Individualism and Stock Price Crash Risk

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Abstract

Employing a sample of 26,473 firms across 42 countries from 1990 to 2013, we find that firms located in countries with higher individualism have higher stock price crash risk. Furthermore, individualism can be transmitted by foreign investors from overseas markets to influence local firms' crash risk, and can exacerbate the impact of firm risk taking and earnings management on crash risk. Moreover, the positive relation between individualism and crash risk is amplified during the global financial crisis and attenuated by enhanced country-level financial information transparency and the adoption of International Financial Reporting Standards.

JEL Classification: G14, G15
Keywords: cross-country study, national culture, individualism, stock price crash risk

1. Introduction

Understanding the sources of stock price crash risk (hereafter "crash risk") is of great importance for investors and policy makers, especially given that large stock price crashes diminish firm value and investor wealth, and even potentially induce financial market instability. Crash risk arises when bad news that has been hoarded deliberately by managers accumulates beyond a critical threshold and suddenly becomes publicly available to investors (Jin & Myers, 2006). Incentives exist for managers to strategically engage in this behavior, as bad news could adversely affect their compensation, professional career opportunities, and reputations (Ball, 2009; Kothari, Shu, & Wysocki, 2009). A growing body of literature has linked crash risk to various managerial opportunistic behaviors, such as risk taking (Callen & Fang, 2015) and earnings management (Hutton, Marcus, & Tehranian, 2009). A fundamental factor surprisingly ignored by the existing literature in explaining crash risk from a psychological perspective is national culture, which shapes managers' perceptions of hiding bad news, thereby influencing crash risk. This paper examines the impact of individualism, as an important national culture dimension, on crash risk around the world.

We conjecture that individualism functions in three ways to encourage managerial bad news hoarding, leading to crash risk. First, when faced with bad news, managers in individualistic countries have great career and compensation concerns. As employees, they do not expect to be cared for by their employers beyond the scope of their work contract (Hofstede, 2005). Underperforming managers are thus likely to be dismissed. In addition, their compensation is structured to accommodate individual contribution (Hofstede, 1980; Jackson & Schuler, 1995). Performance-based compensation is prevalently used (Schuler & Rogovsky, 1998). Hence, to safeguard their job and/or protect their compensation, they tend to withhold bad news (Kothari et al., 2009). Second, these managers generally enjoy a high degree of autonomy that allows them flexibility in self-governance to adopt their own choices (Gray, 1988; Han, Kang, Salter, & Yoo, 2010). If bad news hoarding is at their discretion and to their benefit, they are likely to practice this behavior. Third, these managers' strong self-enhancement tendency (Markus & Kitayama, 1991) motivates them to hide bad news that contradicts their positive self-view. However, the non-sustainability of the bad news hoarding can result in stock price crashes.

Using a sample of 26,473 firms across 42 countries from 1990 to 2013, we examine how a country's score on Hofstede's individualism index affects three crash risk measures: the negative skewness of firm-specific weekly returns (*NCSKEW*); the down-to-up volatility of firm-specific weekly returns (*DUVOL*); and the number of crash weeks minus the number of jump weeks over a given year (*COUNT*). Our regression results show that individualism is positively and significantly related to all three crash risk measures, suggesting that firms located in more individualistic countries exhibit higher crash risk.

Hofstede's other cultural dimensions are also found to influence crash risk. First, we report lower crash risk in higher power-distance countries, where managers engaging in bad news hoarding would face more severe disapproval and punishment from their superiors. Second, we report high crash risk in masculine countries, where, as expected, managers tend to conceal bad news to sustain their career prospects and compensation levels in their pursuit of material success. Third, uncertainty avoidance mitigates crash risk, which corroborates the notion that managers in uncertainty-avoiding countries try to avoid the strong uncertainty—and hence high anxiety—associated with bad news hoarding.

Individualism does not arise solely from domestic national culture; it could also be transmitted by foreign investors from their home countries. In line with this argument, we show that the capital inflow from a foreign country with an individualism score *higher* (*lower*) than that of the host country *increases* (*decreases*) the crash risk of host-country recipient firms. This relation indicates that foreign investors can disseminate their home-country individualistic cultures to the host country, thereby shaping host-country managers' crash-related values and behaviors through socialization.

Expanding on the existing evidence that risk taking and earnings management provide motives and vehicles for managers to hide bad news (Callen & Fang, 2015; Hutton et al., 2009), we find that individualism exacerbates the positive effects of risk taking and earnings management on crash risk. This finding suggests that individualism can encourage these bad-news-hoarding-related activities of managers, which in turn amplify crash risk.

Complementing Jin and Myers (2006), who argue that enhanced country-level financial information transparency dampens managers' ability to hide bad news, we show that the positive impact of individualism on crash risk is less pronounced in countries with higher financial information

transparency. This evidence highlights the importance of establishing transparent financial disclosure systems to curtail crash risk in high individualism countries.

We verify that the positive link between individualism and crash risk holds across 10 census geographic regions in the United States. By employing an accounting restatement setting, we further show that managers in individualistic regions tend to hide and accumulate adverse firm-specific earnings information until it can no longer be concealed and has to be released through restatements, which precipitate stock price crashes. This finding reinforces our argument that the heightened bad news hoarding in individualistic cultures induces crash risk.

Based on exogenous market events, we show that the positive relation between individualism and crash risk was strengthened during the global financial crisis, and that the improved financial reporting quality following the adoption of International Financial Reporting Standards (IFRS) attenuates this relation. Finally, we find that firms in more individualistic countries experience a larger drop in the stock price during crashes.

This paper contributes to the existing literature in several ways. First, it adds to the research on the impact of formal and informal institutions on crash risk. One related study is conducted by DeFond, Hung, Li, and Li (2014), who focus on the adoption of *formal* accounting rules across countries. As regards *informal* institutions, Callen and Fang (2015) investigate how religion affects the crash risk of U.S. firms. Although religion has been used as a proxy for national culture in previous studies (e.g., La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1999; Stulz & Williamson, 2003) and may be a more acceptable measure of interregional differences in social norms within a single country (e.g., Callen & Fang, 2015), our cross-country analysis of individualistic cultures has different implications than the studies resting on religion. "Religions are exceedingly complex institutions with protracted evolutionary tracks. Many accommodate the coexistence of conflicting views on numerous issues, and degree of religious commitment varies both within and across countries. Moreover, many modern countries are predominantly secular, thus weakening the direct link between religion and contemporary informal institutions. Finally, simply classifying countries by religion leaves the substantive content of the cultural differences virtually undefined" (Siegel, Licht, & Schwartz, 2011: 623–624). Our study links crash risk to individualistic cultures that shape managers' beliefs and actions in the first place, thereby

providing the first convincing evidence of culture's impact on crash risk.

Second, this paper contributes to the literature on the effects of individualistic cultures on stock price behaviors. The scarce literature in this area generally maintains that individualistic cultures are beneficial for stock investors as individualism enhances momentum trading profits (Chui, Titman, & Wei, 2010) and stock price informativeness (Eun, Wang, & Xiao, 2015). Our paper broadens this strand of studies by showing that individualistic cultures can lead to an adverse outcome in stock markets—crashes. In this regard, our paper particularly extends the bad news hoarding theory of crash risk.

Third, this paper offers new insights into the role of foreign investors in domestic stock markets. The financial consequence of introducing foreign capital into domestic stock markets is undergoing a continuing debate. For example, Bae, Chan, and Ng (2004) show that foreign-owned stocks, which are closely integrated with the global market, are vulnerable to international financial shocks. In contrast, Li, Nguyen, Pham, and Wei (2011) find that firms owned by large foreign investors have low stock return volatility. Our paper sheds additional light on this debate by showing that the impact of foreign capital on crash risk is dependent on the individualism distance between the home country of the foreign capital and its host country. This finding unveils a key undocumented feature: the role of foreign investors is decided by their cultural distance to the investee.

The remainder of this paper proceeds as follows. Section 2 provides a literature review and develops the hypothesis. Section 3 describes the model and data. Sections 4–6 present the empirical results. Section 7 concludes this paper.

2. Literature review and hypothesis development

Corporate managers, as insiders, have access to superior information regarding firms' investments and operations. Managers' commitment to prompt and accurate disclosure of inside information can improve information transparency and reduce the cost of capital (Diamond & Verrecchia, 1991; Leuz & Verrecchia, 2000). However, to serve their own benefit, managers may exercise some discretion in timing the disclosure (Verrecchia, 2001). Kothari et al. (2009) show that managers, on average, withhold or delay bad news release. This bad news hoarding tendency arises for three main reasons. First, it can stem from managers' career concerns. As managerial ability is largely assessed based on operating

outcomes, the release of bad news could prompt their quick dismissal or jeopardize their promotion prospects, while the withholding of bad news reduces such costs (Kothari et al., 2009). Second, if the revelation of bad news depresses the stock price, then managers have an incentive to hide such news, which, on being released, would result in wealth losses to their equity compensation (Benmelech, Kandel, & Veronesi, 2010; Kim, Li, & Zhang, 2011a). Third, as argued by Graham, Harvey, and Rajgopal (2005) and Kothari et al. (2009), managers often delay bad news disclosure in the hope that firms' real performance will improve soon, which then camouflages the unreleased bad news.

Two types of bad news can be strategically withheld by managers, yielding crash risk. The first is bad news about firms' earnings. Hutton et al. (2009) show that bad earnings news can be disguised through earnings manipulation, which engenders stock price crashes. Kim, Li, and Zhang (2011b) find that tax sheltering serves as a tool for managers to hide bad earnings news, thus elevating crash risk. The second type of bad news is unfavorable information about firms' investments. Bleck and Liu (2007) argue that, under the historical cost accounting regime, which allows managers to conceal investments' poor performance, bad investment projects would be kept alive for too long. When their inferior performance eventually surfaces, a stock price crash occurs. Furthermore, managers engaging in excessive risk taking tend to hide the true riskiness of the firm's investments in order to alleviate investors' concerns that the firm takes too much risk, which also increases crash risk (Kim et al., 2011a).

The above agency theory-based literature assumes that managers always rationally evaluate the consequences of their decisions and accurately assess the intrinsic value of investments. But, to derive private benefit, they may deliberately hide unfavorable information at the expense of shareholders. In contrast, Kim, Wang, and Zhang (2016) argue that managers may not always hold unbiased beliefs and may sometimes make irrational inferences and decisions. Overconfident CEOs could (irrationally) perceive negative information about the firm's investments as inaccurate and, hence, simply disregard or hide this *ex post* bad news, which allows these projects to survive for an extended period. Once the stockpiled adverse news materializes and breaks out, a stock price crash will occur.

Most of the previous crash risk studies focus on a single market (e.g., the U.S.) and investigate how firm characteristics or actions affect crash risk (e.g., Hutton et al., 2009; Kim et al., 2011a, 2011b). Extending these studies, we examine the cross-country differences in crash risk, and test whether these

differences are attributable to varied national culture. Recent literature on international business (IB) has witnessed a rapid growth of research topics on national culture and risky projects. Articles have documented that cultural distance affects international research and development (R&D) collaborations (Choi & Contractor, 2016) and cross-border venture capital syndication (Dai & Nahata, 2016). Boubakri, Guedhami, Kwok, and Saffar (2016) show that collectivism culture impacts the risk taking of privatized firms. Lisak, Erez, Sui, and Lee (2016) find that multicultural team leaders foster firm innovation. The retrospective articles by Beugelsdijk, Kostova, and Roth (2017), Devinney and Hohberger (2017), and Kirkman, Lowe, and Gibson (2017) synthesize the existing development in this field and inspire IB scholars to further advance the study of culture.

The dominant cultural framework in IB research is arguably that of Hofstede, who defines national culture as the collective programming of the mind that distinguishes members of one country from another. Hofstede (2005) maintains that, within a country, individual members' personal values may differ from the national cultural pattern but those who differ are fewer than those who conform to it, such that the national cultural values are shared by the majority of individuals. Among the four cultural dimensions in this framework (i.e., individualism, power distance, masculinity, and uncertainty avoidance), the individualism (versus collectivism) dimension appears to stand for the most significant cultural difference (Triandis, 2001). In countries oriented towards individualism (e.g., the U.S. and the U.K.), people on average hold more individualist values and fewer collectivist values (Hofstede, 2005). They are primarily individualists, who are loosely tied to each other. Their own interests more often take precedence over the interests of their in-group. By contrast, collectivism-oriented countries (e.g., China and Indonesia) form tightly knit social structures in which the group's interests more likely prevail over those of the individual.

