8)        |
| High IR                          | 0.0959*** | 0.0867*** | 0.1259*** | 0.0374     |
|                                  | (0.0300) | (0.0198)  | (0.0161)  | (0.0331)   |
| Observations                     | 403      | 307       | 475       | 235        |
| Firm Characteristics             | yes      | yes       | yes       | yes        |
| Industry Fixed Effects           | yes      | yes       | yes       | yes        |
| Country Fixed Effects            | yes      | yes       | yes       | yes        |
| Adjusted R-Squared              | 0.27     | 0.30      | 0.26      | 0.37       |

| Dependent Variable: Abn. returns | Low Uncertainty Avoidance | High Uncertainty Avoidance | Low Long-Term Orientation | High Long-Term Orientation |
|----------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
|                                  | (9)                       | (10)                      | (11)                      | (12)                      |
| High IR                          | 0.0825***                 | 0.1410***                 | 0.0855***                 | 0.0898**                  |
|                                  | (0.0287)                  | (0.0273)                  | (0.0222)                  | (0.0405)                  |
| Observations                     | 453                       | 257                       | 316                       | 394                       |
| Firm Characteristics             | yes                       | yes                       | yes                       | yes                       |
| Industry Fixed Effects           | yes                       | yes                       | yes                       | yes                       |
| Country Fixed Effects            | yes                       | yes                       | yes                       | yes                       |
| Adjusted R-Squared              | 0.32                      | 0.26                      | 0.35                      | 0.23                      |
6. Robustness

We conduct several robustness tests to ensure the validity of our main finding that firms with strong (private) IR had higher stock returns than those with weak (private) IR during the COVID-19 stock market crash. First, we use two alternative specifications for the collapse period provided by Fahlenbrach et al. (2021). Specifically, we calculate cumulative abnormal returns over the period from February 24 until March 20, 2020, which is the so-called “Fever period” in Ramelli and Wagner (2020), as well as over the entire first quarter as done in Albuquerque et al. (2020). Our findings persist when changing the observation period. Additionally, we test whether the results remain robust for an extended crisis period and find that firms with higher-quality IR performed significantly better up to October 2020.

Second, we re-run our baseline regressions using a measure similar to the severity of loss measure provided by Desjardine et al. (2019) as the dependent variable, i.e., we calculate the percentage decline in a firms stock price from the stock price immediately prior to the crisis (January 20, 2020) to the lowest stock price within the period from January 21 through December 31, 2020. Consistent with our previous findings, we also find firms with strong (private) IR to have higher crisis returns.

Third, we check whether the results from our baseline regressions as well as those from our difference-in-differences estimations are driven by firms headquartered in the UK, Germany, and France. This is because these firms account for approximately 50% of our observations. However, excluding these observations and rerunning the regressions does not change our results. Additionally, we exclude (I) firms with low stock market liquidity, i.e., micro-cap firms with a market capitalization smaller than $250 million as suggested in Lins et al. (2017), and (II) firms operating in the financial, communication services, and utilities industry, but our results hold.

Fourth, we also perform an analysis where we match firms from countries that physically share a border using entropy balancing and rerun our baseline tests as well as our difference-in-differences tests on this matched sample. With this approach, we

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Table 15
Public vs. Private IR and crisis-period returns depending on country characteristics.
This table shows the results from OLS regressions of the firm’s cumulative abnormal stock return over the period from February 3, 2020 to March 23, 2020 on Public IR and Private IR, firm controls and country and industry-fixed effects. We split the entire sample based on the median score of the countries in our sample. The subsamples are based on the following characteristics: the Rule of Law index from the World Bank’s World Governance Indicators for the year 2019 (columns (1) and (2)), the Disclosure index provided by La Porta et al. (2006) (columns (3) and (4)), the Anti-Self-Dealing index (ASDI) provided by Djanikov et al. (2008) (columns (5) and (6)), the level of societal trust from the World Values Survey’s latest wave (columns (7) and (8)), and Hofstede’s cultural dimensions Uncertainty Avoidance (columns (9) and (10)) and Long-Term Orientation (columns (11) and (12)). We report robust standard errors that are clustered by country in parentheses, with ***, **, * denoting statistical significance at the 1%, 5%, and 10% level.

