Individualism and Stock Price Crash Risk

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Abstract

By employing a sample of 26,473 firms across 42 countries from 1990 to 2013, we show that firms located in countries with higher levels of individualism exhibit higher stock price crash risk. The increasing impact of individualism on crash risk is strengthened in firms with higher foreign institutional ownership, lower managerial discretion over information disclosure, and higher firm growth rates, and in countries with higher openness and lower information transparency. This increasing impact has been amplified in the period of global financial crisis and attenuated by the adoption of International Financial Reporting Standards. Various robustness tests and careful considerations of endogeneity confirm our findings.

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I. Introduction

> *"The current crisis, in fact, has its roots in a form of individualism, which obscures the relational dimension of man and leads him to close himself off in his own little world, to take care of his own needs and desires above all, caring little for others" (Pope Benedict XVI, January 12, 2012).*

Stock price crash risk (hereafter, crash risk) arises when bad news hoarded deliberately by managers accumulates beyond a critical threshold and suddenly becomes publicly available to investors (Hutton *et al.* 2009). Recent anecdotal evidence from the collapse cases of Enron, WorldCom, and many others, confirms that the non-sustainability of bad news hoarding triggers stock price crashes. Indeed, bad news can be strategically withheld by managers out of the concerns for compensation, professional career, reputation, and empire building (Graham *et al.* 2005; Ball 2009; Kothari *et al.* 2009). Understanding the sources of crash risk is of great importance for both academics and policy makers, especially given that large stock price crashes can diminish firm value and investor wealth and even potentially induce financial market instability. A growing body of literature has linked crash risk to various opportunistic behaviors of firm insiders, such as risk taking (Callen & Fang 2015) and earnings management (Hutton *et al.* 2009). However, a fundamental factor surprisingly ignored by existing literature in explaining crash risk from a psychological perspective is national culture, which shapes the perceptions of managers for hiding bad news, possibly leading to subsequent crashes in stock prices. This paper thus investigates the impact of individualism, as a proxy for national culture, on crash risk around the world.

According to bounded rationality theory, human agents are unable to contract for all relevant contingencies in decision making by only relying on formal legal rules (Williamson 1988). As an informal rule involving different human mindsets across countries, national culture has a pervasive impact on individual economic decisions (Guiso *et al.* 2006). Among different cultural dimensions, individualism measures the degree to which people focus on themselves over their societal groups. People in high

individualism countries stress self-interest and autonomy, whereas people in low individualism countries stress group cohesion. There is no consensus on the role of individualism in broad financial markets. On the one hand, individualism can exert a positive impact on financial markets by spurring corporate investment on research and development (Shao *et al.* 2013). Individualism is also beneficial for stock market development as it enhances momentum trading profits (Chui *et al.* 2010) and stock price informativeness (Eun *et al.* 2015). On the other hand, individualism can generate unfavorable financial market conduct such as earnings management (Han *et al.* 2010). The recent global financial crisis, as evidenced by a continuous series of price crashes in major countries, may suffer from the detrimental effect of individualism-induced self-centered behavior, which reflects people's selfish, excessive desires for high payoffs. This implies that individualism may also harm stock markets by generating large price crashes.

Given the existing evidence that individualistic cultures foster people's tendency to be overconfident and overoptimistic (Markus & Kitayama 1991; Odean 1998; Heine *et al.* 1999; Van den Steen 2004; Chui *et al.* 2010), we hypothesize that individualism has a positive impact on stock price crash risk. The link between psychological attributes induced by individualistic cultures and crash risk can be established based on both the managerial bad news hoarding story from an agency theory perspective and the direct effect of inherent psychological attributes on crash risk from a non-agency theory perspective. For the former, driven by the cognitive limitation of overconfidence, managers in individualistic cultures tend to overestimate their ability to strategically disguise and withhold bad earnings news and believe that the strategies they use to mask the unfavorable news will not be detected by investors. Further, these managers could be overly optimistic about firms' prospects by holding a belief that current poor earnings conditions will be improved so that the hoarded bad earnings news can be absorbed internally and will not be eventually leaked to the markets. As a result, managers in individualistic cultures are inclined to conceal and accumulate bad earnings news for prolonged periods,

which engenders a crash in the stock price.[1] For the latter, we argue that crash risk can be directly induced by inherent individualism-related psychological attributes of managers, even without agency problems. That is, when the interests of managers and investors are perfectly aligned, managers in individualistic countries can still misevaluate their decision outcomes due to their biased beliefs driven by overconfidence and keep ex-post unprofitable projects for too long, triggering stock price crashes.

By employing 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 (Hofstede 2001) influences the levels of three crash-risk variables: 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*). After controlling for various firm- and country-level characteristics, the results show that crash risk is positively related to individualism and that this relation is not only statistically significant but also economically significant. A one-standard-deviation increase in individualism is associated with a 14.37% increase in *NCSKEW*, a 10.39% increase in *DUVOL*, and a 26.96% increase in *COUNT*, relative to their respective sample means. Overall, the results suggest that firms in more individualistic countries experience more severe and more frequent stock price crashes. We carefully address the endogeneity concern by using genetic distance and grammatical rule on pronoun drop as two instrumental variables for individualism and alternatively including additional country-level controls in the model. The positive relation between individualism and crash risk remains valid.

We implement a number of robustness tests and lend further support to our main findings. First, we employ three alternative individualism indexes from Tang and Koveos (2008), House et al. (2004), and the World Values Survey. Second, we use the restricted sample excluding the United States (U.S.) (and

[1] In addition to this direct impact of individualism on crash risk, prior literature has suggested that individualism can indirectly increase crash risk through two possible channels. First, individualism can facilitate managerial risk taking (Li et al. (2013) and Shao et al. (2013)), which in turn increases crash risk (Kim et al. (2011) and Callen and Fang (2015)). Second, individualism can aggravate earnings manipulation by accountants (Han et al. (2010)), which in turn increases crash risk (Hutton et al. (2009)). We test these two possible mechanisms in Appendix A.2 and find results consistent with the predictions in the literature.

Japan), as well as balanced panels spanning different sample periods. Third, we conduct robustness checks with alternative model specifications, including weighted-least-square regressions, Fama-MacBeth regressions, adjusting firm-level continuous variables by within-country medians, hierarchical linear models, alternative clustering levels, and aggregate country-level regressions. The results show that the positive impact of individualism on crash risk still holds.

We further examine the cross-sectional heterogeneity in the impact of individualism on crash risk along the dimensions of firm and country characteristics. We find that the positive impact of individualism on crash risk is significantly larger in firms with higher foreign institutional ownership, lower managerial discretion over information disclosure, and higher growth rates. The impact of individualism on crash risk is not uniform across countries, being more salient in countries with higher openness and greater information asymmetry. The results add to the current debate over the role of country openness in financial markets and stress the importance of information transparency in mitigating stock price crashes.

We study how market financial constraints and financial reporting transparency can influence the relation between individualism and crash risk. We find that this relation is intensified during the global financial crisis, suggesting that crash risk can be aggravated by increased financial constraints in markets. In contrast, the adoption of International Financial Reporting Standards (IFRS) attenuates this relation, indicating that crash risk can be reduced by enhanced financial reporting transparency.

This paper contributes to existing literature in several ways. First, we establish a direct link between individualism and crash risk and thus supplement the literature on the impact of managerial behavior on crash risk by directly relating crash risk to individualistic cultures. One related study is conducted by Callen and Fang (2015), who investigate the impact of religion on crash risk. Although some earlier studies use religion as a proxy for national culture (e.g., La Porta *et al.* 1999; Stulz & Williamson 2003), this application could be inherently flawed in our setting. As Siegel et al. (2011) suggest, religion, as a set of complex informal constraints imposed on human behavior, comprises

conflicting views on many issues; and, more critically, using religion to capture cultural values will leave the substantial content of national culture undefined. Drawing on these insights, we employ Hofstede's national cultural framework and provide the first convincing evidence for the influence of national culture on crash risk.

This paper also complements the literature on the role of formal and informal institutional environments in financial markets. A wide array of literature on the impact of formal institutions has centered on issues such as investor protection (Shleifer & Wolfenzon 2002), macro information transparency (Gelos & Wei 2005), macro corporate governance (Li *et al.* 2006), and corporate disclosure requirements (Leuz *et al.* 2010). However, little is known about how informal institutions can influence financial markets. More recent research has started to focus on the issues regarding the impact of culture and religion on general financial decisions (e.g., Siegel *et al.* 2011; Ahern *et al.* 2015; Callen & Fang 2015; Pevzner *et al.* 2015). In particular, researchers have found that national culture can shape stock price behaviors, including momentum (Chui *et al.* 2010) and synchronicity (Eun *et al.* 2015). Our paper thus contributes to this strand of literature and reveals that crash risk is an extreme adverse outcome of individualistic cultures.

Second, this paper adds to the literature on crash risk. The prior literature has shown that crash risk is associated with earnings manipulation (Hutton *et al.* 2009), tax avoidance (Kim *et al.* 2011b), momentum trading (Barroso & Santa-Clara 2015), and many others. Extending these studies, our paper finds that the crash-related opportunistic behaviors of firm insiders can be caused by individualistic cultures. Our paper provides one important implication for the crash risk literature: even without agency problems, stock price crashes can still arise in individualistic countries because managers can misevaluate their decision outcomes due to their biased beliefs driven by overconfidence and overoptimism fostered in these cultures. This finding complements the extant studies that rest mainly on the agency theory assumption that individuals can make accurate evaluations but may choose to take suboptimal decisions because of conflicts of interest. In other words, agency theory argues that managers always judge

rationally the true value of firm projects and growth options but may deliberately withhold true information about unprofitable projects for their own benefit at the expense of shareholders (Kim *et al.* 2015). Our investigation is similar in spirit to the study by Kim et al. (2015), which documents a positive relation between CEO overconfidence and crash risk. Our paper expands on this study by focusing on cross-country comparisons of crash risk and showing that overconfidence can be introduced by individualistic cultures into the behavior of managers, and not merely CEOs. Overall, we present a new angle of social norm to offer a rigorous explanation for crash risk from the perspective of psychology and sociology.