To date, a large amount of literature has shown that the cultural dimension of individualism has a profound influence on various corporate decisions, such as dividend payouts (Shao, Kwok, & Guedhami, 2010), corporate investment (Shao, Kwok, & Zhang, 2013), accounting discretion (Han et al., 2010), and corporate governance practices (Griffin, Guedhami, Kwok, Li, & Shao, 2017). The additional evidence on the relevance of individualism to stock price movements (e.g., Chui et al., 2010; Eun et al., 2015) further points to the possibility that stock price crashes may relate to individualism.

We hypothesize that managers in a more individualistic country, on average, are more likely to hide bad news, leading to higher crash risk. There are several reasons for this hypothesis. First, managers in individualistic countries are especially concerned about bad news release. In Hofstede's (2005) view, the relationship between employees and employers in individualistic countries is of a *calculative* contract type. Employers are not expected to care for their employees beyond the scope of the work contract. It is thus socially acceptable for employers to dismiss employees who are underperforming. However, in collectivistic countries, the corporation itself can be seen as an in-group where employees and employers comprise an "extended family." The work relationship is composed of a *moral* commitment: employers protect their employees in exchange for loyalty. "Poor performance of an employee in this relationship is no reason for dismissal: one does not dismiss one's child" (Hofstede, 2005: 100). Relative to the board of directors and shareholders, managers are employees. Their poor performance in individualistic countries greatly increases the likelihood of their being replaced, giving a strong incentive for them to hide bad news (Kothari et al., 2009), thus generating crash risk.

Moreover, Hofstede (2005) and Jackson and Schuler (1995) argue that individualistic societies prefer compensation practices that center on individual recognition, and tend to remunerate individuals for what they have contributed. Schuler and Rogovsky (1998) show that managerial compensation in individualistic countries is closely linked to firm performance, and that performance-based compensation plans such as bonuses and equity grants are prevalent. Such compensation structures create incentives for managers to hide bad news, as this behavior can sustain stock prices in the short term and consequently their equity wealth (Benmelech et al., 2010; Kim et al., 2011a).[1] The hoarding of bad news further augments the likelihood of crashes in individualistic countries.[2]

Second, managers in individualistic countries tend to enjoy high autonomy to make individual

[1] John, Saunders, and Senbet (2000) find that incorporating the incentive features of managerial compensation structures as inputs into Federal Deposit Insurance Corporation deposit insurance pricing can elicit optimal investment-risk choices by banks. Our (unreported) regression results based on a dynamic simultaneous equations model suggest that crash risk can be endogenized in the design of CEOs' equity-based compensation to achieve desired outcomes.

[2] In addition, other corporate governance mechanisms may impact the link between individualism and crash risk. As John and Senbet (1998) suggest, one mechanism crucial to corporate governance effectiveness is board monitoring. Outside directors, who often play an effective role in monitoring and disciplining managers (e.g., Weisbach, 1988), primarily comprise the corporate boards in high individualism countries (Li & Harrison, 2008). A consequent intuitive expectation would be that these outside directors could constrain managerial bad news hoarding, thereby moderating the effect of individualism on crash risk.

decisions on bad news hoarding. According to Markus and Kitayama (1991), the independent self-construal in individualistic cultures is characterized by an emphasis on autonomy and independence. As discovering and expressing one's unique internal attributes is crucial in these cultures, people have a strong belief in individual choices and decisions (Markus & Kitayama, 1991). Within firms, the independence focus fosters a considerable amount of individual judgment in decision making by managers (Gray, 1988), and they are endowed with high flexibility in terms of self-governance and professionalism (Han et al., 2010). Therefore, we expect that managers in individualistic countries are likely to make individual choices to hoard bad news, particularly when the hiding of bad news can protect their job and wealth, which ultimately results in stock price crashes.

Finally, managers in high individualism countries tend to enhance their positive view of themselves by suppressing bad news. Markus and Kitayama (1991) argue that the motive to enhance a positive self-concept is strong in individualistic cultures, where expressing and affirming the self is vital, and is weak in collectivistic cultures, where fitting in with others is critical and enhancing oneself can harm interpersonal harmony and even single out the individual. As such, self-enhancement, which reflects people's inclination to view their own traits, attitudes, and actions in the most positive light (Pfeffer & Fong, 2005), is more evident in individualistic cultures than collectivistic ones (Heine, 2003). When confronted with negative self-relevant information, people in individualistic cultures tend to behave in a way that restores their positive self-view (Heine, 2003). Thus, it is logical to expect that managers in individualistic countries are likely to withhold bad news that conflicts with their desire to perceive themselves as skilled and competent.

In addition, the self-enhancement tendency in individualistic cultures has two consequent effects concerning bad news hoarding. First, managers in these cultures tend to think optimistically about the future (Fischer & Chalmers, 2008), believing that things will turn in their favor and improved future conditions can absorb at least some of the hidden bad news. Second, they are likely to overestimate their abilities (Heine, Lehman, Markus, & Kitayama, 1999; Markus & Kitayama, 1991). They tend to believe that they have chosen a subtle, clever approach to systematically disguising unfavorable information—for example, by engaging in complex earnings manipulation or tax shelters—so that investors will not detect their misbehavior. Furthermore, the bad news is often deemed inaccurate by these overconfident

managers, who may simply ignore it, which also adds to crash risk (Kim et al., 2016).

Taken together, we posit that, on average, managers in higher individualism countries are more likely to hide bad news, which then leads to higher crash risk. Our hypothesis is formulated as follows:

Hypothesis (H1): Firms located in countries with higher levels of individualism have higher stock price crash risk.

3. Model and data

3.1. Crash risk measures

To measure firm-specific crash risk, we first estimate the following expanded market model regression for each firm and year based on the model of Jin and Myers (2006):

$$
\begin{aligned}
(1) \qquad r_{i,t} = {} & \beta_{0,i} + \beta_{1,i} r_{m,j,t} + \beta_{2,i}\left[r_{U.S.,t} + EX_{j,t}\right] + \beta_{3,i} r_{m,j,t-1} + \beta_{4,i}\left[r_{U.S.,t-1} + EX_{j,t-1}\right] \\
& + \beta_{5,i} r_{m,j,t-2} + \beta_{6,i}\left[r_{U.S.,t-2} + EX_{j,t-2}\right] + \beta_{7,i} r_{m,j,t+1} + \beta_{8,i}\left[r_{U.S.,t+1} + EX_{j,t+1}\right] \\
& + \beta_{9,i} r_{m,j,t+2} + \beta_{10,i}\left[r_{U.S.,t+2} + EX_{j,t+2}\right] + e_{i,t}
\end{aligned}
$$

where $r_{i,t}$ is the stock return for firm *i* in week *t*, $r_{m,j,t}$ is the local market return for country *j* in week *t*, $r_{U.S.,t}$ is the U.S. market return in week *t*, and $EX_{j,t}$ is the change in country *j*'s exchange rate versus the U.S. dollar in week *t*. As the local firm's stock return could be exposed to global market fluctuations, $r_{U.S.,t}$+$EX_{j,t}$ is included as a proxy for the global market return. We include two lead and two lag terms for both the local and global market returns to allow for non-synchronous trading (Dimson, 1979). The residual return, $e_{i,t}$, is the stock return explained by neither the local nor the global market return variations and thus is related to firm-specific idiosyncratic factors. As the residual returns are positively skewed on average (Jin & Myers, 2006), we log-transform the returns, and compute the firm-specific weekly return ($W_{i,t}$) as the natural logarithm of 1 plus the residual return—that is, $W_{i,t} = log(1 + e_{i,t})$.

The first crash risk variable, *NCSKEW*, measures the negative skewness of firm-specific weekly returns, which denotes the degree of asymmetry in the distribution of stock returns. We compute *NCSKEW* by taking the negative of the third central moment of firm-specific weekly returns scaled by the sample variance of firm-specific weekly returns raised to the power of 3/2 (Chen, Hong, & Stein, 2001). Specifically, *NCSKEW* is calculated as:

(2) $$NCSKEW_{i,t} = -\frac{n(n-1)^{\frac{3}{2}}\sum W_{i,t}^3}{(n-1)(n-2)\left(\sum W_{i,t}^2\right)^{\frac{3}{2}}}$$

where n is the number of firm i-specific weekly returns in year t.

The second crash risk variable, *DUVOL*, measures the down-to-up volatility of firm-specific weekly returns, which denotes the degree of asymmetry in volatilities between negative and positive stock returns. *DUVOL* is calculated by taking the natural logarithm of the ratio of the standard deviation of firm-specific weekly returns in down weeks to the standard deviation of firm-specific weekly returns in up weeks (Chen et al., 2001). A firm-week is defined as a down (an up) week if the firm-specific weekly return is below (above) its annual mean. Specifically, *DUVOL* is calculated as:

(3) $$DUVOL_{i,t} = log\left[\frac{(n_u-1)\sum W_{i_d,t}^2}{(n_d-1)\sum W_{i_u,t}^2}\right]$$

where $W_{i_d,t}$ ($W_{i_u,t}$) is the firm i-specific weekly return during a down (an up) week in year t, and n_d (n_u) is the number of down (up) weeks for firm i in year t.

The third crash risk variable, *COUNT*, is created based on the frequency of negative versus positive extreme firm-specific weekly returns. We define a firm-week as a crash (jump) week if the firm-specific weekly return is 3.09 standard deviations below (above) its annual mean, where 3.09 is chosen to generate a weekly crash (jump) frequency of 0.1% in the normal distribution (Hutton et al., 2009). *COUNT* is computed as the number of crash weeks minus the number of jump weeks over a given year (Jin & Myers, 2006).

In sum, a higher value of *NCSKEW*, *DUVOL*, or *COUNT* signifies a higher level of crash risk.

3.2. Baseline regression model

We examine the impact of individualism on crash risk using the following regression model:

(4) $$CrashRisk_{ij,t+1} = \beta_0 + \beta_1 IDV_j + \boldsymbol{\beta_2 X_{ij,t}} + \boldsymbol{\beta_3 Y_{j,t}} + \varepsilon_{ij,t+1}$$

where country is indexed by j, firm by i, and year by t; *CrashRisk* denotes one of the crash risk variables *NCSKEW*, *DUVOL*, and *COUNT*; and *IDV* is Hofstede's individualism index.

$\boldsymbol{X}$ denotes a set of firm-level control variables that have been documented to influence crash risk (e.g., Kim et al., 2011a, 2011b). *NCSKEW_LAG* is included to account for the persistence of crash risk

over time. Since the dependent variable, *NCSKEW*, is the third moment of firm-specific weekly returns, we control for the first and second moments: the mean (*RET*) and standard deviation (*SIGMA*) of firm-specific weekly returns. Detrended stock turnover (*DTURN*) is included as a proxy for the intensity of investor disagreement about the stock's fundamentals. Earnings opacity (*ACCM*) is calculated by taking the moving sum of the absolute value of discretionary accruals over the previous three years, where discretionary accruals are computed using the modified Jones model (Dechow, Sloan, & Sweeney, 1995). Following the convention in the literature, we control for a range of firm characteristics, including financial leverage (*LEV*), return on assets (*ROA*), market-to-book ratio (*MTB*), and firm size (*SIZE*).

Y denotes a set of country-level control variables. As Hofstede (2005) documents that individualism is strongly correlated with national wealth, we control for GDP per capita (*GDP/CAPITA*). We also control for GDP growth (*GDP_GROWTH*) to isolate the effect of economic growth. Stock market capitalization (*MCAP*) and stock market turnover (*STKTURN*) are included as measures of stock market development. As Li, Griffin, Yue, and Zhao (2013) argue that individualistic countries tend to build strong formal institutions to protect creditors' rights, we control for the index of creditor rights (*CR*) to separate its impact on crash risk.[3] Variable definitions are summarized in the Appendix.