| Dependent Variable: Abn. returns | Low Rule of Law | High Rule of Law | Low Disclosure | High Disclosure |
|----------------------------------|-----------------|------------------|----------------|-----------------|
| Public IR                        | −0.0099         | −0.0067          | −0.0249        | 0.0010          |
|                                  | (0.0275)        | (0.0789)         | (0.0341)       | (0.0288)        |
| Private IR                       | 0.1027***       | 0.0445           | 0.0779***      | 0.0944***       |
|                                  | (0.0134)        | (0.0278)         | (0.0159)       | (0.0129)        |

| Observations                     | 510             | 200              | 459            | 251             |
| Firm Characteristics             | yes             | yes              | yes            | yes             |
| Industry Fixed Effects           | yes             | yes              | yes            | yes             |
| Country Fixed Effects            | yes             | yes              | yes            | yes             |
| Adjusted R-Squared               | 0.25            | 0.37             | 0.29           | 0.31            |

| Dependent Variable: Abn. returns | Low ASDI | High ASDI | Low Trust | High Trust |
|----------------------------------|----------|----------|-----------|------------|
| Public IR                        | 0.0089   | 0.0134   | −0.0086   | −0.0076    |
|                                  | (0.0319) | (0.0246) | (0.0295)  | (0.0816)   |
| Private IR                       | 0.0925***| 0.1000***| 0.1030*** | 0.0513***  |
|                                  | (0.0201) | (0.0200) | (0.0130)  | (0.0226)   |

| Observations                     | 403      | 307      | 475       | 235         |
| Firm Characteristics             | yes      | yes      | yes       | yes         |
| Industry Fixed Effects           | yes      | yes      | yes       | yes         |
| Country Fixed Effects            | yes      | yes      | yes       | yes         |
| Adjusted R-Squared               | 0.28     | 0.21     | 0.25      | 0.37        |

| Dependent Variable: Abn. returns | Low Uncertainty Avoidance | High Uncertainty Avoidance | Low Long-Term Orientation | High Long-Term Orientation |
|----------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| Public IR                        | −0.0509                   | 0.0320                    | 0.0782                    | −0.0142                   |
|                                  | (0.0498)                  | (0.0238)                  | (0.0482)                  | (0.0406)                  |
| Private IR                       | 0.0776***                 | 0.1221***                 | 0.1033***                 | 0.00966                  |
|                                  | (0.0168)                  | (0.0256)                  | (0.0096)                  | (0.0236)                  |

| Observations                     | 453      | 257      | 316       | 394         |
| Firm Characteristics             | yes      | yes      | yes       | yes         |
| Industry Fixed Effects           | yes      | yes      | yes       | yes         |
| Country Fixed Effects            | yes      | yes      | yes       | yes         |
| Adjusted R-Squared               | 0.32     | 0.25     | 0.34      | 0.25        |

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13 We report the results from these robustness tests in our supplementary material.

14 Firms in these industries are not only different in terms of firm characteristics but were also least impacted by the crisis.
Finally, we also run regressions similar to those in Table 5 but where we (1) employ our measures for the public and private components of IR, and (2) where we interact each independent variable with the weekly growth of the COVID-19 Stringency Index (Hale et al., 2021) in the respective country instead of the weekly growth in COVID-19 cases. With the second test, we specifically check whether firms with better IR performed significantly better in response to stricter restrictions imposed by the governments. Yet, the results from these tests also lend support to our hypothesis.

7. Conclusion

The COVID-19 pandemic and the subsequent economic lockdown in many European countries presents an opportunity to test the link between a firm’s IR quality and its capital market outcomes. This is because the crisis led to enormous uncertainty and a large amount of often-unfiltered news about firms’ future prospects. Helping investors to evaluate information in order to reduce the level of uncertainty and information frictions is the key task of a firm’s IR department. In this paper, we therefore argue that firms with better-quality IR are more resilient during times of crisis as they effectively reduce information frictions and achieve a somewhat fairer valuation.