Third, this paper sheds new light on the ongoing debate over the degree to which a country should be open to foreign markets. Researchers have argued that country openness has a twofold impact on the domestic economy. On the one hand, opening domestic markets to foreign investors can promote financial development and long-term economic growth (Henry 2000; Bekaert *et al.* 2005). On the other hand, overly high openness can engender financial instability and even lead to financial crises (Kaminsky & Reinhart 1999; Weller 2001; Martin & Rey 2006). Our paper studies the role of openness at both the firm and country levels and finds that openness increases crash risk, especially in individualistic countries. More specifically, we show that the positive impact of individualism on crash risk is more pronounced in firms with higher foreign institutional ownership and in countries with higher trade or equity market openness. We thus provide evidence challenging the common view that a country's openness to foreign markets moderates the impact of national culture on domestic financial markets (e.g., Stulz & Williamson 2003; Eun *et al.* 2015).

The reminder of paper is organized as follows. Section II provides literature review and hypothesis development. Section III describes model and data. The empirical results are presented in Sections IV−VI. Section VII concludes the paper.

II. Literature Review and Hypothesis Development

A. Literature Review

A.1. Crash Risk

In early studies, the phenomenon of stock price crashes is largely explained from the perspective of financial market mechanisms. For instance, Chen et al. (2001) find that stocks with higher trading volume exhibit higher future crash risk. Hong and Stein (2003) further rationalize this evidence and present a theoretical framework in analyzing the causes of crash risk based on heterogeneous beliefs of investors. They argue that bearish information that is not fully incorporated into stock prices due to investors' constraints in short selling is accumulated and is likely to be released during declining market periods, resulting in stock price crashes. Extending this strand of literature, Barroso and Santa-Clara (2015) show that stocks with the highest momentum experience the worst crashes.

Recent studies resort to the agency theory to explore how corporate behavior affects crash risk. These studies center on the crash-risk scenarios involving bad news hoarding and presume that managers can evaluate and analyze information rationally. But, even these rational managers may choose to hoard negative corporate information until it is accumulated beyond a critical threshold; at this point, the managers suddenly abandon their previous position and release the hoarded bad information to the markets, leading to a sharp drop in the stock price. The literature has noticed two sources of managerial bad news hoarding. First, it can arise from opaque accounting information. Jin and Myers (2006) argue that managers from opaque financial markets with limited shareholder protection tend to capture partial operating cash flows by suppressing bad news disclosure for the purpose of maintaining their jobs. If the bad news is accumulated for a sufficiently long period and beyond the managers' capability and/or willingness to continue to hoard, the managers' natural choice is to abandon the hoarding, thus engendering stock price crashes. Hutton et al. (2009) find that earnings management increases stock price synchronicity and makes firms more prone to stock price crashes. Kim et al. (2011b) show that tax sheltering, facilitating earnings manipulation by managers, also increases crash risk. Kim and Zhang (2014, 2015) and DeFond et al. (2014) show that crash risk can be elevated by financial reporting opacity.

Second, the bad news hoarding can arise from corporate investment behavior. Bleck and Liu (2007) argue that managers are able to hide bad news about the poor performance of firms' unprofitable projects under the historical cost accounting regime.[2] The bad projects will be maintained for too long and may even deteriorate; ultimately, the accumulated inferior performance of these bad projects materializes, generating a stock price crash. Benmelech et al. (2010) argue that stock-based compensation incentivizes managers to make suboptimal investments that can be used to mask adverse information about future growth opportunities, leading to higher crash risk. Further, Kim et al. (2011a) state that managers are likely to hide the true riskiness of firm investment to mitigate the concerns of investors regarding excessive firm risk taking, which subsequently increases crash risk. Similarly, Callen and Fang (2015) argue that high risk-taking managers tend to hoard bad earnings news because they are worried that investors would be aware of their high risk taking. Benmelech et al. (2010) and Kedia and Philippon (2009) notice that poorly performing managers are inclined to mimic the investment strategy of truly growing firms in order to hide bad news about their poor investments (also see Kim *et al.* 2011a).

The above agency-theory based literature assumes that managers always rationally evaluate the intrinsic value of firm projects and growth options, but, for their own benefit, may deliberately hoard unfavorable but true information at the expense of shareholders. However, these agency-based theories may not be able to provide adequate explanations for the sources of crash risk. More recent literature complements the agency theory view and investigates how managers' personal traits can influence their economic decisions and resultant crash risk of firms. It argues that, even without agency problems, managers are still able to trigger stock price crashes due to their overconfidence and consequential overestimation of future cash flows. For example, Kim et al. (2015) point out that even in the case of perfect alignment of the interests of managers and investors, "Overconfident managers … tend to misperceive ex-post negative NPV projects as value creating … they are more likely to stick to money-losing projects that rational managers would terminate. Keeping negative NPV projects for extended

[2] More specifically, the historical cost method grants managers a free call option, in that, when the market value is low, managers can choose to employ the asset's initial cost as the book value.

periods in turn leads to asset price crashes" (p. 7). In their theory, overconfident managers extend the periods of negative NPV projects, because they irrationally overestimate future cash flows although they still aim to act on behalf of shareholders. In particular, this study refers to social psychology literature and argues that managers often perceive negative information about firm projects as inaccurate and thus easily ignore or hide it, which makes these projects alive for too long and results in stock price crashes. Further, several studies examine the influence of some other managerial traits on crash risk. Kim et al. (2014) show that socially responsible firms have higher accounting transparency and hence exhibit lower crash risk. Callen and Fang (2015) show that firms headquartered in more religious U.S. counties are less likely to crash as managerial bad news hoarding is discouraged by powerful social norms imposed by religions.

A.2. Culture and Financial Markets

There is increasing interest in the interdisciplinary study of national culture in the field of corporate finance. For example, Shao et al. (2013) and Li et al. (2013) both show that firms domiciled in more individualistic countries take on more risky investment projects. Further, Han et al. (2010) examine how national culture influences earnings quality. They find that reported earnings are manipulated more severely by firms in more individualistic countries, where accountants have greater flexibility in choosing the accounting measures used to prepare financial statements and are allowed to report more optimistic earnings numbers. Further, Kanagaretnam et al. (2013) document higher risk taking and earnings management in banks from more individualistic countries.

National culture also plays an influential role in stock markets. Grinblatt and Keloharju (2001) find that the cultural origin of CEOs influences investors' preference for buying and holding stocks. Beckmann et al. (2008) show that national culture affects asset managers' investment decisions. Guiso et al. (2008) find that less trusting investors have lower tendency to buy stocks and allocate less of their wealth into stockholdings. Beugelsdijk and Frijns (2010) and Anderson et al. (2011) both find that national culture influences investors' decisions to participate in foreign equity markets. Chui et al. (2010) show that stocks listed in more individualistic countries have higher momentum profits. More recently,

Eun et al. (2015) report lower degrees of stock price synchronicity in culturally loose and individualistic countries. Pevzner et al. (2015) document stronger stock market reactions to corporate earnings announcements in countries with higher levels of social trust.

B. Hypothesis Development

According to Hofstede (1991), "culture is the collective programming of the mind which distinguishes the members of one group or category of people from those of another". We use the individualism dimension of Hofstede's cultural framework as a proxy for national culture for two reasons. First, individualism is considered as the most influential cultural dimension in Hofstede's framework for capturing cross-country cultural differences (Triandis 2001; Heine 2008). Second, and more importantly, among the many cultural dimensions, individualism is expected to have the most significant influence on stock price behavior, as the literature has shown that individualism is related to stock return momentum (Chui *et al.* 2010) and stock price synchronicity (Eun *et al.* 2015).

In psychology research, individualism is self-construal characterized by independence, not interdependence. When independence is highly valued in cultures, individuals are more self-conscious (Markus & Kitayama 1991). As these individuals are more distinguishable from others, they tend to put their own interests before the interests of their societal groups. Hofstede (2001) differentiates cultures into the dimension of individualism (i.e., independent self-construal) versus collectivism (i.e., interdependent self-construal). People living in individualistic cultures emphasize their personal interests, while people living in collectivistic cultures emphasize the mutual interests of societal groups. Markus and Kitayama (1991) and Heine et al. (1999) further suggest that people in individualistic countries tend to believe that their relative abilities are above average. Markus and Kitayama (1991) argue that people in individualistic countries maintain self-esteem by attributing success to their own abilities and failure to external factors, which Zuckerman (1979) refers to as self-attribution bias. Moreover, Chui et al. (2010) argue that investors in individualistic countries are overconfident about their information analysis skills and are likely to overestimate the accuracy of information. Odean (1998) and Van den Steen (2004) point out that

overconfident people have overly optimistic expectations about their chances of success as they believe that they have a high ability to make accurate predictions. In contrast, people in collectivistic countries are more attentive to group interests. They are more likely to monitor themselves to conform to societal expectations (Church *et al.* 2006) and suffer less from these cognitive biases (Biais *et al.* 2005).

Due to the overconfidence bias fostered in individualistic cultures, managers tend to overestimate their ability to hoard bad earnings news. They believe that they have chosen a subtle approach to strategically disguise unfavorable information about firm earnings so that investors will neither find out the masked adverse information nor detect managerial bad news hoarding activities. Further, managers in individualistic countries think overly optimistically about the future, holding a belief that corporate earnings conditions will be improved and the disguised negative earnings numbers can be at least partially offset by enhanced future firm performance; as a result, firms will be able to absorb the hoarded bad information internally and not have to release it to the markets. Taken together, we expect that, driven by the cognitive biases of overconfidence and overoptimism, managers in individualistic countries tend to endure downside risk by hoarding bad earnings news until they are unwilling or unable to continue to hide it. The suppressed bad news then suddenly comes out and causes a stock price crash. Our hypothesis is described as follows,

Hypothesis (H1): Firms located in more individualistic countries exhibit higher stock price crash risk.

III. Model and Data

A. Empirical Model

We examine the relation between individualism and crash risk based on the following model,

$$CrashRisk_{ij,t+1} = \alpha_0 + \beta_1 IDV_j + \boldsymbol{\beta_2 X_{ij,t}} + \boldsymbol{\beta_3 Y_{j,t}} + \varepsilon_{ij,t+1} \quad (1)$$

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

X denotes a set of firm-level control variables that have been previously shown to influence crash risk (Kim *et al.* 2011a, b), including lagged *NCSKEW*, the mean and standard deviation of firm-specific weekly returns (*RET* and *SIGMA*), detrended turnover (*DTURN*), earnings opacity (*ACCM*), 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, including GDP per capita (*GDP*), GDP growth (*GDPG*), stock market capitalization (*MCAP*), stock market turnover (*STKTURN*), anti-director index (*ANTID*), and creditor rights (*CR*). Variable definitions are provided in Appendix A.1.

We include industry- and year-fixed effects to capture the unobserved industry and year determinants of crash risk. Equation 1 is estimated by using ordinary least squares (OLS) regressions with robust standard errors corrected by firm-level clustering (Petersen 2009). If the coefficient estimate of *IDV* (i.e., β_1) is positive and significant, then **H1** is supported. That is, firms located in countries with higher individualism have higher stock price crash risk.