In addition, industry dummies (based on 3-digit Industry Classification Benchmark code) and year dummies are included to account for industry-wide and yearly fluctuations in crash risk, respectively. Equation (4) is then estimated by using ordinary least squares (OLS) regressions with robust standard errors corrected for firm-level clustering (Petersen, 2009). If the coefficient estimate (β_1) of *IDV* is positive and significant, then the hypothesis *H1* is supported. That is, firms in more individualistic countries have higher crash risk.

3.3. Sample

We start with all publicly listed firms worldwide covered by Datastream. We calculate the weekly stock return (*Ret*) using Datastream total return index (mnemonic: *RI*), a stock price index adjusted for stock

[3] We do not control for anti-director rights, because we find that the effect of creditor rights on crash risk subsumes that of anti-director rights, and that adding a control for anti-director rights can result in severe multicollinearity problems, leading to spurious results on anti-director rights. Nevertheless, the relation between individualism and crash risk is unaffected by adding this additional control variable.

splits and dividends. We follow Ince and Porter (2006) in screening and correcting for coding errors in *RI*. Specifically, we set an *RI* as missing if it is less than 0.01, as Datastream rounding *RI* to the nearest tenth can overstate the fraction of zero returns; and we drop an *RI* if *Ret* exceeds 200% and reverses within one week. We truncate the absolute value of *Ret* at 0.5 for unusual large returns. Our additional data sources include Hofstede (2005) for the individualism index, Worldscope for firm-level financial statement data, and World Development Indicators and existing literature for country-level data.

We apply the following filters to the sample: (1) we exclude American Depository Receipts and Global Depository Receipts because these stocks traded outside their home country could be affected by the host country's governance rules, political risks, and even cultures, which may distort our results; (2) we exclude utility firms because they are heavily regulated by governments and largely monopolistic; (3) we exclude financial firms because their normally high leverage often reflects financial distress for other firms;[4] (4) we require at least 26 weekly stock returns available in a year to avoid any distortions associated with the stock's initial public offering, delisting, or long-term trading suspension; (5) we require the sample with non-missing data for all variables in Equation (4); and (6) we exclude countries with fewer than 100 firm-year observations over the entire sample period. Finally, we are left with a sample of 26,473 firms from 42 countries spanning the period 1990–2013.

Panel A of Table 1 presents the sample distribution. The individualism scores range from 0.14 for Indonesia and Pakistan, the least individualistic countries, to 0.91 for the U.S., the most individualistic country. In Column 4, we define a firm as a crashed firm if it experienced at least one crash week over the sample period. We find that a country with a higher score of individualism is likely associated with a higher percentage of crashed firms. Panel B of Table 1 presents the sample distribution of crashed firms by year. We observe that 17.08% of firms crashed in 2008, which coincided with the peak of the recent global financial crisis.

< Insert Table 1 >

Panel A of Table 2 presents the summary statistics of firm- and country-level variables. The mean values of *NCSKEW*, *DUVOL*, and *COUNT* are –0.155, –0.091, and –0.077, respectively. Panel B of

[4] Our main finding remains the same if the American Depository Receipts, Global Depository Receipts, utility firms, and financial firms are added back to the sample.

Table 2 reports the univariate tests of the crash risk variables in high versus low individualism countries. We classify a country-year into the *High* (*Low*) *IDV* group if the country's individualism score is above (below) the cross-country sample median in the year. We find that the firm-level crash risk in *High IDV* countries is, on average, significantly higher than that in *Low IDV* countries. Note that the firm-level univariate test results could suffer from the countries' disproportionate representation in the firm-year sample. We compute value-weighted country average crash risk for each year and repeat the univariate analysis at the aggregate country level. *High IDV* countries report significantly higher mean and median values of crash risk than *Low IDV* countries.

< Insert Table 2 >

Figure 1 plots each country's value-weighted average crash risk against the country's individualism score. All fitted trend lines are upward sloping, implying a positive link between individualism and crash risk.

< Insert Figure 1 >

4. Individualism and crash risk

4.1. Baseline regression results

In Table 3, we present the baseline OLS regression results for the impact of individualism on crash risk. The coefficient estimates (*t*-statistics) of *IDV* are equal to 0.148 (15.69), 0.071 (15.70), and 0.096 (13.69) in Columns 1–3, respectively. The results suggest a positive and significant effect of individualism on crash risk, lending support to hypothesis *H1* that firms in more individualistic countries are more prone to stock price crashes.

< Insert Table 3 >

For the firm-level control variables, we find that *NCSKEW_LAG* is positively related to future crash risk, indicating that crash risk tends to persist over time (Chen et al., 2001). *SIGMA* significantly increases crash risk, in line with the notion that high risk-taking firms are likely to crash (Callen & Fang, 2015). We document positive and significant coefficients on *ACCM*, consistent with Hutton et al. (2009), who show that firms with higher levels of earnings management display higher crash risk. *DTURN* is positively related to crash risk, consistent with the finding of Chen et al. (2001) that stocks are more

crash prone when there are greater differences of investors' opinion about the stock fundamentals. The coefficients on *MTB* and *SIZE* are significantly positive, indicating that high-growth stocks and large-cap stocks have high crash risk, consistent with the results of Kim et al. (2011b).

For the country-level control variables, we find that *GDP/CAPITA* and *GDP_GROWTH* are positively and significantly related to crash risk, which reflects the high firm-level crash risk in wealthy countries and high-growth countries. *STKTURN* is positively related to crash risk, indicating that firms listed in stock markets with higher turnover ratios exhibit higher crash risk. *CR* has a negative impact on crash risk, which reveals the beneficial role of creditor protection in mitigating crash risk.

The adjusted R^2 values range from 0.021 to 0.042, comparable in magnitude to the results of Kim et al. (2011a) and DeFond et al. (2014) on studies of crash risk. Crash risk regressions tend to produce low R^2 because crash risk variables are derived from firm-specific stock returns, which contain noisy, firm-specific information.

4.2. Endogeneity

To mitigate endogeneity concerns, we first estimate two-stage least squares (2SLS) regressions by employing two instrumental variables (IVs) for individualism: (1) the country's genetic distance to the U.S., denoted *Genetic_Distance*, retrieved from Spolaore and Wacziarg (2009); and (2) the country's grammatical rule on pronoun drop, *Pronoun_Drop*, which equals 1 if the major language spoken in the country licenses pronoun drop and 0 otherwise, collected from Kashima and Kashima (1998). In Table 4, the first-stage regression results show that *Genetic_Distance* is negatively and significantly related to *IDV*, in line with the notion that a country that is more genetically distant from the U.S. is more culturally distant from the U.S.—that is, less individualistic. *Pronoun_Drop* is negatively and significantly related to *IDV*, which upholds Kashima and Kashima's (1998) viewpoint that people who speak a pronoun-drop language are less highlighted from the context of speech and naturally become less individualistic. In the second-stage regressions, $\widehat{IDV}$ significantly increases crash risk, which supports our hypothesis that firms in more individualistic countries are more crash prone.

< Insert Table 4 >

In addition, we rerun the baseline OLS regressions by including additional country-level control

variables, and report the results in Online Appendix Table A1.

First, as religion and culture interact closely in their development,[5] we control for the country's predominant religion as proxied by *Catholicism*, *Protestantism*, *Orthodox*, *Islam*, and *Buddhism* dummies collected from the World Factbook. The omitted dummy refers to the countries with a predominant religion of Hinduism or Judaism, or modern secular countries. We show that, compared to stocks listed in these omitted countries, those listed in Catholic and Protestant countries have low crash risk.

Second, as La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) find that legal origins influence the development of modern legal systems, which in turn could affect crash risk, we control for the country's legal origin by including English common law (*English*), French civil law (*French*), German civil law (*German*), and Scandinavian civil law (*Scandinavian*) dummies collected from Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2003). The omitted dummy is the one for countries with a socialist legal origin (i.e., China, Poland, and Russia in our sample). We show that firms in countries with a French civil law origin have lower crash risk than those in countries with a socialist legal origin.

Third, as Licht, Goldschmidt, and Schwartz (2007) show that individualistic countries tend to establish strong governance institutions, we control for the country's governance quality (*Governance*). The variable is constructed as the first factor of the factor analysis of the six indexes created by Kaufmann, Kraay, and Mastruzzi (2010) for assessing each country's governance quality in aspects of (1) voice and accountability, (2) political stability and absence of violence/terrorism, (3) government effectiveness, (4) regulatory quality, (5) rule of law, and (6) control of corruption. The results show that firms in better-governed countries are less likely to crash.

Finally, as individualistic countries place more emphasis on individual freedom and thus are less likely to impose limit rules on individual stocks' daily price variation,[6] we control for the dummy indicator of the presence of daily price limit rules on the country's major stock exchanges (*Price_Limit*),

[5] For example, Protestant countries tend to be more individualistic than Catholic countries (Hofstede, 2001).

[6] The U.S. and the U.K. do not have daily stock price limit rules, while China, Indonesia, and Pakistan have such rules.

which is collected from Deb, Kalev, and Marisetty (2010) and stock exchange websites. We find that the price limit rules can curb crash risk.

When these additional controls are incorporated into the baseline OLS regressions, the positive relation between individualism and crash risk continues to hold.

4.3. Robustness checks

We conduct a variety of robustness tests and find our results largely unchanged.[7]

4.3.1. Alternative indexes of individualism

The cultural dimension of individualism is not only a product of Hofstede's work but also is prevalent in other conceptual cultural studies. To compare the regression results across different individualism indexes, we rescale each of the indexes to be between 0 and 1 (with the minimum score recoded as 0 and the maximum score recoded as 1), and rerun the baseline regressions using the rescaled indexes from Hofstede as well as the following cultural frameworks.

First, we employ the bipolar dimensions of autonomy versus embeddedness from Schwartz (1994, 2004). For autonomy, there are two types of constructs: (1) *intellectual autonomy*, which reflects the independent pursuit of individuals' own ideas and intellectual directions; and (2) *affective autonomy*, which reflects the independent pursuit of individuals' positive affective experiences for themselves. At the opposite pole, embeddedness refers to individuals being integrated into the large collectivity. To measure individualism, we multiply the embeddedness score by –1, labeled *opposite embeddedness*. In Online Appendix Table A2, we show that only *affective autonomy* is positively and significantly related to crash risk, whereas the effects of *intellectual autonomy* and *opposite embeddedness* are either negative or insignificant.[8]

[7] In addition, we re-estimate Equation (4) by using weighted-least-squares regressions, Fama-MacBeth estimation procedure, adjusting firm-level variables by their within-country medians, hierarchical linear modeling, and altering the cluster specifications of heteroscedasticity-robust standard errors. Our main finding still holds. See Online Appendix Note A1 and Table A5 Panel D for details of these tests.

[8] The inconsistent results could be driven by Schwartz's ordering of the U.S. on the individualism dimension. Schwartz (1994, 2004) highlights that the U.S., viewed by Hofstede as the most individualistic country, ranks only 30th on the autonomy dimension of his own framework. Since U.S. firms dominate our sample, and the country's individualism ranking differs greatly across the two frameworks, we exclude the U.S. from the sample. Online Appendix Table A3 shows that, in the non-U.S. sample, *affective* and *intellectual autonomy* and *opposite embeddedness* indexes are all positively and significantly associated with crash risk.