To test this relationship, we use a large sample of European firms and the IR rankings provided by Institutional Investor. Consistent with our hypothesis, we find firms with strong IR to experience significantly higher stock returns compared to those with weak IR during the crisis. Furthermore, we find that high-quality IR did not only appear to attract significantly more institutional investors but also to enhance credibility with the firms current shareholder base during the first quarter of 2020. After decomposing IR into public and private functions, we find the private IR function to be the main driver of our results.

In additional tests, we also find that the value of IR is dependent on the country the firm is headquartered in. In line with Karolyi et al. (2020), the results show that firms with better-quality IR benefited significantly more in countries with low-quality legal institutions. Further, we find that the value of IR was higher in countries with low levels of societal trust and in uncertainty-avoidant countries.

Moreover, we test whether firms with strong IR had lower stock volatility and higher operating performance during the crisis. While we find support for the first notion, there is no evidence that firms with better IR had better operating performance. However, this in line with our argument that firms with strong IR achieve higher stock returns through establishing an effective two-way communication and reducing information frictions.

Finally, as with most research in this field, we know that unobserved systematic differences between strong and weak IR firms could explain our results. However, we run a battery of robustness checks, include time and firm-fixed effects, and use entropy balancing to ensure the validity of our results. We thus conclude that establishing an effective communication through a firm’s IR department appeared to have paid off significantly during the crisis when investors and analysts became concerned about high corporate debt and liquidity.

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Declaration of Competing Interest

The authors declare no conflicts of interest.

Table 13
IR and crisis-period returns in particularly affected industries.

This table presents the results from OLS regressions on a subsample of firms particularly affected by the COVID-19 pandemic. The dependent variable is a firm’s cumulative abnormal return (based on market model estimations) for the period from February 3, 2020 to March 23, 2020, which is the collapse period as defined in Fahlenbrach et al. (2021). In columns (1) and (2), the main independent variable of interest is High IR, which equals one if the firm’s IR score is larger than the median IR score within the respective country. In column (3), the main independent variables of interest are a firm’s Public IR Score and the respective Private IR Score.

To construct the public and private components of IR, we run a regression of the natural logarithm of the IR score on three variables related to a firm’s public IR functions, namely Guidance, Conferences, and US Listing. We employ the fitted values as firms’ Public IR Score and the residuals as firms’ Private IR Score. Across all columns, we control for country-fixed effects and industry-fixed effects based on the Global Industry Classification Standard’s (GICS) 11 sectors. In columns (2) and (3) we also control for a variety of firm characteristics. All variables are described in detail in Table A.1 in the appendix. We report robust standard errors clustered by country in parentheses, with *, **, *** denoting statistical significance at the 1%, 5%, and 10% level.

| Dependent Variable: Abnormal returns | (1) | (2) | (3) |
|--------------------------------------|-----|-----|-----|
| High IR                             | 0.1126** | 0.0598 |     |
| Public IR Score                     | (0.0453) | (0.0369) |     |
| Private IR Score                    | −0.0166 | (0.2024) |     |
| Size                                | 0.0119  | 0.0130 |     |
| ROE                                 | (0.0149) | (0.0197) |     |
| Tobin’s Q                           | 0.3025  | 0.2093 | (0.2142) |
| Market-to-Book                      | (0.0176) | (0.0184) |     |
| Historical Volatility               | −0.0011 | 0.0120 |     |
| Cash / Assets                       | (0.1881) | (0.2011) |     |
| Short-term Debt / Assets            | −0.7259 | (0.3690) | (0.3587) |
| Long-term Debt / Assets             | −0.6025** | (0.1070) | (0.1086) |
| Momentum                            | −0.3125** | (0.0233) | (0.0225) |
| Analyst Following                   | 0.0387  | 0.0365 |     |
| Blockholder                         | (0.0404) | (0.0452) |     |
| Institutional Ownership             | −0.0940 | −0.0851 |     |
| US Listing                          | (0.1052) | (0.1137) |     |
| Observations                        | 263     | 248    | 248 |
| Industry Fixed Effects              | yes    | yes   | yes |
| Country Fixed Effects               | yes    | yes   | yes |
| Adjusted R-Squared                  | 0.13    | 0.36   | 0.37 |