B. Crash Risk Measures

To construct the crash-risk variables, we estimate the expanded market model as follows (Jin & Myers 2006),

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

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*. We includes two lead and two lag terms to allow for non-synchronous trading (Dimson 1979). We compute the firm-specific weekly return ($W_{i,t}$) as the natural logarithm of 1 plus the residual term from Equation 2 (i.e., $W_{i,t} = log(1 + e_{i,t})$).

The first crash-risk variable, *NCSKEW*, measures the negative skewness of firm-specific weekly

returns and 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 3/2 (Chen *et al.* 2001). Specifically, *NCSKEW* is calculated as,

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

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

The second crash-risk variable, *DUVOL*, measures the down-to-up volatility of firm-specific weekly returns and 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 down-week to up-week firm-specific weekly returns (Chen *et al.* 2001). A firm week is defined as an up (a down) week if the firm-specific weekly return is above (below) its annual mean. Specifically, *DUVOL* is calculated as,

$$DUVOL_{i,t} = \log\left[\frac{(\mathrm{n_u}-1)\sum \mathrm{W_{i_d,t}^2}}{(\mathrm{n_d}-1)\sum \mathrm{W_{i_u,t}^2}}\right] \quad (4)$$

where $W_{i_u,t}$ ($W_{i_d,t}$) is the firm *i*-specific weekly return during an up (down) week, and n_u (n_d) is the number of up (down) weeks 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. *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*, and *COUNT* indicates a higher level of crash risk.

C. Data and Sample

We collect return index (Datastream mnemonic: *RI*) from Datastream and calculate the weekly stock return (*Ret*). We follow Ince and Porter (2006) in screening and correcting *RI*. In particular, we set *RI* as missing if it is less than 0.01 as Datastream rounding *RI* to the nearest tenth can exaggerate the proportion of zero returns, and we drop the observation if *Ret* exceeds 200% and reverses within one week. We truncate the absolute value of *Ret* at 0.5 for unusual large returns. Firm-level accounting data and country-level control variables are collected from Worldscope and World Development Indicators, respectively. Individualism index is obtained from Hofstede (2001).

We filter the sample by applying the following procedures: (1) firm-level variables are winsorized at the 1st and 99th percentiles to alleviate potential outlier effects, (2) exclude American Depository Receipts and Global Depository Receipts, (3) exclude utility and financial firms, (4) exclude firm-year observations if the firm has fewer than 26 weekly stock returns in a given year, and (5) exclude countries with fewer than 100 firm-year observations over the sample period. Finally, the sample contains 26,473 firms across 42 countries from 1990 to 2013.

Panel A of Table 1 presents the sample distribution. The score of individualism index varies widely across countries. In particular, Indonesia and Pakistan have the lowest individualism score of 0.14, being the least individualistic countries in our sample, while the U.S has a score of 0.91, being the most individualistic country. In Column 4, a firm is considered as a crashed firm if it experiences at least one crash week in a year. A country with a higher score of individualism index generally has a higher percentage of crashed firms. Figure 1 plots the country means of crash-risk variables against the individualism index. All fitted-trend lines are upward sloping, implying a positive link between crash risk and individualism. Panel B of Table 1 presents the sample distribution of crashed firms by year. The percentage of crashed firms reached the highest during the global financial crisis (i.e., 17.08% in 2008).

< Insert Table 1 >

< Insert Figure 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, which are similar to those documented by Kim *et al.* (2011a) and An and Zhang (2013) for U.S. firms. Panel B of Table 2 presents the correlation matrix of firm- and country-level variables. We find that *NCSKEW*, *DUVOL,* and *COUNT* are highly correlated. Individualism index is positively and significantly correlated with all three crash-risk variables. Panel C of Table 2 reports the summary statistics of crash-risk variables in high- and low-individualism subsamples based on the median individualism score. Both the mean and median of firm-level crash-risk variables are significantly higher in high-individualism countries than in low-individualism countries. We also compute the equal-weighted and value-weighted country average crash risk and repeat our analysis at the country level. The results are similar.

< Insert Table 2 >

IV. The Impact of Individualism on Crash Risk

A. OLS Regression Analysis

Table 3 presents baseline regression results for the impact of individualism on crash risk. In Columns 1-3, the coefficient estimates (t-statistics) of *IDV* are 0.158 (16.69), 0.076 (16.82), and 0.103 (14.53), respectively, indicating that *IDV* significantly and positively impacts on all three crash-risk variables. The results lend support to **H1** that firms located in more individualistic countries have higher stock price crash risk. Given that firm risk taking (*SIGMA*) and earnings management (*ACCM*) have been controlled for in the model, our analysis separates the direct effect of individualism on crash risk from its indirect effect on crash risk through these potential channels. By controlling for these channels, our results suggest that individualism has a direct, positive impact on crash risk, supporting the notion that individualistic cultures can directly introduce the psychological biases of overconfidence and overoptimism into managerial bad news hoarding behavior and increase crash risk.

For firm-level control variables, *NCSKEW* is positively associated with future crash risk,

suggesting that crash risk tends to persist over time (Chen *et al.* 2001). *ACCM* is positively associated with crash risk, suggesting that firms with higher levels of earnings management display higher crash risk (Hutton *et al.* 2009). The coefficients on *MTB* and *SIZE* are significantly positive, indicating that crash risk is higher for high-growth stocks and large-cap stocks (Kim *et al.* 2011b). For country-level control variables, we report significantly positive coefficients on *GDP* and *GDPG*, indicating that firms in wealthier countries and higher-growth countries are less likely to crash. *STKTURN* is positively associated with crash risk, suggesting that stocks listed in markets with higher stock market turnover have higher crash risk. *CR* is negatively related to crash risk, which reflects the beneficial role of creditor protection in reducing crash risk.

B. Endogeneity

National culture changes slowly, perhaps over centuries or millennia (Hofstede 2001; Licht *et al.* 2005). It is unreasonable to expect that crash risk can influence individualistic attributes rooted in national culture. Furthermore, Hofstede's individualism index was created based on IBM surveys undertaken between 1967 and 1973, nearly two decades before the beginning of our sample period. Thus, the reverse causality issue is least likely to confound our results. However, there may be some omitted country-level factors that are closely related to individualism and also influence crash risk. To address this endogeneity concern, we employ the following two approaches.

B.1. Instrumental-Variable Approach

We estimate the two-stage least squares (2SLS) regressions by using two instrumental variables (IVs) for individualism: (1) the genetic distance (*Genetic_Distance*) between a given country and the U.S. (i.e., the most individualistic country), following Spolaore and Wacziarg (2009), Ahern et al. (2015), and Eun et al. (2015)[3]; and (2) the country's grammatical rule on pronoun drop (*Pronoun_Drop*), which is a dummy variable indicating whether the major language spoken in the country licenses pronoun drop, following

[3] As Gorodnichenko and Roland (2011) state, "parents transmit their culture as well as their genes to their children, so that genetic data can proxy for vertical cultural transmission." Thus, a country that is genetically distant from the U.S. is likely to be culturally distant from the U.S., that is, less individualistic.

Licht et al. (2007) and Shao et al. (2013)[4]. Table 4 presents the 2SLS regression results for the impact of individualism on crash risk. In Column 1 of Panel A, *Genetic_Distance* is negatively and significantly associated with *IDV* in the first-stage regression, suggesting that a country that is more genetically distant from the U.S. cultivates less individualistic national culture. In Column 1 of Panel B, *Pronoun_Drop* is negatively and significantly related to *IDV*, indicating that people who speak languages that license pronoun drop are less individualistic than people who speak languages that require the use of pronouns. In the second-stage regressions, Columns 2-4 show that $\widehat{IDV}$ positively and significantly impacts on crash-risk variables. The coefficient estimates of $\widehat{IDV}$ are smaller in magnitude than those reported in OLS regressions of Table 3, indicating that the impact of *IDV* on crash risk is biased upwards in the baseline regressions due to the existence of omitted variables. Overall, after the 2SLS approach is exploited to mitigate the endogeneity problem, the positive relation between individualism and crash risk still holds, which provides support for **H1** that firms located in more individualistic countries are more crash-prone.

< Insert Table 4 >

B.2. Additional Country-Level Control Variables

In Table 5, we include additional country-level control variables to alleviate the concern that the observed positive relation between individualism and crash risk could capture the impacts of other relevant country-specific characteristics on crash risk.

< Insert Table 5 >

In Panel A, we control for Hofstede's other three cultural indexes, including power distance (*PDI*), masculinity (*MAS*), and uncertainty avoidance (*UAI*).[5] We show that the positive relation between *IDV*

[4] Kashima and Kashima (1998) argue that people who speak a language that requires the use of pronouns (e.g., "I" and "you") are more highlighted from the context of speech, whereas people who speak a language that licenses pronoun drop are less distinguishable against the context. As a result, people in countries where pronouns are not allowed to be dropped in languages naturally become more individualistic than those in countries where pronouns can be dropped.

[5] Power distance refers to the unequalness of power accepted by a society member with less power. The key issue underlying this cultural dimension is how a society deals with inequality. Masculinity measures a society's

and crash risk is unchanged. In addition, *PDI* decreases crash risk. This result suggests that, since managers in countries with greater power inequality are endowed with more managerial power as well as more responsibilities for their decisions on corporate strategies, they are more cautious about their bad news hoarding activities that could eventually engender stock price crashes and put their own jobs at risk. We also document a positive impact of *MAS* on crash risk, consistent with the prediction that managers in masculine countries are more likely to manipulate reported earnings (Han *et al.* 2010), which in turn increases crash risk (Hutton *et al.* 2009).

Religion and culture interact closely in their development, for example, protestant countries are generally more individualistic than Catholic countries (Hofstede 1980). As shown in Panel B, we control for a country's dominant religion, including dummy variables of *Catholicism*, *Protestantism*, *Orthodox*, *Islam*, and *Buddhism*. The coefficient estimates of *IDV* remain significantly positive.

In Panel C, we control for a country's legal origin as it can influence the development of financial regulatory systems (La Porta *et al.* 1998), which in turn may impact on crash risk. By controlling for the legal origin dummies of English common law (*English*), French civil law (*French*), German civil law (*German*), and Scandinavian civil law (*Scandinavian*), *IDV* is still positively related to crash risk.