Second, we use the indexes developed by House, Hanges, Javidan, Dorfman, and Gupta (2004) in the Global Leadership and Organizational Behavior Effectiveness (GLOBE) project. As the GLOBE's survey respondents are all managers, the indexes could be a more precise measurement of managerial cultural attributes. As opposed to individualism, GLOBE distinguishes two forms of collectivism: (1) *institutional collectivism*, which assesses the degree to which institutional practices at the societal level encourage and reward collective action; and (2) *in-group collectivism*, which assesses the degree to which individuals express pride, loyalty, and cohesiveness in their families. For both dimensions, GLOBE separates the scales of societal *values* ("should be") and *practices* ("as is"). We multiply GLOBE's collectivism scores by –1 (the constructed variables prefixed by *opposite*) to represent the level of individualism. The results in Online Appendix Table A2 show that crash risk is significantly positively associated with *opposite institutional collectivism values* and *opposite in-group collectivism practices*, while its relations with *opposite institutional collectivism practices* and *opposite in-group collectivism values* are inconsistent with our expectation.[9]

Third, we use an individualism index derived from the World Values Survey (WVS). Following Ahern, Daminelli, and Fracassi (2015), we focus on the WVS respondents' answers to the question: "How would you place your views on this scale? 1 means you agree completely with the statement that incomes should be made more equal; 10 means you agree completely with the statement that we need larger income differences as incentives for individual effort; and if your views fall somewhere in between, you can choose any number (1–9) in between." A country that places more emphasis on encouraging individual effort tends to be more individualistic. We rescale each respondent's answer score to fit a range 0–1 and then take the average response score from each country-year to be the country's score of individualism in the surveyed year. Since the surveys were completed in nonconsecutive waves, we assign the most recent available individualism score calculated from the WVS to each country-year in our sample. Using this time-varying index, we control further for country-

[9] The inconsistent results could be due to GLOBE's separate assessment of societal values and practices. Hofstede (2006) argues that GLOBE survey respondents tended to describe their existing practices in comparison to the desirable values in the society. That is, the constructs of societal values and societal practices may not be truly independent. Hence, we use factor analysis and extract the first factor of the two scales to uncover each country's cultural pattern underlying individuals' values and practices. Online Appendix Table A4 shows that the individualism factor scores constructed from GLOBE's indexes significantly increase crash risk.

fixed effects that capture all time-invariant country-level heterogeneity. As shown in Online Appendix Table A2, the relation between individualism and crash risk still holds.

Finally, to minimize measurement errors and make a more compelling case for what is measured in these different cultural constructs, we apply factor analysis to all the individualism indexes of Hofstede, Schwartz, GLOBE, and WVS, and take the first factor as the individualism measure. As reported in Online Appendix Table A2, our finding remains the same.

4.3.2. Alternative market models to derive firm-specific stock returns

We adopt two alternative market models to estimate the firm-specific stock returns. In the single market model, we assume that the local firm's stock returns are unaffected by the global market, and thus we only include the two lead and two lag terms for the local market returns in the model. Alternatively, in the world market model, we assume that the local firm's stock returns are subject to both the local and global market-wide return variations, but substitute the world market index return (Datastream mnemonic: *TOTMKWD*) for $r_{U.S.,t}$+$EX_{j,t}$ in Equation (1). We take the residual returns derived from these two alternative market model regressions to compute crash risk, *SIGMA*, and *RET*, which then enter the regressions of Equation (4). We find qualitatively unchanged results as tabulated in Panel A of Online Appendix Table A5.

4.3.3. Orthogonalization of individualism against GDP per capita

The accumulation of national wealth can cultivate individualistic national culture (Hofstede, 2005). In our sample, individualism correlates highly with GDP per capita, with a correlation coefficient equal to 0.50. To overcome any problems associated with the two variables' high correlation, we orthogonalize individualism against GDP per capita by regressing each country's individualism score on the country's average GDP per capita over the sample period. The residual from this regression is used as a substitute for *IDV* in Equation (4). As shown in Panel B of Online Appendix Table A5, our finding remains valid.

4.3.4. Alternative samples

We rerun the baseline OLS regressions using alternative samples. First, to alleviate the concern that certain dominant countries in the firm-year sample may distort the results, we exclude the U.S. (and Japan) from the sample. Second, to reduce the undue effect of firm-level heterogeneity, we use balanced

panels. We require firms to be continuously listed on stock exchanges during 2004–2013, where the regressions control for the dummy indicator of the 2008–2009 global financial crisis period. To rule out the possibility that the effect of individualism on crash risk may be driven by the extreme financial market turbulence during the global financial crisis, we examine two separate balanced panels for the periods 2004–2007 and 2010–2013. The results reported in Panel C of Online Appendix Table A5 support our main conclusion.

5. Hofstede's other cultural dimensions and crash risk

Kirkman, Lowe, and Gibson (2006) recommend that research in international business should go beyond the single dimension of individualism. The analyses of Hofstede's other cultural dimensions—namely, power distance (*PDI*), masculinity (*MAS*), and uncertainty avoidance (*UAI*)—would yield valuable insights. In this section, we examine the impact of these other cultural dimensions on crash risk.

Power distance describes cultural conceptions regarding the acceptance of power inequality between subordinates and superiors. In high *PDI* countries, the subordinate–superior relationships are strongly hierarchical and existentially unequal (Hofstede, 2005). Superiors hold great amounts of power and authority over subordinates. Contradicting the superiors can lead to severe reprimands and punishment. Subordinates are thus frequently afraid of disobeying their superiors, and often work hard to identify and serve their superiors' needs (Mead & Andrews, 2009). In the business context, managers, as subordinates to the board of directors and even external regulators, likely embrace this power inequality and make themselves submissive to these superiors. Consequently, bad news hoarding, which is discouraged by their superiors, would be avoided by managers in high *PDI* countries, thereby reducing crash risk.

Masculinity assesses the extent to which emotional gender roles are divided between men and women. According to Hofstede (2005), in masculine countries, men are supposed to be assertive, tough, and focused on material success, while women are supposed to be modest, tender, and caring about the quality of life. In contrast, the emotional gender roles tend to overlap in feminine countries, where both men and women are expected to be modest, tender, and caring about the quality of life. As top management is predominantly men (Dezsö & Ross, 2012), cultural values such as preferences for

assertiveness and material success would prevail among managers in masculine countries. As such, these managers could be more concerned about the damage to their career prospects and compensation that is potentially induced by bad news release. Therefore, we expect that managers in higher *MAS* countries have a stronger motivation to withhold bad news, leading to higher crash risk.

Uncertainty avoidance reflects the degree to which people in a society feel anxious and stressed about uncertainty or ambiguity. Although the establishment of formal rules and laws can defend against uncertainty in people's behavior, the defense does not create absolute certainty in an objective sense. We expect that managers in high *UAI* countries tend to feel anxious in the face of uncertain outcomes of bad news hoarding. To minimize uncertainty and ease anxiety, they would refrain from withholding bad news. In the case of hiding bad news about excessive risk taking in investments, in particular, managers in higher *UAI* countries take less risk in general (Li et al., 2013), making such hiding less necessary. Therefore, firms in higher *UAI* countries would be less prone to crashes.

In Table 5, we estimate the effects of these cultural dimensions on crash risk using both firm- and country-level regressions. The country-level estimation mitigates the concern about particular countries' overrepresentation in the firm-year sample, and generates appropriate coefficient estimates for measuring the economic significance of the effects of country-level cultural variables on firm-level crash risk. To form the country-level measures, we aggregate each firm-level variable to its value-weighted country average for each sample year.

< Insert Table 5 >

The regression results in Panels A and B of Table 5 show that crash risk is negatively associated with *PDI* and *UAI*, but positively associated with *MAS*. When we incorporate all four cultural dimensions into the regressions, the key variable of interest, *IDV*, has a significantly positive effect on all three crash risk variables. This result suggests that our finding for individualism does not simply capture the effects of Hofstede's other cultural dimensions.

Kirkman et al. (2017) and Beugelsdijk et al. (2017) urge IB researchers to further assess the effect size of national culture. Following their suggestion, we estimate and present the four cultural variables' economic significance in Panel C of Table 5, based on the country-level regression coefficients reported in Columns 10–12 of Panel B. We find that a one-standard-deviation increase in *IDV* (from half a

standard deviation below the mean to half a standard deviation above it, which is approximately from the level of individualism in Russia to that in Finland) increases *NCSKEW* by 22.23% from its sample mean.[10] An increase in *IDV* from the minimum to the maximum (from the level of individualism in Pakistan to that in the U.S.) increases *NCSKEW* by 69.01%. By comparison, a one-standard-deviation increase in *MAS* (approximately from the level of masculinity in South Korea to that in New Zealand) leads to a 15.21% increase in *NCSKEW*. An increase in *MAS* from the minimum to the maximum (from the level of masculinity in Sweden to that in Japan) leads to a 68.77% increase in *NCSKEW*.

Taken together, several findings emerge. First, the significant and positive relation between individualism and crash risk remains valid in the country-level regressions. Second, the impact of individualism is statistically significant after Hofstede's other cultural dimensions are included. Third, the impact of individualism is economically large compared to the other cultural dimensions. These findings corroborate Triandis (2001), who argues for the dominant role of individualism among different cultural dimensions. Therefore, in the following sections, we focus on the individualism dimension to shed more light on the culture's impact on crash risk.

6. Additional analyses

6.1. The role of foreign investors in transmitting individualism from overseas

Does individualism only stem from domestic national culture? The recent literature has found evidence that foreign investors can diffuse their home-country cultures, such as cultural norms about corruption (DeBacker, Heim, & Tran, 2015) and transparency (Braguinsky & Mityakov, 2015), to host-country recipient firms through socialization. One expectation in our setting is that foreign investors may carry individualism cultures from their home country to the local firms in the host country. The individualistic values of foreign investors would then be socialized into the host-country managers' attitudes and actions towards individualism, which consequently affects the local managers' bad news hoarding tendency and the firms' crash risk.

[10] The magnitude of the economic significance is calculated as (0.095×0.248)/0.106=22.23%, where 0.095 is the coefficient of *IDV* in Column 10 of Panel B of Table 5, 0.248 is the standard deviation of *IDV* in the country-year sample, and 0.106 is the absolute value of the mean *NCSKEW* in the country-year sample.

Empirically, if individualism can be transmitted by foreign investors from overseas markets, we should observe a significant effect of the transmitted individualism on the crash risk of host-country recipient firms. We collect firm-level foreign institutional ownership data from the FactSet database,[11] and assess the level of transmitted individualism by calculating the weighted sum of the signed algebraic difference in individualism scores between the home country of the foreign institutional investors and the host country. Specifically, the firm-level yearly transmitted individualism measure is constructed as follows:

$$(5) \quad IDV\ difference\ due\ to\ foreign\ institutional\ investors_{i,j} = \sum_{n}(IDV_{i,n,k} - IDV_{i,j}) \times w_{i,n}$$

where *i* indexes the firm, *n* indexes the foreign institutional investor who invests in the firm, *j* indexes the country of domicile of the firm, *k* indexes the country of residence of the foreign institutional investor, and *w* is the proportion of shares held by the foreign institutional investor. A positive (negative) value indicates that the firm's foreign institutional investors as a whole come from an individualistic (a collectivistic) country relative to the host country.

We augment the right-hand side of Equation (4) with the *IDV difference due to foreign institutional investors* variable. Columns 1−3 of Table 6 show that this variable is positively and significantly related to crash risk, which suggests that the capital inflow from a foreign country whose individualism score is *higher* (*lower*) than that of the host country *increases* (*decreases*) the crash risk of the host-country recipient firm.

< Insert Table 6 >

Foreign ownership, while shaping domestic cultures, can integrate domestic stocks with the global market, rendering the stocks vulnerable to global market shocks (Bae et al., 2004). We therefore control for the domestic stocks' price responsiveness to global market fluctuations by including two alternative additional control variables: *Delay 1 to global information* and *Delay 2 to global information*, which quantify the delay with which an individual stock's price return adjusts to the global market portfolio return variation, constructed following Hou and Moskowitz (2005) and McQueen, Pinegar, and Thorley (1996), respectively. A domestic stock whose price reacts more slowly to global market information

[11] The foreign ownership data exist in the FactSet database from 1999 onwards.

would be less vulnerable to global market shocks and, hence, less likely to crash. Columns 4−9 of Table 6 show that our results continue to hold when the price delay is added as a control, and that the price delay reduces crash risk. Overall, our findings espouse the idea that the individualism transmitted by foreign investors from overseas has an influence on domestic stocks' crash risk.

6.2. Individualism, firm risk taking, and earnings management

The crash-relevant managerial bad news hoarding can arise from firm risk taking (Callen & Fang, 2015) and earnings management (Hutton et al., 2009). As managers in more individualistic countries generally have more freedom to make risky investment decisions and to adopt their individual accounting choices (Han et al., 2010; Li et al., 2013), we expect that individualism, as a cultural institution, can motivate managers to engage in these bad-news-hoarding-related opportunistic behaviors, which in turn heighten crash risk. To test for this prediction, we examine how individualism, risk taking, and earnings management interact with each other to affect crash risk.