aim to condition out several confounding variables. As matching pairs, we choose Germany and France, Italy and France, as well as Spain and France. The results from these tests provide further support for our previous findings since we find firms with better-quality IR to outperform those with lower-quality IR.15

As a fifth robustness test, we also change the definition of the variable crisis in our difference-in-differences estimation. Following Albuquerque et al. (2020), we set the variable equal to one for each date in the period from January 30 to March 23, 2020, and zero otherwise. The rationale behind is that on January 30, 2020 the World Health Organisation (WHO) declared the outbreak a public health emergency of international concern. Nonetheless, we find very similar results as reported in Table 6.

15 We thank an anonymous referee for this suggestion.
Appendix

Table A.1
Description of variables.

This table provides definitions of the variables used in our empirical analysis. The survey-based IR rankings come from Institutional Investor. Stock data and accounting data come from Compustat/Capital IQ. Corporate ES ratings, governance data, data on a firm's informational environment, and ownership data come from Thomson Reuters Eikon. Additionally, we obtain data on news coverage from Dow Jones Factiva. Data on trust come from the World Values Survey's (WVS) latest wave (i.e., wave 7, 2017–2020). The Rule of Law index data come from the World Bank's World Governance Indicators 2019. The anti-self-dealing index (ASDI) is from Djankov et al. (2008) and the Disclosure index is from La Porta et al. (2006). Data on Uncertainty Avoidance and Long-Term Orientation come from Hofstede’s website.

| Variable | Definition |
|----------|------------|
| **Dependent variables:** | | |
| Raw returns | The cumulative daily logarithmic return based on the daily closing prices. |
| Weekly returns | The cumulative weekly logarithmic return based on the daily closing prices. |
| Abnormal returns | The cumulative daily abnormal return which is the raw return minus the expected return based on a market model estimated over a 12-month period from January 2019 until January 2020. |
| **Idiosyncratic Volatility independent variables:** | | |
| log(IR Score) | The logarithmic IR score of a firm. |
| High IR | Dummy variable that equals one if the firm's IR score is larger than the median score within the respective country, and zero otherwise. |
| IR Score 2 | Dummy variable that equals one if the firm's IR score is in the second IR quartile, and zero otherwise. |
| IR Score 3 | Dummy variable that equals one if the firm's IR score is in the third IR quartile, and zero otherwise. |
| IR Score 4 | Dummy variable that equals one if the firm's IR score is in the fourth IR quartile, and zero otherwise. |
| Public IR Score | The fitted values from a regression of the natural logarithm of the IR score on three variables related to a firm's public IR functions, namely Guidance, Conferences, and US Listing. |
| Private IR Score | The residuals from a regression of the natural logarithm of the IR score on three variables related to a firm's public IR functions, namely Guidance, Conferences, and US Listing. |
| Private IR | Dummy variable that equals one if the firm's Public IR Score is larger than the sample median, and zero otherwise. |
| **Control variables:** | | |
| Size | Total assets of a firm minus the book value of equity plus market capitalization, all divided by total assets. |
| Tobin’s Q | Return on equity calculated as net income of a firm over market capitalization. |
| Market-to-Book | Market capitalization of a firm over book value of equity. |
| Hystorical Volatility | Annualized stock volatility of daily raw returns during 2019. |
| Cash / Assets | Cash over total assets of a firm. |
| Short-term Debt / Assets | Short-term debt over total assets of a firm. |
| Long-term Debt / Assets | Long-term debt over total assets of a firm. |
| Momentum | Momentum factor based on the four-factor model from Carhart (1997) estimated over a 12-month period from January 2019 until January 2020. |
| Analyst Following | The natural logarithm of the number of sell-side analysts forecasting a firm's earnings per share (EPS). |
| Blockholder | The percentage of a firm’s shares held by blockholders who own 5% or more of a firm's shares. |
| Institutional Ownership | The percentage of a firm’s shares held by institutional investors. |
| US Listing | Dummy variable that equals one if a firm is cross-listed on a US stock exchange, and zero otherwise. |
| High ES | Dummy variable that equals one if the firm’s ES rating is larger than the sample median, and zero otherwise. |
| Board Size | The number of a firm’s board members. |
| Board Independence | The percentage of independent board members reported by the firm. |
| Board Governance Score | The corporate governance score of a firm. |
| Conferences | The number of conferences held by a firm in 2019. |
| Road Show | The number of road shows held by a firm in 2019. |
| Guidance | The number of guidance announcements of a firm in 2019. |
| News Coverage | The logarithm of the number of news articles which are related to a firm in 2019. |
| Collapse News Coverage | The logarithm of the number of news articles which are related to a firm during the collapse period from February 3, 2020 to March 23, 2020. |
| % Staying Inst. Investors | The fraction of incumbent institutional investors who stayed loyal to the firm during the first quarter of 2020. |
| % Staying Domestic Inst. Investors | The fraction of incumbent domestic institutional investors who stayed loyal to the firm during the first quarter of 2020. |
| % Staying Foreign Inst. Investors | The fraction of incumbent foreign institutional investors who stayed loyal to the firm during the first quarter of 2020. |
| #Inst. Ownership Change | The change in the number of all institutional owners during the first quarter of 2020. |
| #Domestic Inst. Ownership Change | The change in the number of all domestic institutional owners during the first quarter of 2020. |
| #Foreign Inst. Ownership Change | The change in the number of all foreign institutional owners during the first quarter of 2020. |