As shown in Panel D, we control for a country's governance quality (*Governance*) to separate the entangled impacts of individualism and country governance on crash risk. The results show that *IDV* is positively related to crash risk. *Governance* negatively impacts on crash risk, suggesting that firms in well-governed countries are less likely to crash.

In Panel E, we control for the presence of daily stock price limit rules (*Price_Limit*). Many stock markets have long imposed certain limits on the maximum variation in individual stock price movements within a single day. Since the price limits are set up to moderate stock market fluctuations, the limits are less likely to be introduced in more individualistic countries, where individual freedom is more

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preference for assertiveness, dominance, competitiveness, and material success. Uncertainty avoidance measures the degree to which members within a society feel stressed or anxious about future uncertainty and ambiguity.

appreciated and valued. Although whether implementing such price limit rules benefits stock markets is unclear (e.g., Fama 1988), we explicitly control for the presence of such rules in each country's major stock exchange(s). The results show that *Price_Limit* decreases crash risk and that *IDV* has a positive impact on crash risk.

C. Robustness Tests

C.1. Alternative Individualism Indexes

We employ three alternative individualism indexes: (1) the individualism index from Tang and Koveos (2008) (*TK_IDV*), who recode Hofstede's individualism index by accounting for the impact of economic development over recent years on cultural evolution; (2) the individualism index developed by House et al. (2004) in the Global Leadership and Organizational Behavior Effectiveness Research (GLOBE) project that surveyed managers; and (3) a time-varying individualism index created following Ahern et al. (2015) and Pevzner et al. (2015) using data from the World Values Survey (WVS).[6] In Panel A of Table 6, we document a significantly positive impact of alternative individualism indexes on crash risk.

< Insert Table 6 >

C.2. Alternative Samples

In Panel B of Table 6, we rerun the baseline regressions by using alternative samples. First, to address the concern that our results may be driven by the countries that are overly represented in the sample, we exclude the U.S. (and Japan) from the sample. Second, we use balanced panels. We require firms to be continuously listed in stock exchanges in 2004–2013 and control for a dummy indicator (*Crisis*) for the 2008–2009 global financial crisis. We also examine two balanced panels in the sub-periods of 2004–2007 and 2010–2013, respectively. These results report a positive relation between individualism and crash risk.

C.3. Alternative Model Specifications

In Panel C of Table 6, we use alternative model specifications. First, we estimate the weighted-least-

[6] We include the time-varying *WVS_IDV* index and country-fixed effects in the model to account for time-invariant country-level heterogeneity. By using the country-fixed effects, we exclude the time-invariant country-level variables (i.e., *Anti-director rights* and *Creditor rights*) from the model.

squares regressions with a weight equal to the inverse of number of firm-year observations in a country, which corrects for the uneven representation of countries in our sample. Second, we employ the Fama-MacBeth estimation procedure to address the cross-sectional correlation in the residuals. Third, we adjust all firm-level continuous variables by their respective country-year medians to mitigate the concern that our results may be plagued with some firm-specific characteristics that are correlated with omitted country-level variables. Fourth, we employ the hierarchical linear modeling (HLM) technique to address the multilevel structure of our data (Li *et al.* 2013). Fifth, we correct standard errors for country-level clustering, year-level clustering, two-way clustering by country and year, and by firm and year, respectively. Finally, we repeat our regression analysis at the aggregate country level. The country-year average of each firm-level variable is calculated as either equal-weighted or value-weighted. The impact of *IDV* on crash risk is not only statistically significant but also economically significant. For example, in the equal-weighted country-level regressions, a one-standard-deviation increase in *IDV* is associated with a 14.37% (= 0.248×0.106/0.183) increase in *NCSKEW*, a 10.39% (=0.248×0.044/0.105) increase in *DUVOL*, and a 26.96% (=0.248×0.100/0.092) increase in *COUNT*, relative to their respective sample means. These results corroborate our finding for a positive impact of individualism on crash risk.

V. Cross-Sectional Heterogeneity in the Impact of Individualism on Crash Risk

A. Institutional Ownership

The effectiveness of external monitoring by institutional investors can influence the ability of managers to hoard bad earnings news (An & Zhang 2013; Callen & Fang 2013).[7] Ferreira and Matos (2008) and McConnell and Servaes (1990) find evidence in supporting the monitoring role of institutional investors. By contrast, Agrawal and Knoeber (1996) and Wahal (1996) suggest that the role of institutional investors in deterring managerial misconduct is negligible. If monitoring by institutional investors helps curb

[7] An and Zhang (2013) document a positive effect of aggregate institutional ownership on stock price crash risk as the increasing impact of transient institutional ownership on crash risk overwhelms the decreasing impact of dedicated institutional ownership on crash risk.

managerial opportunistic behavior, firms that are more largely owned by institutional investors should behave less opportunistically and exhibit lower crash risk, though they can still be subject to behavioral biases stemming from individualistic cultures. On the contrary, if institutional investors are unable to constrain managerial self-serving behavior, individualistic cultures should uniformly increase crash risk across firms with different proportions of institutional shareholdings. We thus examine the variation of the impact of individualism on crash risk for firms with different levels of institutional ownership.

We quantify total institutional ownership (*IO*), domestic institutional ownership (*DIO*), and foreign institutional ownership (*FIO*) as a percentage of total shares outstanding using data extracted from the FactSet/LionShares ownership database. High (Low) institutional ownership (*High_IO* (*Low_IO*)) takes the value of 1 if a firm is in the top (bottom) quartile of institutional ownership for a country-year, and 0 otherwise. High (Low) domestic (*High_DIO* (*Low_DIO*)) and foreign institutional ownership (*High_FIO* (*Low_FIO*)) are constructed analogously based on the ranking of domestic and foreign institutional ownership, respectively.

In Panel A of Table 7, *IDV*×*High_IO* is significantly positively associated with crash risk, while the coefficient estimate of *IDV*×*Low_IO* is only marginally significant. The result indicates that total institutional ownership enhances the positive impact of *IDV* on crash risk. In Panel B, both the coefficient estimates of *IDV*×*High_DIO* and *IDV*×*Low_DIO* are positive and significant. In Panel C, *IDV*×*High_FIO* has a positive and significant relation with crash risk, while the coefficient estimate of *IDV*×*Low_FIO* is negative and insignificant. The tests of coefficient equality reveal that individualism makes a greater positive impact on crash risk in firms with high foreign institutional ownership than in firms with low foreign institutional ownership. Indeed, foreign institutional investors generally need to employ more resources to fulfill their monitoring role than do domestic institutional investors. As a result, they are less incentivized to constrain managerial opportunistic behavior, such as bad news hoarding. The resultant insufficient monitoring by these foreign institutions renders firms more susceptible to individualistic cultures as well as to stock price crashes. This evidence also corroborates the notion that

foreign institutions play a negative role in stabilizing domestic stock markets. When there are more foreign investors in the markets, domestic stock prices are more affected by fluctuations in the global markets and, therefore, become more vulnerable to international financial shocks (Bae *et al.* 2004).

< Insert Table 7 >

B. Managerial Discretion over Information Disclosure

Chen et al. (2001) argue that managers with greater discretion over the disclosure of information are more likely to strategically withhold bad news but accelerate the release of good news to investors, thereby introducing positive skewness into stock returns. We expect that individualism exacerbates these asymmetric disclosures as individualistic cultures encourage managers to make self-serving decisions and exploit their high flexibility in self-governance to implement these decisions. Thus, in firms with more managerial discretion over information disclosure, individualism should generate more positively skewed stock returns, which is associated with lower crash risk.

Following Chen et al. (2001), we use two proxies to measure the managerial discretion: firm size (*Size*) and analyst coverage (*Analyst*). In firms with higher market capitalization or analyst coverage, managers are less likely to asymmetrically release firm news to investors as they are subject to more stringent external monitoring. High (Low) firm size (*High_Size* (*Low_Size*)) takes the value of 1 if a firm is in the top (bottom) quartile of firm size for a country-year, and 0 otherwise. *High_Analyst* (*Low_Analyst*)) is created analogously.

In Table 8, *IDV* significantly increases crash risk in firms with *High_Size* and *High_Analyst*. The tests of coefficient difference show that crash risk is significantly higher in the low managerial discretion group. The results thus support the discretionary disclosure hypothesis of Chen et al. (2001) by suggesting that individualistic cultures promote the asymmetric disclosure of good news relative to bad news by firms that are less scrutinized by external forces, which increases the positive skewness of stock returns and reduces crash risk.

< Insert Table 8 >

C. Firm Growth

According to the stochastic-bubble theories pioneered by Blanchard and Watson (1982), a bubble tends to build up for an extended period in high-growth stocks. However, to a certain degree when the bubble bursts, a sharp stock price collapse will occur. Harvey and Siddique (2000) and Chen et al. (2001) document higher crash risk for high-growth stocks in which the bubble has stockpiled for too long. Scheinkman and Xiong (2003) suggest that overconfident investors hold highly divergent opinions about stock fundamentals and hence bid up the stock price beyond its intrinsic value, enlarging the bubble. Therefore, we expect that the bubble in high-growth stocks accumulates to a greater extent and pops more quickly in more individualistic countries since the bubble is elevated by investor overconfidence arising from individualistic cultures.

We use market-to-book ratio (*MTB*) and sales growth (*Sales*) as proxies for firm growth. High (Low) market-to-book ratio (*High_MTB* (*Low_MTB*)) takes the value of 1 if a firm is in the top (bottom) quartile of market-to-book ratio for a country-year, and 0 otherwise. *High_Sales* (*Low_Sales*)) is created analogously.

In Table 9, we report a significantly positive relation between *IDV* and crash risk in firms with *High_MTB*, while the relation becomes significantly negative in firms with *Low_MTB*. For firms with *High_Sales*, *IDV* exerts a stronger increasing impact on crash risk. The tests of coefficient difference confirm that the positive impact of *IDV* on crash risk is more salient in high-growth firms than in low-growth firms. Overall, our results suggest that individualism boosts the accumulation of bubbles in fast-growing stocks and then triggers a crash in the stock price once the bubbles burst.

< Insert Table 9 >

D. Country Openness

Opening domestic markets to foreign economies exposes people to the norms and values of foreign

societies. Stulz and Williamson (2003) and Eun et al. (2015) argue that the openness of country (i.e., in terms of international trade and foreigners' equity investment) can attenuate the influence of domestic cultures on financial markets. Rodrik (1997) notes that globalization erodes the social cohesion of a country, thereby leading to social disintegration. In a similar vein, Polanyi (2007) argue that the integration with foreign market economies diminishes social networks within a country. Lane (1991) further states that the increased market transactions in globalization cultivate self-attribution bias. Therefore, opening domestic markets to foreigners promotes individualistic cultures, in which people lay little emphasis on social cohesion and tend to attribute personal success to their own ability. As a result, firms in countries with higher openness should exhibit higher individualism and consequently higher crash risk.