In Panel A of Table 7, the positive coefficients on *IDV*×*SIGMA* indicate that risk taking has a larger increasing impact on crash risk in more individualistic countries.[12] In Panel B, the positive coefficients on *IDV*×*ACCM* suggest that firms that manipulate reported earnings suffer higher crash risk in more individualistic countries. These results reveal that individualism exacerbates the link of crash risk with risk taking and earnings management when these two managerial behaviors occur separately. In Panel C, the negative coefficients on the three-way interaction of *IDV*, *SIGMA*, and *ACCM* suggest that the two interaction effects, *IDV*×*SIGMA* and *IDV*×*ACCM*, offset each other when taking place together.

< Insert Table 7 >

It is also noteworthy that the coefficients on the single *IDV* variable in Panel C of Table 7 are significantly positive, indicating that individualism increases crash risk even in the absence of firm risk taking and earnings management. This finding strengthens the argument that individualism has a direct impact on crash risk by aggravating bad news hoarding by managers, necessitating our study of the

[12] Our unreported results further show that Hofstede's uncertainty avoidance index moderates the effect of risk taking on crash risk.

independent role of individualism in stock price crashes.

6.3. Individualism and country-level financial information transparency

The extent to which individualism affects crash risk could vary across countries. As Jin and Myers (2006) document, improved country-level financial information transparency can dampen managers' ability to hoard bad news, thereby reducing crash risk. We thus expect that transparent information environments can curb the heightened managerial bad news hoarding in high individualism countries. If this is the case, empirically we should observe that the positive relation between individualism and crash risk is attenuated by enhanced country-level financial information transparency.

To quantify the degree of country-level financial information transparency, we employ the financial transparency index (*Financial Transparency*) and the prevalence of disclosure index (*Prevalence of Disclosure*) from Bushman, Piotroski, and Smith (2004). These indexes capture cross-country differences in the intensity and timeliness of firm-specific financial information disclosure to investors. In addition, an advanced economy is usually considered to be transparent in financial information disclosure by firms. The *Advanced Economy* dummy is thus created, denoting the country's advanced economy status as evaluated by the International Monetary Fund.

We include each transparency measure alternatively in Equation (4) as an additional control variable, and then examine the effect of individualism on crash risk by allowing the coefficient to vary across high and low financial information transparency countries. For *Financial Transparency* and *Prevalence of Disclosure*, we create the dummy indicator *High* (*Low*), which equals 1 if the country's transparency score is above (below) the cross-country sample median in a given year, and 0 otherwise.[13] For *Advanced Economy*, *Yes* (*No*) equals 1 if the country is (not) an advanced economy, and 0 otherwise.

In Table 8, we assess the effect of country-level financial information transparency by carrying out a *t*-test on the coefficient difference between the two interaction terms. We observe that the positive association between individualism and crash risk consistently holds in both groups of countries, irrespective of the transparency measure used. However, the effect of individualism on crash risk is of

[13] Both individualism and country-level financial information transparency proxies are country-level time-invariant variables. Using their multiplication to estimate an interaction effect in such a large firm-year sample could cause severe collinearity between the two variables and their multiplication, yielding misleading results.

lower magnitude in high transparency countries than in low transparency ones, as reflected by a significant *t*-statistic on the coefficient difference. This evidence supports our prediction that improved country-level financial information transparency weakens the impact of individualism on crash risk.

< Insert Table 8 >

6.4. Individualism and crash risk within the U.S.

6.4.1. Region-level individualism and crash risk

Our baseline cross-country regression results face a challenge of omitted variable bias regarding country-level regressors. The analysis for a single country, without the necessity to consider cross-country institutional differences, enables us to circumvent this endogeneity issue.

Focusing solely on U.S. firms, we examine how the individualism scores across 10 census geographic regions as reported by the World Values Survey (e.g., East North Central, West North Central, Pacific, and so on) relate to the crash risk of firms headquartered in that region. As all the stocks trade in the same country, we remove the country-level control variables of stock market capitalization (*MCAP*), stock market turnover (*STKTURN*), and creditor rights (*CR*) from the baseline model. Given the strong link between individualism and societal wealth, we control for economic development levels and growth potentials across the U.S. states by including state-level GDP per capita (*GDP/CAPITA*) and GDP growth (*GDP_GROWTH*).[14] In addition, we control for *RELIGIOSITY*, which equals the number of religious adherents divided by the total population in the county where the firm is headquartered, using data collected from the Association of Religion Data Archives, following Callen and Fang (2015).

We regress firm-level crash risk on the rescaled WVS region-level individualism index (bounded between 0 and 1) and present the results in Table 9. We find that individualism has a significantly positive effect on crash risk even when the county-level religiosity is being controlled for. Note that the coefficients of *IDV* in the within-U.S. regressions are of lower magnitude and statistical significance

[14] We extract the state-level GDP per capita and GDP growth data from the Bureau of Economic Analysis (BEA). The BEA states: "There is a discontinuity in the GDP-by-state time series at 1997 […] This data discontinuity may affect both the levels and the growth rates of GDP by state. Users of GDP by state are strongly cautioned against appending the two data series in an attempt to construct a single time series for 1963 to 2013" (https://www.bea.gov/regional/docs/product/). Thus, including these state-level variables restricts the sample period to 1997–2013.

than those reported in the cross-country regressions. This is not surprising, as the interregional individualism differences within the U.S. are smaller than the individualism differences across countries (Ahern et al., 2015).

< Insert Table 9 >

6.4.2. Individualism, bad news hoarding, and stock price crashes

The rationale for theorizing a positive effect of individualism on crash risk is that we predict that individualism propels managers to conceal and stockpile bad news up to a critical point at which the hidden bad news suddenly comes out, causing a stock price crash. But, does the link between individualism and crash risk really hinge on the withholding of bad news by managers? We test for this underlying mechanism by employing an accounting misreporting scenario.

To ensure that stock price crashes are a consequence of bad news hoarding by managers, we study U.S. firms that restate accounting numbers and experience a stock price crash as a result. Material misreporting, which typically aims to hide bad news, often connects ultimately to accounting restatements. Take the Enron scandal as an example. To meet Wall Street's expectations, Enron's management adopted a mark-to-market accounting method to inflate earnings and used hundreds of special purpose entities to hide its huge debt. As a result, the company's financial statements became too complex for analysts to understand. The analysts became suspicious of the accuracy of the company's financial reports, while the U.S. Securities and Exchange Commission started to investigate the company's business transactions. Finally, on November 8, 2001, Enron had to correct its financial statements by restating its accounting numbers for the prior four years: earnings decreased by $591 million and debt increased by $658 million. Enron's stock price declined by 7.1% in a single day. It is obvious that when bad news can no longer be concealed, managers typically announce an accounting restatement to unveil the previously undisclosed poor financial information, leading to a stock price crash.

We collect accounting restatement data from the Audit Analytics database. We identify a total of 3,257 accounting restatements issued by our sample U.S. firms, spanning the period 1995–2013. We calculate firm-specific daily returns for the restatement firms, and define a crash event if the firm-

specific daily return is 3.09 standard deviations below its annual mean. Out of the 3,257 total restatements, 296 restatements resulted in at least one crash over the restatement announcement window (0, +3)—that is, from the announcement date to the three following days. Each of the restatement firms with a subsequent crash (i.e., treatment firm) is then matched with a control firm. We require that the control firm (1) issued a restatement in the same year but did not suffer a crash, (2) was in the same industry, (3) had the closest total assets to the treatment firm, and (4) did not differ from the treatment firm in total assets by more than absolute 30%. These criteria yield a sample of 161 matched pairs between treatment and control firms.

In Table 10, we compare treatment firms and control firms. We observe that neither the mean nor the median of firm-specific daily returns from day –3 to day –1 prior to the restatement announcement is significantly different across the two groups of firms. This result suggests that the pool of treatment firms is not a result of selecting certain firms that are inherently more crash prone, justifying the validity of our matching approach.

< Insert Table 10 >

Once the restatement is announced, the mean firm-specific daily return from day 0 to day +3 is −6.87% in treatment firms, which is significantly more negative than the mean return of −0.23% in control firms. The restatements made by treatment firms are associated with an average drop in net income by −2.64% of total assets, which is significantly more negative than −1.35% in control firms. The univariate tests on the medians lead to similar conclusions. These results suggest that, compared to control firms, restatement firms that suffer a subsequent crash are likely to have concealed material *income-reducing* news from investors.

We assign the rescaled WVS region-level individualism scores to restatement firms based on their headquarters location. We compute the mean and median individualism scores for both the treatment and control groups of restatement firms. We show that treatment firms, on average, come from more individualistic regions than control firms. Collectively, our results suggest that managers in higher individualism regions are more likely to conceal firm-specific bad news from investors by overstating accounting numbers. The adverse news is being accumulated until the accounting misreporting has to be corrected through restatements, triggering stock price crashes.

6.5. Global financial crisis and IFRS adoption

6.5.1. Global financial crisis

In the recent global financial crisis, stock prices in major markets plunged about 50–70%. The crisis provides a natural laboratory for exploring how severe market financial constraints affect the relation between individualism and crash risk. As liquidity dried up quickly during the crisis (Lang, Lins, & Maffett, 2012), firms would find it difficult to sustain their bad news hoarding practice because they became more financially constrained and thus less able to disguise their hidden earnings problems. As a result, a larger amount of hidden bad news would be released to the markets, augmenting crash risk. Consistent with this expectation, the results reported in Panel A of Table 11 show that individualism has a larger positive effect on crash risk during the global financial crisis period of 2008–2009, while the incremental effect disappears in the post-crisis period of 2010–2013. That is, firms in higher individualism countries experienced more severe and more frequent crashes during the global financial crisis.

< Insert Table 11 >

6.5.2. IFRS adoption

The International Financial Reporting Standards have been implemented in major developed countries (e.g., the European Union, Australia, and Singapore), aiming to improve listed firms' financial reporting quality and to facilitate cross-country comparisons of financial statements in an era of unprecedented globalization. We investigate how this exogenous change in the *formal* accounting rules influences the *informal* individualistic culture's impact on crash risk. We expect that the impact of individualism would be moderated by IFRS reporting, as its resultant enhanced financial reporting quality can constrain managers' bad news hoarding ability (DeFond et al., 2014), lowering the individualism-induced crash risk.

To test for this prediction, we construct the *IFRS* dummy, which denotes the firm-years following the full set of international standards or IFRS, using data collected from Worldscope. Panel B of Table 11 shows that IFRS adoption attenuates the positive effect of individualism on crash risk. When the sample period is restricted to 2003–2013, eliminating the distortions of the 1997 Asian financial crisis

and the 2002 Sarbanes-Oxley Act, the coefficients on *IDV×IFRS* become even more statistically significant. To mitigate the potential selection bias associated with firms that conform voluntarily to the IFRS before its mandate, we exclude voluntary IFRS adopters from the sample and find similar results (unreported).

6.6. Individualism and crash size

We study the impact of individualism on the size of stock price crashes. Our tests are focused on the firm-years in which at least one stock price crash occurred. Crash size is calculated as the mean of firm-specific weekly returns over the crash weeks in a given year. A *larger* crash size is associated with a *more negative* yearly average firm-specific weekly return over the crash weeks. We replace the dependent variable of Equation (4) with crash size. Table 12 reports both the OLS and 2SLS regression results. We find that the mean firm-specific weekly return over the crash weeks falls with individualism, indicating that firms in more individualistic countries experience a larger drop in the stock price during crashes.

< Insert Table 12 >

6.7. Alternative explanation for crash risk—the discretionary disclosure hypothesis

The above analyses center on the bad news hoarding theory, which is the basis of the majority of crash risk literature (e.g., Callen & Fang, 2015; Hutton et al., 2009; Jin & Myers, 2006; Kim et al., 2011a, 2011b). In this theory, a stock crashes because its hidden bad news is *suddenly* released to the market. In contrast, Chen et al. (2001) explain the occurrence of crashes using the discretionary disclosure hypothesis. Their story rests on two assumptions: (1) managers have some discretion over information disclosure; and (2) managers prefer to announce good news quickly but leak bad news *slowly*. This behavior imparts a degree of *positive skewness* to stock returns, which represents a *lower* degree of crash risk. They further show that the positively skewed stock return pattern is more salient in smaller firms and in firms with fewer analysts (in other words, crash risk is lower in smaller firms and in firms with fewer analysts), as managers in these firms are less scrutinized, with more scope for making asymmetric information disclosure.