(continued on next page)
Table A.1 (continued)

| Variable                        | Definition                                                                                                                                                                                                 |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| **Country characteristics:**    |                                                                                                                                                                                                          |
| Low Rule of Law                 | Dummy variable that equals one if the country’s rule of law score is equal or below the sample countries’ median. Rule of law in a country is measured through the World Bank’s Rule of Law index.                  |
| High Rule of Law                | Dummy variable that equals one if the country's rule of law score is equal or larger than the sample countries’ median. Rule of law in a country is measured through the World Bank’s Rule of Law index.            |
| Low Disclosure                  | Dummy variable that equals one if the country's disclosure score is equal or below sample countries’ median. Disclosure in a country is measured through the disclosure index provided by La Porta et al. (2006). |
| High Disclosure                 | Dummy variable that equals one if the country’s disclosure score is equal or larger than the sample countries’ median. Disclosure in a country is measured through the disclosure index provided by La Porta et al. (2006). |
| Low ASDI                         | Dummy variable that equals one if the country’s ASDI score is equal or below the sample countries’ median. The anti-self-dealing index (ASDI) is provided by Djankov et al. (2008).                       |
| High ASDI                        | Dummy variable that equals one if the country’s ASDI score is equal or larger than the sample countries’ median. The anti-self-dealing index (ASDI) is provided by Djankov et al. (2008).                       |
| Low Trust                       | Dummy variable that equals one if the country’s trust score is equal or below the sample countries’ median. Societal trust in a country is measured through the response to the question “Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?” from the WVS. We use the proportion of respondents answering with most people can be trusted as a score for societal trust. |
| High Trust                      | Dummy variable that equals one if the country’s trust score is equal or larger than the sample countries’ median. Societal trust in a country is measured through the response to the question “Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?” from the WVS. We use the proportion of respondents answering with most people can be trusted as a score for societal trust. |
| Low Uncertainty Avoidance       | Dummy variable that equals one if the country’s uncertainty avoidance score is equal or below the sample countries’ median. Uncertainty avoidance in a country is measured through Hofstede’s cultural dimension scores. |
| High Uncertainty Avoidance      | Dummy variable that equals one if the country’s uncertainty avoidance score is equal or larger than the sample countries’ median. Uncertainty avoidance in a country is measured through Hofstede’s cultural dimension scores. |
| Low Long-Term Orientation       | Dummy variable that equals one if the country’s long-term orientation score is equal or below the sample countries’ median. Long-term orientation in a country is measured through Hofstede’s cultural dimension scores. |
| High Long-Term Orientation      | Dummy variable that equals one if the country’s long-term orientation score is equal or larger than the sample countries’ median. Long-term orientation in a country is measured through Hofstede’s cultural dimension scores. |