Since trade openness and stock market openness are both important for attaining globalization, we investigate how the impact of individualism on crash risk varies with the degree to which a country is open to international trade and foreign investors. We measure trade openness using the dummy indicator *Trade_Open* (Wacziarg and Welch (2008)) and create a dummy variable *Yes (No) trade open* which is equal to 1 if a country is open (closed) to international trade. To measure the extent to which domestic stock markets are open to foreign investors, we employ the financial liberalization intensity index developed by Bekaert et al. (2005), denoted *Liberalization*. We construct a dummy variable *High* (*Low*)*_Liberalization* equal to 1 if the financial liberalization index of a country is above (below) the sample median in a given year.

In Panel A of Table 10, *IDV*×*Trade_Open (Yes)* significantly increases crash risk, while *IDV*×*Trade_Open (No)* has an insignificant impact. In Panel B, *IDV*×*High_Liberalization* significantly increases crash risk, while the impact of *IDV*×*Low_Liberalization* is statistically insignificant. The tests of coefficient difference reveal that the positive impact of *IDV* on crash risk is significantly larger in countries with higher trade or stock market openness.

< Insert Table 10 >

E. Macro Information Transparency

The improved macro information transparency can reduce managers' ability to hoard bad news and mitigate crash risk (Jin & Myers 2006). We predict that transparent information environments can curb managerial bad news hoarding that has been promoted by individualistic cultures to increase crash risk. As a result, the positive impact of individualism on crash risk should be weakened in countries with transparent information environments.

Macro information environments are measured by: (1) *Adv_Econ*, indicating whether a country is classified by the International Monetary Fund as an advanced economy or not; (2) *FERC*, a country's average future earnings response coefficient (Watanabe et al. (2013)), capturing the extent to which firm-specific information about future earnings is incorporated into stock prices; (3) *PIN*, a country's average probability of informed trading (Lai et al. (2014)), calculated based on the approach of Easley et al. (2002); (4) *FINTRA*, the financial transparency index (Bushman et al. (2004)), capturing a country's average intensity and timeliness of firm-specific financial information disclosures made by managers, analysts, and the media; and (5) *GOVTRA*, the governance transparency index (Bushman et al. (2004)), capturing a country's average intensity and timeliness of firm-specific governance information disclosures made to outside investors for holding firm insiders accountable. A country is considered more transparent if it has an advanced economy, higher *FERC*, lower *PIN*, higher *FINTRA*, or higher *GOVTRA*.[8] For *Adv_Econ*, we create a dummy variable denoting that whether or not a country is an advanced economy. For other information-environment measures, we create *High* (*Low*) indicators equal to 1 if the related measure is above (below) the sample median in a given year.

In Table 11, we find that *IDV* has a significantly positive impact on crash risk, regardless of whether a country has a high or low level of information transparency. The tests of coefficient difference reveal that the positive impact of *IDV* on crash risk is significantly smaller in countries with high information transparency than in countries with low information transparency, consistent with our

[8] Lai et al. (2014) show that PIN is negatively related to country-level information transparency.

prediction that macro information transparency mitigates the positive impact of individualism on crash risk.

< Insert Table 11 >

VI. Global Financial Crisis and IFRS Adoption

A. Global Financial Crisis

The recent global financial crisis provides a natural setting to explore how severe market financial constraints affect the relation between individualism and crash risk. Since liquidity dries up quickly during the financial crisis, firms find it difficult to withhold any more bad earnings news as they are financially constrained and are less able to hide their originally undetected earnings problems. Thus, more hoarded bad news is released to the markets, augmenting crash risk.

We employ two dummy variables to distinguish the crisis period of 2008–2009 (*Crisis*) from the post-crisis period of 2010–2013 (*Post_Crisis*). In Panel A of Table 12, *IDV*×*Crisis* is significantly positively related to crash risk, while *IDV*×*Post_Crisis* has an insignificant impact on crash risk. The results suggest that stocks listed in more individualistic countries experienced more severe and more frequent crashes during the global financial crisis.

< Insert Table 12 >

B. IFRS Adoption

IFRS adoption was first mandated by the European Union in 2005 for listed firms in preparing consolidated reports. Since then, a number of non-EU countries with prominent capital markets (e.g., Australia and Singapore) require their firms to prepare financial reports in accordance with IFRS. IFRS aims to improve financial reporting transparency and facilitates the comparison of financial statements across different countries. We expect that the positive impact of individualism on crash risk can be moderated by IFRS reporting as the enhanced financial transparency subsequent to mandatory IFRS adoption reduces the ability of managers to hide bad news (DeFond *et al.* 2014).

We create a dummy variable, *IFRS*, to denote the firm-years that follow the full set of international standards or IFRS (Kim and Shi (2012)). In Panel B of Table 12, the coefficient estimates of *IDV*×*IFRS* are significantly negative for the sample period of 2003–2013, while the coefficient estimates remain negative but less statistically significant for the full sample period.[9] As some firms may choose to adopt IFRS before it is mandated by regulatory rules, and these voluntary adopters may be subject to self-selection bias, we exclude these firms from the sample. The relation reported in Appendix A.3 based on this alternative sample remains qualitatively unchanged. Overall, we suggest that IFRS reporting mitigates the impact of individualism on crash risk as the increased financial transparency subsequent to IFRS adoption constrains managerial bad news hoarding.

VII. Conclusions

Using a cross-country sample, we investigate the impact of individualistic cultures on stock price crash risk. We conjecture that individualistic cultures serve as an informal institutional environment that shapes the perceptions of managers for hoarding bad news and that these individuals behave opportunistically, triggering stock price crashes. We find robust evidence in support of this conjecture. First, after controlling for the factors known to explain crash risk, we document a significantly positive relation between individualism and crash risk. Second, we show that individualism has a larger impact on crash risk in firms with higher foreign institutional ownership, lower managerial discretion over information disclosure, and higher growth rates, and in countries with higher openness and lower information transparency. Third, we document that the impact of individualism on crash risk is strengthened during the global financial crisis, while IFRS adoption moderates this impact.

Collectively, our results highlight a fundamental role of individualistic cultures in determining cross-country differences in crash risk. Our paper provides additional support for the existing theories on crash risk, including the bad news hoarding story proposed by Jin and Myers (2006), the Hong–Stein

[9] By examining the 2003–2013 period, we eliminate the potential impact of the Asian financial crisis in 1997 and the Sarbanes-Oxley Act in 2002 that may distort our analysis of IFRS adoption.

theory about investor disagreement (Hong & Stein 2003), the discretionary disclosure hypothesis of Chen et al. (2001), and the stochastic bubble theory developed by Blanchard and Watson (1982). If, as we have argued, individualistic cultures act as one fundamental factor shaping various individual behaviors to increase crash risk, our results for the relation between individualism and crash risk should be extensively related to different crash risk theories. Our consistent results under different theoretical analyses further justify the main conclusion of this paper.

This paper contributes to existing literature by directly relating crash risk to individualistic cultures that shape the way managers behave. Moreover, this paper demonstrates that, even without agency problems, managers can still trigger stock price crashes due to their overconfidence and the resultant overestimation of future cash flows. We thus complement the agency theory statement that managers always judge the intrinsic value of corporate investment and growth options rationally but may deliberately hide true information about bad projects for their own benefit at the expense of shareholders (Kim *et al.* 2015). Finally, this paper sheds new light on the ongoing debate over the degree to which a country should be open to foreign markets. We show that the positive impact of individualism on crash risk is significantly stronger in firms with higher foreign institutional ownership and in countries with higher trade or equity market openness.

Our study has important implications for policy making. First, to curtail crash risk, the opportunistic behaviors of managers in individualistic countries should be restrained or at least be closely monitored by regulators. Second, country openness should be maintained at a proper level in responding to the degree of individualism in the country in case the crash risk is raised excessively.

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Figure 1: Individualism and Crash Risk

This figure plots the country average of crash-risk variables against individualism index from 1990 to 2013. Crash risk is measured by *NCSKEW*, *DUVOL*, and *COUNT*. Variable definitions are provided in Appendix A.1.

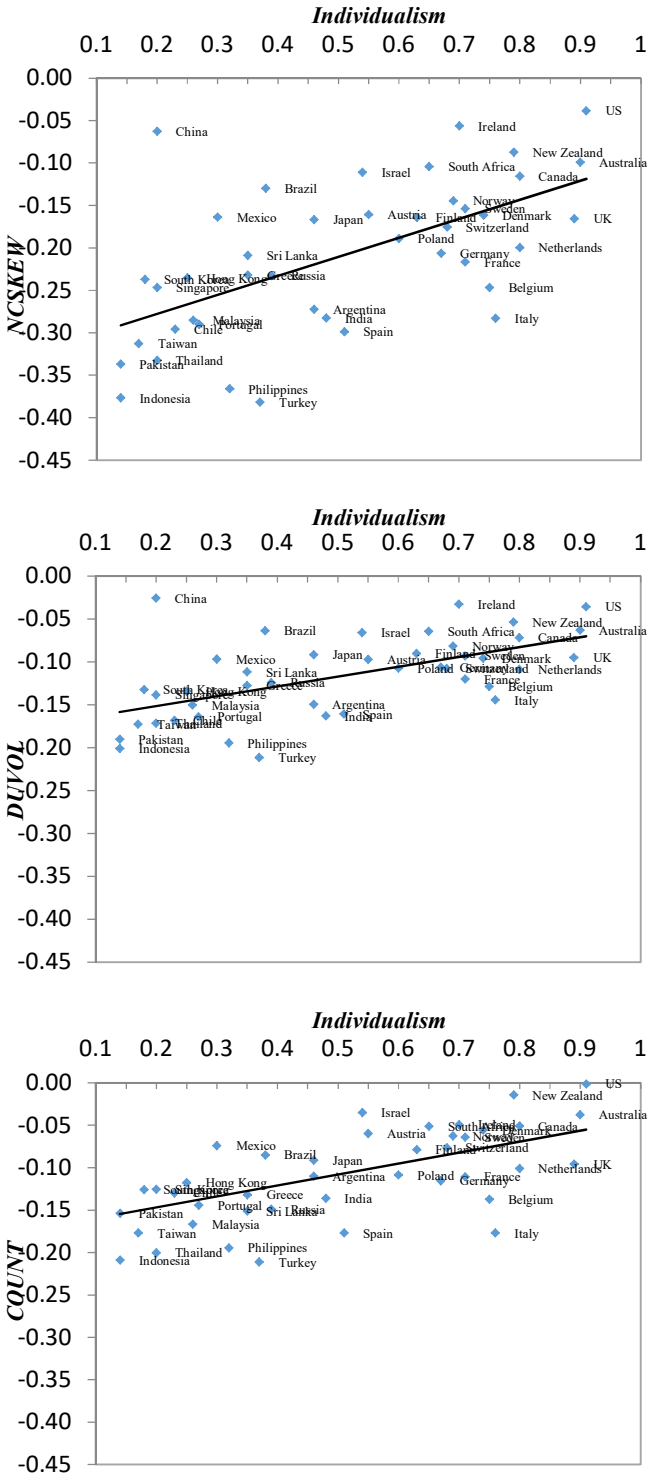

Table 1: The Sample

This table presents the sample distribution across 42 countries from 1990 to 2013. *# Firm-Year Obs.* is the number of firm-year observations. *# Firms* is the number of firms. *% of Crashed firms* (*# Crashed Firms*) is the percentage (number) of firms that experience at least one crash week. Variable definitions are provided in Appendix A.1.