To test whether our finding for individualism is borne out in the discretionary disclosure

hypothesis of Chen et al. (2001), we study how managerial discretionary disclosure ability as measured by firm size and analyst coverage interacts with individualism to affect crash risk. The results in Online Appendix Table A6 provide some evidence that the positive impact of firm size and analyst coverage on crash risk increases with individualism, which is consistent with the implication of Chen et al.'s (2001) hypothesis.

7. Conclusions

Using a large cross-country panel data set, we examine the effect of individualism, as a national culture dimension, on crash risk around the world. We find strong and robust evidence that firms located in more individualistic countries have higher crash risk. Our additional analyses reveal that foreign investors play an important role in transmitting overseas individualism to host-country recipient firms. Individualism can exacerbate bad-news-hoarding-related activities by managers—namely, risk taking and earnings management—which then elevate crash risk. Moreover, the positive relation between individualism and crash risk can be weakened by enhanced country-level financial information transparency. Our further evidence suggests that the high crash risk in individualistic cultures is driven by the heightened managerial bad news hoarding. Finally, we document a larger crash size in firms from more individualistic cultures.

This paper has important implications for investors, regulators, and policy makers. First, investors should take into account the potential large cost of stock price crashes when making stock investments in high individualism countries. Second, to curtail crash risk, regulators in these countries should restrain, or at least closely monitor, managers' crash-related risk taking and earnings management behaviors. Third, policy makers should carefully assess the individualism distance between foreign capital and the local market when deciding upon the market's openness to foreign investors, in case domestic crash risk escalates.

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Figure 1 Individualism and Stock Price Crash Risk

The figures plot each country's value-weighted average crash risk against individualism. Crash risk is measured by *NCSKEW*, *DUVOL*, and *COUNT*, respectively. Variables are defined in the Appendix.

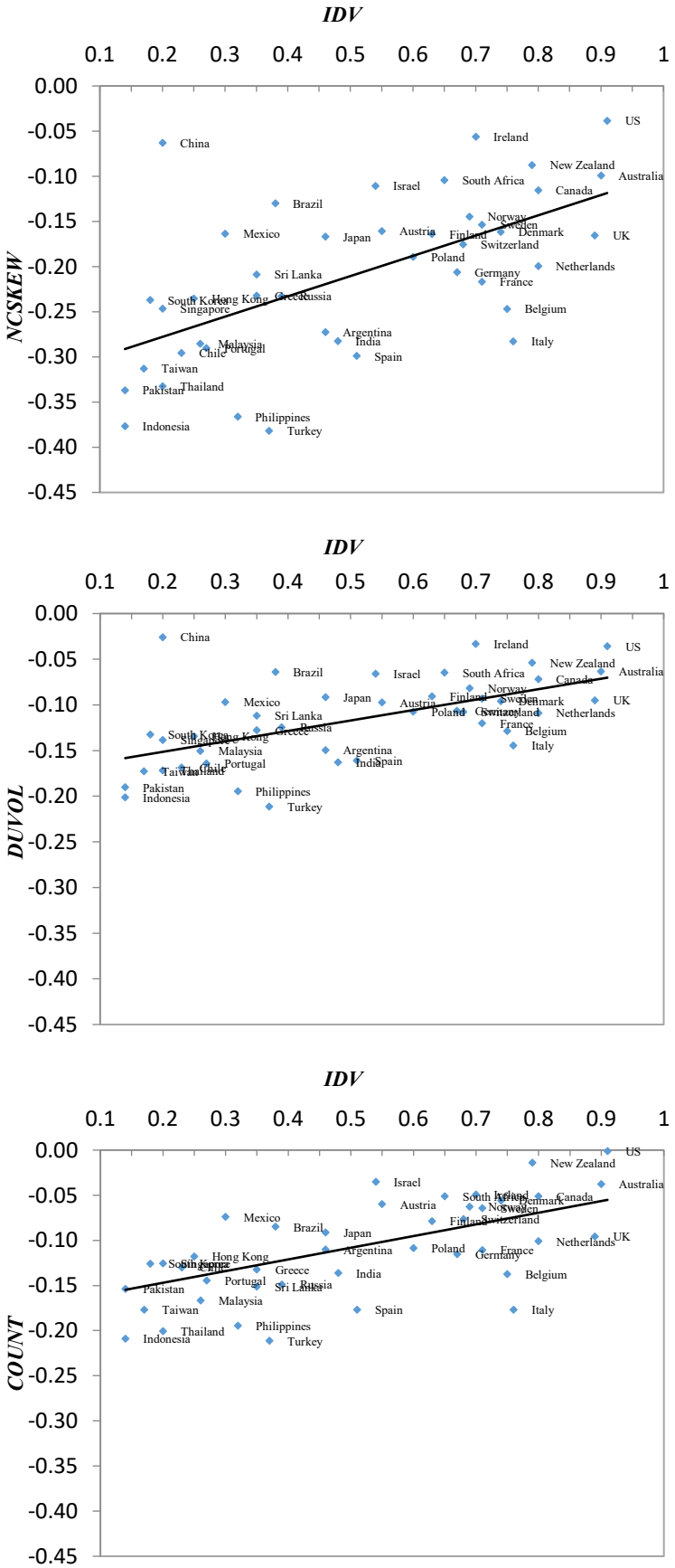

Table 1 The Sample

This table presents the distribution of sample firms across 42 countries for the period 1990−2013. *#Firm-Years* is the number of firm-year observations. *#Firms* is the number of firms. *%Crashed Firms* is the percentage of firms that experienced at least one crash week.

Panel A: Crashed firms by country

Country/Market	*IDV* [1]	*#Firm-Years* [2]	*#Firms* [3]	*%Crashed Firms* [4]
Argentina	0.46	100	20	25.00
Australia	0.90	5,298	1,103	31.19
Austria	0.55	184	34	41.18
Belgium	0.75	554	80	60.00
Brazil	0.38	283	75	22.67
Canada	0.80	7,695	1,581	35.74
Chile	0.23	208	41	19.51
China	0.20	167	21	66.67
Denmark	0.74	808	110	55.45
Finland	0.63	713	93	65.59
France	0.71	4,228	620	50.97
Germany	0.67	4,665	710	55.63
Greece	0.35	1,204	214	32.71
Hong Kong	0.25	5,004	886	38.37
India	0.48	5,989	1,620	20.06
Indonesia	0.14	1,250	229	34.50
Ireland	0.70	183	30	40.00
Israel	0.54	541	162	17.28
Italy	0.76	1,312	208	36.54
Japan	0.46	33,833	3,425	55.94
Malaysia	0.26	4,747	776	36.08
Mexico	0.30	501	66	46.97
Netherlands	0.80	1,022	133	54.89
New Zealand	0.79	286	47	51.06
Norway	0.69	926	173	40.46
Pakistan	0.14	443	81	30.86
Philippines	0.32	494	79	39.24
Poland	0.60	867	256	28.91
Portugal	0.27	208	32	46.88
Russia	0.39	242	75	14.67
Singapore	0.20	2,732	509	35.56
South Africa	0.65	1,506	230	33.91
South Korea	0.18	8,391	1,448	33.29
Spain	0.51	702	102	42.16
Sri Lanka	0.35	192	80	7.50
Sweden	0.71	2,278	369	48.51
Switzerland	0.68	1,624	181	55.80
Taiwan	0.17	8,891	1,363	31.25
Thailand	0.20	2,550	386	45.08
Turkey	0.37	1,379	214	51.40
United Kingdom	0.89	13,345	1,979	65.59
United States	0.91	54,059	6,632	64.88
Mean	0.50	4,324	630	40.71
Total	–	181,604	26,473	48.01

Panel B: Crashed firms by year

Year	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*
#Firms	1,398	1,481	1,788	2,393	2,842	3,114	3,447	3,864	3,923	4,252	5,709	5,927
%Crashed Firms	16.60	14.72	14.65	14.79	12.63	14.71	12.39	16.15	13.15	11.90	13.07	13.41
Year	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*
#Firms	6,464	7,287	8,986	9,923	11,153	12,605	12,470	12,752	13,848	15,106	15,655	15,217
%Crashed Firms	15.45	11.88	14.13	14.44	14.82	13.47	17.08	10.10	11.45	13.41	12.75	11.99

Table 2 Summary Statistics and Univariate Analysis

This table presents summary statistics and univariate test results for sample firms in 42 countries for the period 1990−2013. A country-year is assigned into the *High* (*Low*) *IDV* group if the country's individualism score is above (below) the cross-country median individualism score in the year. The country-level crash risk variables are computed as country-year averages weighted by the firms' market capitalization. *** denotes statistical significance at the 1% level. Variables are defined in the Appendix.

Panel A: Summary statistics

Variable	N	Mean	SD	25%	Median	75%
Crash risk:						
$NCSKEW_{t+1}$	181,604	-0.155	0.741	-0.549	-0.158	0.224
$DUVOL_{t+1}$	181,604	-0.091	0.357	-0.322	-0.097	0.132
$COUNT_{t+1}$	181,604	-0.077	0.583	0.000	0.000	0.000
Individualism index:						
IDV	181,604	0.629	0.275	0.460	0.710	0.910
Control variables:						
$NCSKEW\_LAG_t$	181,604	-0.148	0.714	-0.538	-0.158	0.216
$SIGMA_t$	181,604	0.051	0.026	0.032	0.045	0.064
$ACCM_t$	181,604	0.858	1.614	0.234	0.388	0.711
RET_t	181,604	-0.152	0.141	-0.202	-0.099	-0.050
$DTURN_t$	181,604	0.000	0.006	-0.001	0.000	0.001
LEV_t	181,604	0.211	0.180	0.042	0.188	0.334
ROA_t	181,604	0.017	0.157	0.005	0.042	0.084
MTB_t	181,604	2.305	2.729	0.852	1.475	2.604
$SIZE_t$	181,604	12.220	1.979	10.760	12.090	13.570
$GDP/CAPITA_t$	181,604	10.140	0.903	10.250	10.470	10.590
GDP_GROWTH_t	181,604	0.025	0.028	0.013	0.026	0.040
$MCAP_t$	181,604	1.094	0.700	0.673	1.022	1.314
$STKTURN_t$	181,604	1.211	0.720	0.699	1.105	1.464
CR	181,604	1.931	1.030	1.000	2.000	3.000

Panel B: Univariate analysis

	High IDV				*Low IDV*				Difference in Mean	Difference in Median
	N	Mean	Median	SD	N	Mean	Median	SD	*t*-statistic	Wilcoxon *z*-statistic
Firm-level crash risk:										
NCSKEW	105,820	-0.097	-0.114	0.787	75,784	-0.235	-0.217	0.663	39.37***	39.15***
DUVOL	105,820	-0.063	-0.070	0.367	75,784	-0.130	-0.132	0.338	39.64***	38.96***
COUNT	105,820	-0.040	0.000	0.613	75,784	-0.127	0.000	0.533	31.49***	30.33***
Country-level crash risk:										
NCSKEW	377	-0.059	-0.051	0.193	368	-0.154	-0.157	0.269	5.49***	6.63***
DUVOL	377	-0.040	-0.039	0.107	368	-0.086	-0.090	0.142	4.96***	5.94***
COUNT	377	-0.021	-0.007	0.162	368	-0.090	-0.059	0.206	5.09***	6.14***