Table A.2

| ID | Country | Number of Firms |
|----|---------|-----------------|
| 1  | Austria | 22              |
| 2  | Belgium | 36              |
| 3  | Denmark | 26              |
| 4  | Finland | 20              |
| 5  | France  | 120             |
| 6  | Germany | 149             |
| 7  | Ireland | 16              |
| 8  | Italy   | 80              |
| 9  | Luxembourg | 12          |
| 10 | Netherlands | 44         |
| 11 | Norway  | 23              |
| 12 | Portugal | 10             |
| 13 | Spain   | 70              |
| 14 | Sweden  | 41              |
| 15 | Switzerland | 78         |
| 16 | United Kingdom | 200       |
| **Total** |         | **947**         |
Table A.3
Correlation analysis
This table reports pairwise correlation coefficients for our variables where * indicates significance at the 5% level or lower. All variables are defined in detail in Table A.1 in the appendix.

|       | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) | (18) | (19) | (20) | (21) | (22) | (23) | (24) | (25) |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| (1)   | 1.00* |
| (2)   | 0.82* | 1.00* |
| (3)   | 0.22* | 0.12* | 1.00* |
| (4)   | 0.20* | 0.52* | 1.00* |
| (5)   | 0.08* | 0.05 | 0.16 | 0.54* | 1.00* |
| (6)   | 0.17* | 0.13* | 0.60* | 0.42* | -0.09* | 1.00* |
| (7)   | 0.10* | 0.04 | 0.16* | 0.76* | 0.74* | -0.07* | 1.00* |
| (8)   | 0.19* | 0.15* | 0.62* | 0.74* | -0.07* | 0.74* | -0.04 | 1.00* |
| (9)   | 0.12* | -0.00 | 0.39* | 0.26* | 0.16* | 0.25* | 0.27* | 1.00* |
| (10)  | 0.08* | 0.08* | 0.17* | 0.12* | 0.03 | 0.13* | 0.05 | 0.14* | 0.26* | 1.00* |
| (11)  | 0.11* | 0.16* | 0.03 | 0.09* | 0.02 | 0.10* | 0.02 | 0.11* | -0.24* | -0.12* | 1.00* |
| (12)  | 0.05 | 0.11* | 0.02 | 0.08* | 0.01 | 0.11* | 0.01 | 0.10* | -0.20* | -0.12* | 0.81* | 1.00* |
| (13)  | -0.02 | -0.23* | -0.19* | -0.16* | -0.14* | -0.09* | -0.10* | -0.12* | -0.37* | -0.38* | 0.05 | 0.01 | 1.00* |
| (14)  | 0.11* | 0.08* | -0.09* | -0.11* | -0.11* | -0.03 | -0.13* | -0.33* | 0.10* | 0.26* | 0.15* | 0.22* | 1.00* |
| (15)  | -0.07* | -0.04 | -0.05 | 0.01 | 0.06 | -0.08* | 0.05 | 0.10* | -0.01 | -0.15* | -0.07* | -0.01 | -0.22* | 1.00* |
| (16)  | -0.20* | -0.13* | -0.03 | -0.00 | 0.04 | -0.00 | 0.01 | 0.03 | -0.05 | -0.08* | 0.02 | -0.05 | -0.29* | 0.16* | 1.00* |
| (17)  | -0.19* | 0.20* | 0.04 | 0.02 | 0.03 | 0.04 | -0.03 | 0.07* | -0.00 | 0.04 | 0.12* | 0.15* | -0.43* | -0.11* | -0.01 | 0.15* | 1.00* |
| (18)  | 0.21* | 0.00 | 0.49* | 0.32* | 0.14* | 0.26* | 0.14* | 0.33* | 0.61* | 0.12* | 0.00 | -0.02 | -0.21* | -0.15* | -0.09* | -0.03 | -0.07* | 1.00* |