Panel A: Crash Firms by Country

Country/Market	***Individualism*** [1]	***# Firm-Year Obs.*** [2]	***# Firms*** [3]	***% Crashed Firms*** [4]
Argentina	0.46	100	20	25.00
Australia	0.90	5298	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	7695	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	4228	620	50.97
Germany	0.67	4665	710	55.63
Greece	0.35	1204	214	32.71
Hong Kong	0.25	5004	886	38.37
India	0.48	5989	1,620	20.06
Indonesia	0.14	1250	229	34.50
Ireland	0.70	183	30	40.00
Israel	0.54	541	162	17.28
Italy	0.76	1312	208	36.54
Japan	0.46	33,833	3,425	55.94
Malaysia	0.26	4747	776	36.08
Mexico	0.30	501	66	46.97
Netherlands	0.80	1022	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	2732	509	35.56
South Africa	0.65	1506	230	33.91
South Korea	0.18	8391	1,448	33.29
Spain	0.51	702	102	42.16
Sri Lanka	0.35	192	80	7.50
Sweden	0.71	2278	369	48.51
Switzerland	0.68	1624	181	55.80
Taiwan	0.17	8891	1,363	31.25
Thailand	0.20	2550	386	45.08
Turkey	0.37	1379	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	4324	630	40.71

Panel B: Crash Firms by Year

Year	***1990***	***1991***	***1992***	***1993***	***1994***	***1995***	***1996***	***1997***	***1998***	***1999***	***2000***	***2001***
# Firms	1398	1481	1788	2393	2842	3114	3447	3864	3923	4252	5709	5927
# Crashed Firms	232	218	262	354	359	458	427	624	516	506	746	795
% 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	6464	7287	8986	9923	11,153	12,605	12,470	12,752	13,848	15,106	15,655	15,217
# Crashed Firms	999	866	1270	1433	1653	1698	2130	1288	1586	2025	1996	1825
% 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 Correlation Matrix

This table presents summary statistics and correlation matrix for the sample firms across 42 countries from 1990 to 2013. Panel A reports the summary statistics of firm- and country-level variables. Panel B reports correlation matrix, where bold values indicate that the correlation is statistically significant at the 1% level. Panel C reports summary statistics of crash-risk variables in high- and low-individualism subsamples, where *** denotes statistical significance at the 1% level. The high- (low-) individualism subsample contains firms located in countries with above- (below-) median individualism index. The country-average crash risk is calculated as either equal-weighted or value-weighted. Variable definitions are provided in Appendix A.1.

Panel A: Summary Statistics

	N	Mean	Std. Dev.	Min.	25%	Median	75%	Max.
Crash-Risk Variables								
$NCSKEW_{t+1}$	181,604	-0.155	0.741	-6.594	-0.549	-0.158	0.224	6.720
$DUVOL_{t+1}$	181,604	-0.091	0.357	-2.419	-0.322	-0.097	0.132	3.017
$COUNT_{t+1}$	181,604	-0.077	0.583	-3.000	0.000	0.000	0.000	3.000
Individualism Index								
IDV	181,604	0.629	0.275	0.140	0.460	0.710	0.910	0.910
Control Variables								
$NCSKEW_t$	181,604	-0.148	0.714	-6.594	-0.538	-0.158	0.216	6.720
$SIGMA_t$	181,604	0.051	0.026	0.014	0.032	0.045	0.064	0.138
RET_t	181,604	-0.162	0.173	-0.922	-0.204	-0.099	-0.050	-0.010
$DTURN_t$	181,604	0.000	0.006	-0.034	-0.001	0.000	0.001	0.028
$ACCM_t$	181,604	0.858	1.614	0.061	0.234	0.388	0.711	11.650
LEV_t	181,604	0.211	0.180	0.000	0.042	0.188	0.334	0.696
ROA_t	181,604	0.017	0.157	-0.825	0.005	0.042	0.084	0.311
MTB_t	181,604	2.305	2.729	0.230	0.852	1.475	2.604	18.300
$SIZE_t$	181,604	12.220	1.979	8.120	10.760	12.090	13.570	17.080
GDP_t	181,604	10.140	0.903	6.206	10.250	10.470	10.590	11.120
$GDPG_t$	181,604	0.025	0.028	-0.131	0.013	0.026	0.040	0.152
$MCAP_t$	181,604	1.094	0.700	0.057	0.673	1.022	1.314	6.060
$STKTURN_t$	181,604	1.211	0.720	0.038	0.699	1.105	1.464	4.974
ANTID	181,604	3.849	0.845	1.000	3.000	4.000	4.500	5.000
CR	181,604	1.931	1.030	0.000	1.000	2.000	3.000	4.000

Panel B: Correlation Matrix

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
[1]	$NCSKEW_{t+1}$	**1.00**																		
[2]	$DUVOL_{t+1}$	**0.95**	**1.00**																	
[3]	$COUNT_{t+1}$	**0.75**	**0.68**	**1.00**																
[4]	*IDV*	**0.11**	**0.11**	**0.09**	**1.00**															
[5]	$NCSKEW_t$	**0.06**	**0.07**	**0.05**	**0.12**	**1.00**														
[6]	$SIGMA_t$	**0.01**	0.00	**0.02**	**0.14**	**0.04**	**1.00**													
[7]	RET_t	**-0.02**	**-0.01**	**-0.03**	**-0.15**	**-0.04**	**-0.97**	**1.00**												
[8]	$DTURN_t$	**0.01**	**0.01**	**0.01**	**0.02**	**-0.02**	**0.10**	**-0.11**	**1.00**											
[9]	$ACCM_t$	**0.04**	**0.04**	**0.03**	**0.24**	**0.04**	**0.22**	**-0.22**	0.00	**1.00**										
[10]	LEV_t	**-0.01**	0.00	**-0.01**	**-0.10**	0.00	-0.01	**0.01**	**0.02**	**-0.05**	**1.00**									
[11]	ROA_t	0.00	0.00	0.00	**-0.11**	**-0.03**	**-0.42**	**0.43**	**-0.01**	**-0.14**	**0.01**	**1.00**								
[12]	MTB_t	**0.07**	**0.07**	**0.06**	**0.23**	0.00	**0.12**	**-0.13**	0.00	**0.15**	**-0.01**	**-0.15**	**1.00**							
[13]	$SIZE_t$	**0.11**	**0.12**	**0.08**	**0.17**	**0.08**	**-0.43**	**0.40**	**-0.01**	**-0.03**	**0.04**	**0.30**	**0.22**	**1.00**						
[14]	GDP_t	**0.08**	**0.09**	**0.06**	**0.50**	**0.09**	**0.05**	**-0.07**	**0.03**	**0.11**	**-0.10**	**-0.15**	**0.08**	**0.15**	**1.00**					
[15]	$GDPG_t$	0.01	**0.01**	0.00	**-0.18**	**-0.05**	**-0.05**	**0.05**	**-0.02**	**-0.03**	**0.01**	**0.10**	**0.05**	**-0.02**	**-0.39**	**1.00**				
[16]	$MCAP_t$	**0.02**	**0.02**	**0.01**	**-0.07**	**-0.02**	**0.09**	**-0.09**	**0.02**	**0.08**	**-0.10**	**-0.02**	**0.07**	**0.01**	**0.13**	**0.20**	**1.00**			
[17]	$STKTURN_t$	**0.04**	**0.04**	**0.04**	**0.17**	**0.07**	**0.23**	**-0.22**	**-0.02**	**0.25**	**-0.05**	**-0.09**	**0.04**	-0.01	**0.23**	**-0.19**	**0.01**	**1.00**		
[18]	*ANTID*	**-0.06**	**-0.05**	**-0.05**	**-0.42**	**-0.06**	**-0.12**	**0.12**	**0.02**	**-0.21**	**0.02**	**0.05**	**-0.13**	**-0.12**	**-0.29**	**0.06**	**0.14**	**-0.30**	**1.00**	
[19]	*CR*	**-0.06**	**-0.06**	**-0.05**	**-0.35**	**-0.06**	**-0.07**	**0.08**	0.00	**-0.16**	**-0.02**	**0.03**	**-0.09**	**-0.15**	**-0.14**	**0.09**	**0.28**	**-0.15**	**0.70**	**1.00**

Panel C: High and Low Individualism Subsamples

	High Individualism				Low Individualism				Difference in	Difference in median
	N	Mean	Median	Std. Dev.	N	Mean	Median	Std. Dev.	mean (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***
Equal-Weighted Country-Average Crash Risk										
NCSKEW	377	-0.138	-0.135	0.177	368	-0.230	-0.243	0.236	6.06***	6.80***
DUVOL	377	-0.083	-0.087	0.097	368	-0.127	-0.137	0.128	5.35***	6.33***
COUNT	377	-0.064	-0.062	0.126	368	-0.121	-0.129	0.154	5.60***	6.07***
Value-Weighted Country-Average Crash Risk										
NCSKEW	377	-0.062	-0.053	0.187	368	-0.153	-0.156	0.269	5.40***	6.61***
DUVOL	377	-0.041	-0.039	0.105	368	-0.086	-0.092	0.142	4.88***	5.89***
COUNT	377	-0.023	-0.010	0.154	368	-0.090	-0.060	0.206	5.05***	6.05***

Table 3: The Impact of Individualism on Crash Risk

This table presents OLS regression results for the impact of individualism on crash risk. All time-varying control variables are lagged by one year relative to the dependent variable. Intercepts are included but not reported. Variable definitions are provided in Appendix A.1. 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.