Table 3 Individualism and Crash Risk

This table presents OLS regression results for the impact of individualism on crash risk. All time-varying independent variables are lagged by one year relative to the dependent variable. Intercepts are included but are suppressed for brevity. Variables are defined in the Appendix. The *t*-statistics based on robust standard errors clustered by firm are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable=	*NCSKEW*	*DUVOL*	*COUNT*
	[1]	[2]	[3]
IDV	0.148***	0.071***	0.096***
	[15.69]	[15.70]	[13.69]
NCSKEW_LAG	0.046***	0.023***	0.025***
	[13.34]	[15.13]	[10.99]
SIGMA	1.554***	0.626***	0.489*
	[4.11]	[3.42]	[1.75]
ACCM	0.003***	0.002***	0.002
	[2.61]	[2.74]	[1.63]
RET	0.020	0.011	-0.104**
	[0.30]	[0.36]	[-2.07]
DTURN	0.657***	0.418***	0.291
	[2.68]	[3.45]	[1.42]
LEV	0.001	0.001	-0.008
	[0.12]	[0.28]	[-0.96]
ROA	-0.003	-0.003	0.016
	[-0.66]	[-1.25]	[1.57]
MTB	0.006***	0.003***	0.004***
	[7.73]	[7.86]	[6.01]
SIZE	0.041***	0.020***	0.024***
	[32.77]	[33.67]	[25.94]
GDP/CAPITA	0.024***	0.014***	0.013***
	[9.03]	[10.26]	[6.26]
GDP_GROWTH	0.290***	0.120**	0.271***
	[3.03]	[2.52]	[3.58]
MCAP	-0.002	-0.003**	0.002
	[-0.59]	[-2.05]	[0.74]
STKTURN	0.008***	0.005***	0.006**
	[2.65]	[3.16]	[2.22]
CR	-0.007***	-0.002**	-0.008***
	[-3.09]	[-2.29]	[-4.64]
Industry-fixed effect	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes
Adj. R^2	0.037	0.042	0.021
N	181,604	181,604	181,604

Table 4 Individualism and Crash Risk: Instrumental Variable Approach

This table presents 2SLS regression results for the impact of individualism on crash risk. The instrumental variables are the genetic distance between a given country and the U.S. (*Genetic_Distance*) and the country's grammatical rule on pronoun drop (*Pronoun_Drop*). The *t*-statistics based on robust standard errors clustered by firm are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	1st Stage	*2nd Stage*		
Dependent variable=	*IDV*	*NCSKEW*	*DUVOL*	*COUNT*
	[1]	[2]	[3]	[4]
Panel A: IV=Genetic distance				
$\widehat{IDV}$		0.093***	0.041***	0.068***
		[8.21]	[7.46]	[7.91]
Genetic_Distance	-0.041***			
	[-176.57]			
Controls	Yes	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes	Yes
Adj. R^2	0.841	0.037	0.041	0.021
N	181,604	181,604	181,604	181,604
Panel B: IV=Pronoun prop				
$\widehat{IDV}$		0.112***	0.052***	0.078***
		[10.10]	[9.71]	[9.40]
Pronoun_Drop	-0.450***			
	[-225.35]			
Controls	Yes	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes	Yes
Adj. R^2	0.860	0.037	0.042	0.021
N	181,604	181,604	181,604	181,604
Panel C: IVs=Genetic distance + Pronoun drop				
$\widehat{IDV}$		0.104***	0.047***	0.074***
		[9.62]	[9.10]	[9.09]
Genetic_Distance	-0.020***			
	[-44.71]			
Pronoun_Drop	-0.277***			
	[-56.38]			
Controls	Yes	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes	Yes
Adj. R^2	0.887	0.037	0.042	0.021
N	181,604	181,604	181,604	181,604

Table 5 Hofstede's Other Cultural Dimensions and Crash Risk

This table presents OLS regression results for the impact of Hofstede's power distance (*PDI*), masculinity (*MAS*), uncertainty avoidance (*UAI*), and individualism (*IDV*) on crash risk. Panel A presents firm-level regression results, and Panel B presents value-weighted country-level regression results. All time-varying independent variables are lagged by one year relative to the dependent variable. The *t*-statistics in brackets are based on robust standard errors clustered by firm in Panel A and by country in Panel B. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Panel C reports the cultural variables' economic significance derived from the coefficients reported in Columns 10−12 of Panel B.

Panel A: Firm-level regressions												
Dependent variable=	*NCSKEW*	*DUVOL*	*COUNT*	*NCSKEW*	*DUVOL*	*COUNT*	*NCSKEW*	*DUVOL*	*COUNT*	*NCSKEW*	*DUVOL*	*COUNT*
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
PDI	-0.155***	-0.067***	-0.114***							-0.031	-0.007	-0.037**
	[-9.28]	[-8.23]	[-8.94]							[-1.54]	[-0.70]	[-2.28]
MAS				0.085***	0.048***	0.042***				0.113***	0.059***	0.064***
				[8.42]	[9.52]	[5.26]				[9.51]	[10.11]	[6.84]
UAI							-0.092***	-0.040***	-0.067***	-0.035**	-0.014*	-0.030**
							[-8.72]	[-7.94]	[-8.44]	[-2.24]	[-1.80]	[-2.52]
IDV										0.123***	0.063***	0.070***
										[8.23]	[8.65]	[6.14]
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.036	0.041	0.020	0.036	0.041	0.020	0.036	0.041	0.020	0.038	0.042	0.021
N	181,604	181,604	181,604	181,604	181,604	181,604	181,604	181,604	181,604	181,604	181,604	181,604
Panel B: Country-level regressions												
Dependent variable=	*NCSKEW*	*DUVOL*	*COUNT*	*NCSKEW*	*DUVOL*	*COUNT*	*NCSKEW*	*DUVOL*	*COUNT*	*NCSKEW*	*DUVOL*	*COUNT*
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
PDI	-0.167***	-0.084**	-0.134***							-0.117*	-0.065	-0.092**
	[-2.77]	[-2.13]	[-3.24]							[-1.75]	[-1.58]	[-2.20]
MAS				0.084***	0.044***	0.041				0.081**	0.041**	0.040
				[3.19]	[3.10]	[1.67]				[2.58]	[2.36]	[1.16]
UAI							-0.026	-0.009	-0.035	-0.010	-0.003	-0.017
							[-0.52]	[-0.34]	[-0.69]	[-0.23]	[-0.15]	[-0.32]
IDV										0.095**	0.049**	0.075*
										[2.27]	[2.11]	[1.78]
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.163	0.170	0.092	0.158	0.165	0.083	0.153	0.161	0.083	0.169	0.175	0.095
N	745	745	745	745	745	745	745	745	745	745	745	745

Panel C: Magnitude of economic significance				
		NCSKEW	*DUVOL*	*COUNT*
PDI	One standard deviation increase	-24.83%	-23.21%	-37.64%
	Change from min to max	-102.65%	-95.95%	-155.56%
MAS	One standard deviation increase	15.21%	12.95%	14.47%
	Change from min to max	68.77%	58.57%	65.45%
UAI	One standard deviation increase	-2.31%	-1.17%	-7.57%
	Change from min to max	-9.81%	-4.95%	-32.15%
IDV	One standard deviation increase	22.23%	19.29%	33.82%
	Change from min to max	69.01%	59.89%	105.00%

Table 6 The Culture Transmission Effect of Foreign Investors

This table presents OLS regressions of crash risk on firm-level transmitted individualism. *IDV difference due to foreign institutional investors* is calculated as the weighted sum of the signed algebraic difference in individualism scores between the home country of foreign institutional investors and the host country, where the weight is set equal to the proportion of shares held by each foreign institutional investor. *Delay 1 to global information* measures the delay with which an individual stock's price return responds to global market information, constructed following Hou and Moskowitz (2005). *Delay 2 to global information* is an alternative price delay measure proposed by McQueen et al. (1996). All time-varying independent variables, except the price delay variables, are lagged by one year relative to the dependent variable. The *t*-statistics based on robust standard errors clustered by firm are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable=	*NCSKEW* [1]	*DUVOL* [2]	*COUNT* [3]	*NCSKEW* [4]	*DUVOL* [5]	*COUNT* [6]	*NCSKEW* [7]	*DUVOL* [8]	*COUNT* [9]
IDV	0.191***	0.094***	0.117***	0.195***	0.096***	0.118***	0.192***	0.095***	0.117***
	[14.25]	[14.49]	[11.35]	[14.55]	[14.70]	[11.47]	[14.31]	[14.54]	[11.39]
IDV difference due to foreign institutional investors	0.502***	0.248***	0.316***	0.508***	0.251***	0.319***	0.503***	0.249***	0.317***
	[4.94]	[4.80]	[4.46]	[4.98]	[4.82]	[4.49]	[4.96]	[4.81]	[4.47]
Delay 1 to global information				-0.046***	-0.018**	-0.019			
				[-2.93]	[-2.45]	[-1.58]			
Delay 2 to global information							-0.032***	-0.014***	-0.017**
							[-3.47]	[-3.18]	[-2.34]
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.041	0.046	0.022	0.041	0.046	0.022	0.041	0.046	0.022
N	104,412	104,412	104,412	104,412	104,412	104,412	104,412	104,412	104,412

Table 7 Individualism, Firm Risk Taking, and Earnings Management

This table presents OLS regressions of crash risk on the interactions between individualism (*IDV*), risk taking (*SIGMA*), and earnings management (*ACCM*). All time-varying independent variables are lagged by one year relative to the dependent variable. The *t*-statistics based on robust standard errors clustered by firm are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable=	*NCSKEW*	*DUVOL*	*COUNT*
	[1]	[2]	[3]
Panel A: Individualism and risk taking			
IDV	0.112***	0.052***	0.072***
	[6.60]	[6.32]	[5.72]
SIGMA	1.142***	0.408**	0.210
	[2.75]	[2.01]	[0.69]
IDV × SIGMA	0.696***	0.370***	0.472**
	[2.62]	[2.77]	[2.36]
Controls	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes
Adj. R^2	0.037	0.042	0.021
N	181,604	181,604	181,604
Panel B: Individualism and earnings management			
IDV	0.131***	0.061***	0.087***
	[11.79]	[11.46]	[10.10]
ACCM	-0.011	-0.007	-0.007
	[-1.23]	[-1.60]	[-0.97]
IDV × ACCM	0.026**	0.015***	0.016*
	[2.38]	[2.83]	[1.69]
Controls	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes
Adj. R^2	0.037	0.042	0.021
N	181,604	181,604	181,604
Panel C: Individualism, risk taking, and earnings management			
IDV	0.088***	0.042***	0.064***
	[4.42]	[4.39]	[4.38]
SIGMA	0.794*	0.258	0.052
	[1.87]	[1.23]	[0.17]
ACCM	-0.064***	-0.030***	-0.037***
	[-4.10]	[-3.85]	[-3.16]
IDV × SIGMA	1.091***	0.522***	0.585**
	[3.46]	[3.30]	[2.49]
IDV × ACCM	0.069***	0.032***	0.036***
	[3.85]	[3.55]	[2.70]
SIGMA × ACCM	0.970***	0.450***	0.535***
	[4.02]	[3.73]	[3.20]
IDV × SIGMA × ACCM	-0.994***	-0.448***	-0.504***
	[-3.64]	[-3.28]	[-2.65]
Controls	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes
Adj. R^2	0.037	0.042	0.021
N	181,604	181,604	181,604

Table 8 Individualism and Country-Level Financial Information Transparency

This table presents OLS regression results for the impact of country-level financial information transparency on the relation between individualism and crash risk. *Financial Transparency*, *Prevalence of Disclosure*, and *Advanced Economy* are used as proxies for financial information transparency. In Panels A and B, the *High* (*Low*) dummy equals 1 if the country's transparency score is above (below) the cross-country median score in a given year, and 0 otherwise. In Panel C, the *Yes* (*No*) dummy equals 1 if the country is (not) an advanced economy, and 0 otherwise. The *t*-tests for the coefficient difference between the two interaction terms are reported at the bottom of each panel. The *t*-statistics based on robust standard errors clustered by firm are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable=	*NCSKEW*	*DUVOL*	*COUNT*
	[1]	[2]	[3]
Panel A: Financial transparency			
IDV × High_Financial Transparency	0.114***	0.047***	0.076***
	[8.68]	[7.53]	[7.86]
IDV × Low_Financial Transparency	0.195***	0.096***	0.125***
	[10.38]	[9.96]	[8.54]
Controls	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes
Adj. R^2	0.034	0.039	0.019
N	170,187	170,187	170,187
Coefficient difference	-0.081***	-0.049***	-0.049***
	[-4.29]	[-5.04]	[-3.33]
Panel B: Prevalence of disclosure			
IDV × High_Prevalence of Disclosure	0.035***	0.015***	0.011
	[2.93]	[2.68]	[1.26]
IDV × Low_Prevalence of Disclosure	0.129***	0.062***	0.078***
	[14.52]	[14.58]	[11.59]
Controls	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes
Adj. R^2	0.037	0.042	0.021
N	179,078	179,078	179,078
Coefficient difference	-0.094***	-0.046***	-0.067***
	[-9.26]	[-9.47]	[-8.60]
Panel C: Advanced economy			
IDV × Yes_Advanced Economy	0.128***	0.060***	0.085***
	[12.39]	[12.22]	[11.03]
IDV × No_Advanced Economy	0.254***	0.111***	0.175***
	[7.82]	[6.72]	[6.85]
Controls	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes
Adj. R^2	0.037	0.042	0.021
N	181,604	181,604	181,604
Coefficient difference	-0.126***	-0.050***	-0.089***
	[-3.68]	[-2.91]	[-3.33]

Table 9 Region-Level Individualism and Crash Risk within the U.S.