| (19)  | -0.04 | 0.07 | -0.18* | -0.15* | -0.08* | 0.12* | -0.11* | -0.09* | -0.12* | -0.20* | -0.08* | 0.04 | 0.04 | 0.11* | -0.01 | 0.10* | 0.03 | 0.05 | 0.03 | 1.00* |
| (20)  | -0.10* | -0.00* | -0.02 | -0.18* | -0.21* | 0.03 | -0.23* | 0.01 | -0.09* | -0.07* | 0.11* | 0.09* | 0.08* | 0.02 | -0.04 | 0.00 | 0.06 | -0.02 | -0.02 | 1.00* |
| (21)  | 0.11* | 0.06 | 0.14* | 0.20* | 0.20* | -0.01 | 0.26* | -0.01 | 0.17* | -0.04 | 0.01 | -0.00 | -0.02 | 0.10* | -0.03 | -0.03 | 0.01 | 0.18* | -0.17* | -0.05 | 1.00* |
| (22)  | 0.15* | 0.09* | 0.23* | 0.25* | 0.18* | 0.09* | 0.18* | 0.17* | 0.51* | 0.03 | -0.12* | -0.09* | -0.21* | -0.15* | 0.07 | 0.01 | 0.03 | 0.42* | -0.10* | -0.11* | 0.13* | 1.00* |
| (23)  | 0.13* | 0.00 | 0.21* | 0.12* | 0.12* | 0.07* | 0.08* | 0.09* | 0.43* | 0.05 | -0.22* | -0.18* | -0.15* | 0.11* | 0.09* | -0.03 | -0.09* | 0.37* | 0.04 | -0.23* | 0.04 | 0.38* | 1.00* |
| (24)  | 0.03 | 0.00 | 0.12* | 0.15* | 0.17* | 0.11* | 0.14* | 0.07* | 0.20* | 0.00 | 0.01 | -0.01 | -0.11* | -0.00 | -0.05 | -0.02 | 0.07* | 0.21* | -0.33* | 0.12* | 0.17* | 0.22* | -0.07 | 1.00* |
| (25)  | 0.03 | -0.03 | 0.25* | 0.19* | 0.13* | 0.14* | 0.13* | 0.15* | 0.39* | 0.07* | -0.05 | -0.05 | -0.13* | -0.10* | -0.03 | 0.02 | 0.06 | 0.38* | -0.33* | 0.00 | 0.15* | 0.40* | 0.17* | 0.42* | 1.00* |

Number of Variable
(1) Abnormal returns
(2) Raw returns
(3) High IR
(4) log(IR Score)
(5) Public IR
(6) Private IR
(7) Public IR Score
(8) Private IR Score
(9) Size
(10) ROE
(11) Tobin’s Q
(12) Market-to-Book
(13) Historical Vola
(14) Cash / Assets
(15) Short-term Debt / Assets
(16) Long-term Debt / Assets
(17) Momentum
(18) Analyst Following
(19) Blockholder
(20) Institutional Ownership
(21) US Listing
(22) High ES
(23) Board Size
(24) Board Independence
(25) Board Governance Score
Supplementary material

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jbankfin.2022.106450.

CRediT authorship contribution statement

Daniel Neukirchen: Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Data curation, Writing – original draft, Writing – review & editing, Visualization, Project administration, Funding acquisition. Nils Engelhardt: Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Data curation, Writing – original draft, Writing – review & editing, Visualization, Funding acquisition. Miguel Krause: Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Data curation, Writing – original draft, Writing – review & editing, Visualization, Funding acquisition. Peter N. Posch: Writing – review & editing, Resources, Supervision.

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