	NCSKEW	***DUVOL***	***COUNT***
	[1]	[2]	[3]
IDV	0.158***	0.076***	0.103***
	[16.69]	[16.82]	[14.53]
NCSKEW	0.046***	0.023***	0.024***
	[13.19]	[14.95]	[10.78]
SIGMA	-0.069	-0.509***	-0.109
	[-0.22]	[-3.44]	[-0.49]
RET	-0.236***	-0.166***	-0.178***
	[-5.53]	[-7.85]	[-5.67]
DTURN	0.545**	0.354***	0.236
	[2.22]	[2.92]	[1.16]
ACCM	0.004***	0.002***	0.002*
	[2.91]	[3.01]	[1.82]
LEV	0.005	0.004	-0.006
	[0.45]	[0.71]	[-0.71]
ROA	0.013	0.003	0.024**
	[0.97]	[0.44]	[2.28]
MTB	0.006***	0.003***	0.004***
	[7.90]	[8.01]	[6.12]
SIZE	0.040***	0.019***	0.024***
	[31.48]	[32.39]	[25.37]
GDP	0.028***	0.016***	0.015***
	[10.16]	[11.31]	[7.23]
GDPG	0.421***	0.190***	0.353***
	[4.35]	[3.94]	[4.62]
MCAP	-0.002	-0.003**	0.002
	[-0.66]	[-2.07]	[0.70]
STKTURN	0.014***	0.008***	0.009***
	[4.39]	[5.02]	[3.56]
ANTID	0.026***	0.014***	0.016***
	[8.41]	[8.70]	[6.50]
CR	-0.020***	-0.009***	-0.016***
	[-7.45]	[-7.11]	[-7.61]
Industry-fixed effect	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes
Adj. R^2	0.038	0.043	0.021
N	181,604	181,604	181,604

Table 4: The Impact of Individualism on Crash Risk: Instrumental-Variable Approach
This table presents 2SLS regression results for the impact of individualism on crash risk. The instrumental variables include the genetic distance between a given country and the U.S. (*Genetic_Distance*) and the grammatical rule on pronoun drop (*Pronoun_Drop*). Variable definitions are provided in Appendix A.1. 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***		
	IDV	***NCSKEW***	***DUVOL***	***COUNT***
	[1]	[2]	[3]	[4]
Panel A: Genetic Distance				
$\widehat{IDV}$		0.127***	0.058***	0.089***
		[11.25]	[10.79]	[10.47]
Genetic_Distance	-0.045***			
	[-175.83]			
Controls	Yes	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes	Yes
Adj. R^2	0.860	0.038	0.042	0.021
N	181,604	181,604	181,604	181,604
Panel B: Pronoun Drop				
$\widehat{IDV}$		0.133***	0.063***	0.092***
		[11.97]	[11.79]	[10.96]
Pronoun_Drop	-0.461***			
	[-192.32]			
Controls	Yes	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes	Yes
Adj. R^2	0.864	0.038	0.043	0.021
N	181,604	181,604	181,604	181,604
Panel C: Genetic Distance and Pronoun Drop				
$\widehat{IDV}$		0.130***	0.061***	0.090***
		[12.07]	[11.81]	[11.16]
Genetic_Distance	-0.024***			
	[-45.84]			
Pronoun_Drop	-0.260***			
	[-44.21]			
Controls	Yes	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes	Yes
Adj. R^2	0.899	0.038	0.043	0.021
N	181,604	181,604	181,604	181,604

Table 5: The Impact of Individualism on Crash Risk: Additional Country-Level Controls

This table presents regression results for the impact of individualism on crash risk with additional country-level variables as controls. The additional control variables are Hofstede's other cultural dimensions (*IDV*, *PDI*, *MAS*, and *UAI*), dominant religions (*Catholicism*, *Protestantism, Orthodox, Islam,* and *Buddhism*), legal origins (*English, French, German,* and *Scandinavian*), governance quality (*Governance*), and stock price limit rule (*Price_Limit*) in Panels A-E, respectively. Baseline control variables, industry-fixed effects, and year-fixed effects are included in all regressions but suppressed for brevity. Variable definitions are provided in Appendix A.1. 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.

	NCSKEW	***DUVOL***	***COUNT***
	[1]	[2]	[3]
Panel A: Hofstede's Other Cultural Dimensions			
IDV	0.129***	0.066***	0.074***
	[8.59]	[9.01]	[6.48]
PDI	-0.055***	-0.019*	-0.054***
	[-2.67]	[-1.82]	[-3.25]
MAS	0.086***	0.046***	0.046***
	[6.82]	[7.37]	[4.52]
UAI	-0.023	-0.008	-0.022*
	[-1.47]	[-1.08]	[-1.80]
Adj. R^2	0.038	0.043	0.022
N	181604	181604	181604
Panel B: Religions			
IDV	0.236***	0.119***	0.120***
	[11.03]	[11.33]	[7.16]
Catholicism	-0.042***	-0.019***	-0.045***
	[-3.17]	[-2.85]	[-4.45]
Protestantism	0.005	0.004	-0.011
	[0.35]	[0.63]	[-1.05]
Orthodox	0.055**	0.032***	-0.003
	[2.36]	[2.82]	[-0.16]
Islam	0.017	0.012**	-0.013
	[1.34]	[2.01]	[-1.35]
Buddhism	0.049***	0.028***	-0.001
	[3.77]	[4.34]	[-0.07]
Adj. R^2	0.038	0.043	0.022
N	181604	181604	181604
Panel C: Legal Origins			
IDV	0.128***	0.063***	0.083***
	[8.54]	[8.63]	[7.27]
English	-0.042**	-0.027***	-0.016
	[-2.05]	[-2.60]	[-0.92]
French	-0.138***	-0.073***	-0.073***
	[-6.79]	[-7.15]	[-4.26]
German	-0.057***	-0.033***	-0.026
	[-2.73]	[-3.14]	[-1.50]
Scandinavian	-0.076***	-0.045***	-0.022
	[-3.36]	[-3.95]	[-1.16]
Adj. R^2	0.039	0.043	0.022
N	181604	181604	181604
Panel D: Governance Quality			
IDV	0.185***	0.093***	0.110***
	[16.01]	[16.66]	[12.79]
Governance	-0.022***	-0.014***	-0.006
	[-4.28]	[-5.29]	[-1.57]
Adj. R2	0.038	0.043	0.021
N	181604	181604	181604
Panel E: Stock Price Limit Rule			
IDV	0.143***	0.074***	0.084***
	[11.45]	[12.00]	[8.79]
Price_Limit	-0.012*	-0.002	-0.015***
	[-1.69]	[-0.49]	[-2.80]
Adj. R^2	0.038	0.043	0.021
N	181604	181604	181604

Table 6: The Impact of Individualism on Crash Risk: Robustness Tests

This table presents regression results for the impact of individualism on crash risk based on a variety of robustness tests. In Panel A, we examine the baseline regressions by using alternative individualism indexes, including TK individualism (*TK_IDV*) from Tang and Koveos (2008), GLOBE individualism (*GLOBE_IDV*) from House et al. (2004), and WVS Individualism (*WVS_IDV*) from the World Values Survey. In Panel B, we examine the baseline regressions using alternative samples, including the sample excluding the U.S. (and Japan), and balanced panels that consist of continuously listed firms in 2004-2013, 2004-2007, and 2010-2013, respectively. In Panel C, we adopt alternative model specifications, including weighted-least-squares regressions, Fama-MacBeth regressions, adjusting firm-level continuous variables by within-country medians, hierarchical linear model, alternative clustering methods for standard errors, and country-level regressions. All regressions include control variables and industry- and year-fixed effects, but their coefficients are suppressed. Only the coefficient estimates of *IDV* are reported to conserve space. Variable definitions are provided in Appendix A.1. The t-statistics based on cluster-robust standard errors are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	NCSKEW	***DUVOL***	***COUNT***
	[1]	[2]	[3]
Panel A: Alternative Individualism Indexes			
TK_IDV	0.267***	0.128***	0.165***
	[14.74]	[14.64]	[12.01]
GLOBE_IDV	0.102***	0.050***	0.069***
	[15.05]	[14.89]	[12.71]
WVS_IDV	0.157***	0.068***	0.076*
	[3.00]	[2.59]	[1.83]
Panel B: Alternative Samples			
Exclude the U.S.	0.112***	0.052***	0.073***
	[9.69]	[9.32]	[8.48]
Exclude the U.S. and Japan	0.143***	0.069***	0.089***
	[11.25]	[11.12]	[9.27]
Balanced Panel 2004−2013	0.159***	0.077***	0.100***
	[8.05]	[8.02]	[6.61]
Balanced Panel 2004−2007	0.174***	0.081***	0.108***
	[6.99]	[6.70]	[5.54]
Balanced Panel 2010−2013	0.167***	0.079***	0.104***
	[8.73]	[8.60]	[7.21]
Panel C: Alternative Model Specifications			
Weighted Least Squares	0.178***	0.090***	0.095***
	[9.31]	[9.21]	[6.32]
Fama-MacBeth	0.129***	0.061***	0.080***
	[3.72]	[3.21]	[3.75]
Within-Country Median Adjustment	0.068***	0.012***	0.135***
	[7.54]	[2.85]	[19.40]
Hierarchical Linear Model	0.168***	0.090***	0.099***
	[3.87]	[3.70]	[3.63]
Clustering at Country-Level	0.158***	0.076***	0.103***
	[6.86]	[6.10]	[5.35]
Clustering at Year-Level	0.158***	0.076***	0.103***
	[6.13]	[5.46]	[6.32]
Two-Way Clustering by Country and Year	0.158***	0.076***	0.103***
	[7.39]	[6.56]	[5.52]
Two-Way Clustering by Firm and Year	0.158***	0.076***	0.103***
	[6.21]	[5.54]	[6.42]
Equal-Weighted Country-Level Regressions	0.106*	0.044	0.100**
	[1.97]	[1.42]	[2.68]
Value-Weighted Country-Level Regressions	0.154***	0.071***	0.121***
	[3.90]	[2.98]	[3.47]

Table 7: The Impact of Individualism on Crash Risk: Institutional Ownership

This table presents the joint impact of individualism and institutional ownership on crash risk. High (Low) institutional ownership (*High_IO* (*Low_IO*)) takes the value of 1 if a firm is in the top (bottom) quartile of institutional ownership for a country-year, and 0 otherwise. High (Low) domestic (*High_DIO* (*Low_DIO*)) and foreign institutional ownership (*High_FIO* (*Low_FIO*)) are constructed analogously based on the ranking of domestic and foreign institutional ownership, respectively. Significance tests for the difference between the coefficients on interaction terms are presented at the bottom of each panel. Variable definitions are provided in Appendix A.1. 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.