This table presents OLS regression results for the impact of region-level individualism on crash risk of U.S. firms. *IDV* is the rescaled WVS individualism score of the geographic region in which the firm is headquartered. All time-varying independent variables are lagged by one year relative to the dependent variable. Intercepts are included but are suppressed for brevity. The *t*-statistics based on robust standard errors clustered by firm are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable=	*NCSKEW* [1]	*DUVOL* [2]	*COUNT* [3]	*NCSKEW* [4]	*DUVOL* [5]	*COUNT* [6]
IDV	0.040**	0.016*	0.029**	0.044**	0.016*	0.027*
	[1.98]	[1.67]	[2.09]	[2.01]	[1.65]	[1.82]
NCSKEW_LAG	0.021***	0.010***	0.008***	0.018***	0.009***	0.006*
	[4.51]	[4.46]	[2.70]	[3.58]	[3.94]	[1.93]
SIGMA	2.033***	0.609**	2.441***	2.094***	0.690***	2.489***
	[3.97]	[2.30]	[7.11]	[3.74]	[2.63]	[6.59]
ACCM	0.001	0.000	-0.000	-0.001	-0.001	-0.001
	[0.52]	[0.39]	[-0.46]	[-0.57]	[-0.89]	[-1.08]
RET	0.167***	0.010	0.291***	0.195***	0.045	0.301***
	[2.68]	[0.30]	[6.94]	[2.85]	[1.37]	[6.46]
DTURN	0.927**	0.289	0.517	1.203**	0.406*	0.772**
	[2.02]	[1.23]	[1.56]	[2.43]	[1.78]	[2.17]
LEV	-0.011	-0.000	-0.022*	-0.020	-0.006	-0.028**
	[-0.60]	[-0.02]	[-1.86]	[-1.01]	[-0.70]	[-2.15]
ROA	0.108***	0.046***	0.073***	0.114***	0.049***	0.072***
	[6.24]	[5.04]	[6.25]	[6.01]	[5.41]	[5.53]
MTB	0.004***	0.002***	0.002***	0.004***	0.002***	0.002**
	[4.15]	[4.13]	[2.73]	[3.74]	[4.11]	[2.53]
SIZE	0.031***	0.017***	0.017***	0.030***	0.014***	0.016***
	[14.79]	[15.76]	[11.73]	[12.94]	[13.03]	[10.19]
GDP/CAPITA	-0.023	-0.025**	-0.025	-0.028	-0.021*	-0.036*
	[-0.91]	[-2.03]	[-1.57]	[-1.03]	[-1.65]	[-1.87]
GDP_GROWTH	0.033	0.087	0.127	-0.033	0.056	0.082
	[0.20]	[1.02]	[1.12]	[-0.18]	[0.66]	[0.67]
RELIGIOSITY				-0.009	0.001	-0.019
				[-0.27]	[0.03]	[-0.80]
Industry-fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.020	0.024	0.016	0.020	0.023	0.016
N	39,517	39,517	39,517	32,536	32,536	32,536

Table 10 Individualism, Bad News Hoarding, and Stock Price Crashes within the U.S.

This table presents univariate tests on the region-level individualism scores between treatment firms (i.e., restatement firms with crashes) and matched control firms (i.e., restatement firms without crashes). *IDV* is the rescaled WVS individualism score of the geographic region in which the firm is headquartered. The mean and median firm-specific daily returns are compared between the matched pairs for the pre-restatement period from day −3 to day −1 and the post-restatement period from day 0 to day +3, where day 0 is the restatement announcement date. *** and ** indicate statistical significance at the 1% and 5% levels, respectively.

		Firm-Specific Daily Return						Impact of Restatement on Net Income (% of total assets)			*IDV*		
		(−3,−1)			(0,+3)								
	N	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
Treatment firms													
Restatements with crash	161	-0.19%	0.01%	0.019	-6.87%	-4.90%	0.065	-2.64%	-0.64%	0.056	0.710	0.766	0.199
Matched control firms													
Restatements without crash	161	-0.36%	-0.19%	0.019	-0.23%	-0.25%	0.023	-1.35%	-0.14%	0.038	0.669	0.672	0.215
Difference between groups (treatment − control)		0.17%	0.20%		-6.64%	-4.65%		-1.29%	-0.50%		0.041	0.094	
t-statistic for the difference		0.76	1.32		-12.30***	-10.65***		-2.62***	-3.73***		2.83***	2.04**	

Table 11 Global Financial Crisis and IFRS Adoption

This table presents OLS regression results for the impact of the global financial crisis and IFRS adoption on the relation between individualism and crash risk. *Crisis* is a dummy indicator of the global financial crisis period 2008–2009. *Post_Crisis* is a dummy indicator of the post-crisis period 2010–2013. The *IFRS* dummy is set equal to 1 if the firm follows the full set of international standards or IFRS in a given year, and 0 otherwise. The *t*-statistics based on robust standard errors clustered by firm are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable=	*NCSKEW* [1]	*DUVOL* [2]	*COUNT* [3]
Panel A: Global financial crisis			
IDV	0.132***	0.061***	0.093***
	[11.39]	[10.88]	[10.55]
IDV × Crisis	0.089***	0.050***	0.050***
	[4.93]	[5.56]	[3.31]
IDV × Post_Crisis	0.007	0.007	-0.012
	[0.45]	[1.01]	[-1.00]
Crisis	0.044*	0.024**	0.021
	[1.91]	[2.16]	[1.12]
Post_Crisis	-0.104***	-0.062***	-0.035**
	[-4.70]	[-5.89]	[-1.99]
Controls	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes
Adj. R^2	0.037	0.042	0.021
N	181,604	181,604	181,604
Panel B: IFRS adoption			
1990–2013			
IDV	0.185***	0.086***	0.122***
	[16.81]	[16.48]	[14.88]
IDV × IFRS	-0.025	-0.006	-0.042***
	[-1.31]	[-0.59]	[-2.82]
IFRS	-0.014	-0.011*	0.009
	[-1.16]	[-1.89]	[0.96]
Controls	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes
Adj. R^2	0.042	0.046	0.023
N	176,920	176,920	176,920
2003–2013			
IDV	0.223***	0.106***	0.143***
	[16.05]	[16.71]	[14.24]
IDV × IFRS	-0.065***	-0.028***	-0.064***
	[-3.09]	[-2.74]	[-3.99]
IFRS	0.005	-0.001	0.019*
	[0.37]	[-0.20]	[1.95]
Controls	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes
Adj. R^2	0.041	0.046	0.022
N	131,781	131,781	131,781

Table 12 Individualism and Crash Size

This table presents regression results for the impact of individualism on the size of stock price crashes. The sample includes only the firm-years in which at least one stock price crash occurred. The dependent variable is crash size, calculated as the mean of firm-specific weekly returns over the crash weeks in a given year. In Columns 2–4, the 2nd stage IV regression results are based on the fitted values of individualism generated from 1st stage regressions with IVs chosen as *Genetic_Distance*, *Pronoun_Drop*, and both of them, respectively. All time-varying independent variables are lagged by one year relative to the dependent variable. Intercepts are included but are suppressed for brevity. The *t*-statistics based on robust standard errors clustered by firm are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable= Crash size				
	OLS	***2nd Stage IV***		
IVs=		*Genetic distance*	*Pronoun drop*	*Genetic distance & Pronoun drop*
	[1]	[2]	[3]	[4]
IDV	-0.054***	-0.065***	-0.051***	-0.058***
	[-17.56]	[-18.95]	[-14.97]	[-17.37]
NCSKEW_LAG	-0.003***	-0.003***	-0.003***	-0.003***
	[-3.70]	[-3.50]	[-3.76]	[-3.64]
SIGMA	-3.124***	-3.108***	-3.128***	-3.119***
	[-24.33]	[-24.21]	[-24.39]	[-24.31]
ACCM	-0.002***	-0.002***	-0.002***	-0.002***
	[-5.88]	[-5.51]	[-5.98]	[-5.77]
RET	-0.167***	-0.165***	-0.167***	-0.166***
	[-7.11]	[-7.04]	[-7.14]	[-7.09]
DTURN	0.209**	0.206**	0.210**	0.208**
	[2.21]	[2.18]	[2.23]	[2.21]
LEV	-0.030***	-0.031***	-0.030***	-0.031***
	[-8.62]	[-8.94]	[-8.55]	[-8.73]
ROA	0.088***	0.089***	0.088***	0.088***
	[17.73]	[17.78]	[17.74]	[17.76]
MTB	-0.002***	-0.001***	-0.002***	-0.002***
	[-6.61]	[-6.26]	[-6.69]	[-6.49]
SIZE	0.007***	0.007***	0.007***	0.007***
	[19.85]	[19.96]	[19.85]	[19.91]
GDP/CAPITA	0.001	0.003***	0.001	0.002*
	[1.31]	[2.70]	[0.89]	[1.74]
GDP_GROWTH	-0.185***	-0.189***	-0.184***	-0.186***
	[-5.09]	[-5.19]	[-5.07]	[-5.13]
MCAP	-0.006***	-0.006***	-0.006***	-0.006***
	[-5.54]	[-5.77]	[-5.49]	[-5.62]
STKTURN	-0.001	-0.000	-0.001	-0.001
	[-0.80]	[-0.00]	[-1.02]	[-0.55]
CR	0.002***	0.002***	0.002***	0.002***
	[3.67]	[3.31]	[3.77]	[3.56]
Industry-fixed effect	Yes	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes	Yes
Adj. R^2	0.487	0.487	0.487	0.487
N	24,266	24,266	24,266	24,266

Appendix: Variable Definitions and Data Sources

Variable	Description
NCSKEW	The negative skewness of firm-specific weekly returns over a given year. Source: Datastream
DUVOL	The natural logarithm of the ratio of the standard deviation of down-week firm-specific weekly returns to the standard deviation of up-week firm-specific weekly returns over a given year. A firm-week is defined as a down (an up) week if the firm-specific weekly return is below (above) its annual mean. Source: Datastream
COUNT	The number of crash weeks minus the number of jump weeks over a given year. A firm-week is defined as a crash (jump) week if the firm-specific weekly return is 3.09 standard deviations below (above) its annual mean. Source: Datastream
IDV	The degree to which individuals focus on themselves and their immediate families over their societal groups. Source: Hofstede (2005)
SIGMA	The standard deviation of firm-specific weekly returns over a given year. Source: Datastream
ACCM	The three-year moving sum of the absolute value of discretionary accruals, where discretionary accruals are calculated based on the modified Jones model (Dechow et al., 1995). Source: Worldscope
RET	The mean of firm-specific weekly returns over a given year, multiplied by 100. Source: Datastream
DTURN	The difference between the average monthly stock turnover over the current year and that over the previous year, where monthly stock turnover is calculated as monthly trading volume scaled by the number of shares outstanding during the month. Source: Datastream
LEV	Total debt divided by total assets. Source: Worldscope
ROA	Earnings before interest and taxes divided by total assets. Source: Worldscope
MTB	The ratio of market value to book value of equity. Source: Worldscope
SIZE	The natural logarithm of the firm's market capitalization (in constant 2005 US$). Source: Worldscope
GDP/CAPITA	The natural logarithm of the country's GDP per capita (in constant 2005 US$). Source: World Development Indicators
GDP_GROWTH	The country's annual GDP growth rate. Source: World Development Indicators
MCAP	The country's stock market capitalization scaled by its GDP. Source: World Development Indicators
STKTURN	Total value of stocks traded divided by the country's stock market capitalization. Source: World Development Indicators
CR	The country's creditor rights index. Source: Djankov, McLiesh, and Shleifer (2007)