	NCSKEW	***DUVOL***	***COUNT***
	[1]	[2]	[3]
Panel A: Institutional Ownership			
IDV × High_IO	0.029***	0.012***	0.018**
	[2.93]	[2.65]	[2.35]
IDV × Low_IO	0.010	0.008*	0.011
	[1.05]	[1.76]	[1.41]
Controls	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes
Adj. R^2	0.042	0.047	0.022
N	116,092	116,092	116,092
Coefficient difference	0.019	0.004	0.008
	[1.36]	[0.61]	[0.71]
Panel B: Domestic Institutional Ownership			
IDV × High_DIO	0.027***	0.011***	0.016**
	[2.90]	[2.62]	[2.20]
IDV × Low_DIO	0.025***	0.016***	0.020***
	[2.66]	[3.52]	[2.69]
Controls	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes
Adj. R^2	0.041	0.047	0.022
N	116,092	116,092	116,092
Coefficient difference	0.002	-0.005	-0.004
	[0.14]	[-0.76]	[-0.40]
Panel C: Foreign Institutional Ownership			
IDV × High_FIO	0.045***	0.020***	0.024***
	[4.45]	[4.33]	[3.00]
IDV × Low_FIO	-0.012	-0.002	-0.007
	[-1.37]	[-0.40]	[-0.96]
Controls	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes
Adj. R^2	0.039	0.045	0.021
N	116,092	116,092	116,092
Coefficient difference	0.057***	0.022***	0.031***
	[4.33]	[3.50]	[2.94]

Table 8: The Impact of Individualism on Crash Risk: Managerial Discretion

This table presents the joint impact of individualism and managerial discretion over information disclosure on crash risk. We use firm size (*Size*) and analyst coverage (*Analyst*) to measure the degree to which managers exercise discretion over the disclosure of information. High (Low) firm size (*High_Size* (*Low_Size*)) takes the value of 1 if a firm is in the top (bottom) quartile of firm size for a country-year, and 0 otherwise. High (Low) analyst coverage (*High_Analyst* (*Low_Analyst*)) takes the value of 1 if a firm is in the top (bottom) quartile of analyst coverage for a country-year, and 0 otherwise. Significance tests for the difference between the coefficients on interaction terms are presented at the bottom of each panel. Variable definitions are provided in Appendix A.1. 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.

	NCSKEW	***DUVOL***	***COUNT***
	[1]	[2]	[3]
Panel A: Firm Size			
IDV × High_Size	0.051***	0.025***	0.031***
	[5.92]	[6.30]	[4.58]
IDV × Low_Size	0.011	0.013***	-0.001
	[1.27]	[3.30]	[-0.16]
Controls	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes
Adj. R^2	0.036	0.041	0.020
N	181,604	181,604	181,604
Coefficient difference	0.040***	0.012*	0.032***
	[3.04]	[1.90]	[3.05]
Panel B: Analyst Coverage			
IDV × High_Analyst	0.027***	0.012***	0.017**
	[3.05]	[2.83]	[2.32]
IDV × Low_Analyst	-0.074***	-0.021***	-0.044***
	[-6.41]	[-4.05]	[-5.50]
Controls	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes
Adj. R^2	0.038	0.043	0.021
N	181,604	181,604	181,604
Coefficient difference	0.101***	0.033***	0.061***
	[6.86]	[4.86]	[5.58]

Table 9: The Impact of Individualism on Crash Risk: Firm Growth

This table presents the joint impact of individualism and firm growth on crash risk. We use market-to-book ratio (*MTB*) and sales growth (*Sales*) as proxies for firm growth. High (Low) market-to-book ratio (*High_MTB* (*Low_MTB*)) takes the value of 1 if a firm is in the top (bottom) quartile of market-to-book ratio for a country-year, and 0 otherwise. High (Low) sales growth (*High_Sales* (*Low_Sales*)) takes the value of 1 if a firm is in the top (bottom) quartile of sales growth for a country-year, and 0 otherwise. Significance tests for the difference between the coefficients on interaction terms are presented at the bottom of each panel. Variable definitions are provided in Appendix A.1. 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.

	NCSKEW	***DUVOL***	***COUNT***
	[1]	[2]	[3]
Panel A: Market-to-Book Ratio			
IDV × High_MTB	0.053***	0.023***	0.032***
	[6.30]	[5.84]	[4.93]
IDV × Low_MTB	-0.016**	-0.006*	-0.010*
	[-2.29]	[-1.81]	[-1.94]
Controls	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes
Adj. R^2	0.036	0.041	0.020
N	181,604	181,604	181,604
Coefficient difference	0.069***	0.029***	0.043***
	[6.49]	[5.80]	[5.22]
Panel B: Sales Growth			
IDV × High_Sales	0.079***	0.039***	0.049***
	[10.39]	[10.92]	[8.12]
IDV × Low_Sales	0.012*	0.008**	0.006
	[1.66]	[2.40]	[1.08]
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	178,949	178,949	178,949
Coefficient difference	0.067***	0.031***	0.043***
	[6.77]	[6.60]	[5.48]

Table 10: The Impact of Individualism on Crash Risk: Country Openness

This table presents the joint impact of individualism and country openness on crash risk. In Panel A, a country is classified as open or closed based on whether or not it is open to international trade. *Trade_Open* takes the value of 1 if a country is open to international trade, and 0 otherwise. In Panel B, sample countries are ranked based on stock market liberalization index. *High (Low)_Liberalization* takes the value of 1 if a country's stock market liberalization index is above (below) the sample median in a given year, and 0 otherwise. Significance tests for the difference between the coefficients on interaction terms are presented at the bottom of each panel. Variable definitions are provided in Appendix A.1. 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.

	NCSKEW	***DUVOL***	***COUNT***
	[1]	[2]	[3]
Panel A: Trade Openness			
IDV × Trade_Open (Yes)	0.162***	0.081***	0.099***
	[15.29]	[15.87]	[12.54]
IDV × Trade_Open (No)	-0.112	-0.072	-0.100
	[-1.14]	[-1.41]	[-1.39]
Controls	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes
Adj. R^2	0.038	0.043	0.021
N	181,604	181,604	181,604
Coefficient difference	0.274***	0.153***	0.199***
	[2.76]	[2.96]	[2.74]
Panel B: Stock Market Liberalization			
IDV × High_Liberalization	0.093***	0.043***	0.061***
	[7.06]	[6.66]	[6.11]
IDV × Low_Liberalization	0.026	0.011	0.018
	[1.27]	[1.08]	[1.08]
Controls	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes
Adj. R^2	0.035	0.039	0.020
N	166,433	166,433	166,433
Coefficient difference	0.067***	0.031***	0.043**
	[2.97]	[2.76]	[2.44]

Table 11: The Impact of Individualism on Crash Risk: Macro Information Transparency

This table presents the joint impact of individualism and macro information transparency on crash risk. The macro information transparency measures include the advanced economy indicator (*ADV_Econ*), future earnings response coefficient (*FERC*), coefficient of probability of informed trading (*PIN*), financial transparency index (*FINTRA*), and governance transparency index (*GOVTRA*). *ADV_Econ* takes the value of 1 if a country is an advanced economy, and 0 otherwise. *High (Low)_FERC* takes the value of 1 if the *FERC* of a country is above (below) the sample median in a given year, and 0 otherwise. *High (Low)_PIN*, *High (Low)_FINTRA*, and *High (Low)_GOVTRA* are dummy variables constructed analogously. Significance tests for the difference between the coefficients on interaction terms are presented at the bottom of each panel. Variable definitions are provided in Appendix A.1. 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.

	NCSKEW [1]	***DUVOL*** [2]	***COUNT*** [3]		***NCSKEW*** [1]	***DUVOL*** [2]	***COUNT*** [3]
Panel A: Advanced Economy				**Panel B: FERC**			
IDV × Adv_Econ (Yes)	0.141***	0.067***	0.093***	*IDV × High_FERC*	0.142***	0.068***	0.092***
	[13.50]	[13.50]	[11.94]		[14.76]	[14.87]	[12.78]
IDV × Adv_Econ (No)	0.236***	0.102***	0.163***	*IDV × Low_FERC*	0.183***	0.093***	0.119***
	[7.26]	[6.20]	[6.36]		[13.67]	[14.23]	[11.12]
Controls	Yes	Yes	Yes	*Controls*	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes	*Industry-fixed effect*	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes	*Year-fixed effect*	Yes	Yes	Yes
Adj. R^2	0.038	0.043	0.021	*Adj. R^2*	0.038	0.043	0.022
N	181,604	181,604	181,604	*N*	180,629	180,629	180,629
Coefficient difference	-0.096***	-0.035**	-0.070**	*Coefficient difference*	-0.041***	-0.025***	-0.027***
	[-2.78]	[-2.02]	[-2.57]		[-3.78]	[-4.72]	[-3.15]
Panel C: PIN				**Panel D: Financial Transparency**			
IDV × High_PIN	0.204***	0.100***	0.141***	*IDV × High_FINTRA*	0.131***	0.056***	0.085***
	[16.70]	[16.43]	[14.98]		[9.70]	[8.78]	[8.60]
IDV × Low_PIN	0.124***	0.059***	0.081***	*IDV × Low_FINTRA*	0.240***	0.119***	0.149***
	[12.70]	[12.78]	[11.02]		[12.08]	[11.85]	[9.64]
Controls	Yes	Yes	Yes	*Controls*	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes	*Industry-fixed effect*	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes	*Year-fixed effect*	Yes	Yes	Yes
Adj. R^2	0.038	0.043	0.021	*Adj. R^2*	0.035	0.040	0.020
N	181,604	181,604	181,604	*N*	170,187	170,187	170,187
Coefficient difference	0.080***	0.041***	0.061***	*Coefficient difference*	-0.109***	-0.063***	-0.063***
	[6.55]	[6.76]	[6.53]		[-5.69]	[-6.42]	[-4.23]
Panel E: Governance Transparency							
IDV × High_GOVTRA	0.110***	0.050***	0.065***				
	[7.72]	[7.24]	[6.10]				
IDV × Low_GOVTRA	0.144***	0.070***	0.083***				
	[11.62]	[11.84]	[8.80]				
Controls	Yes	Yes	Yes				
Industry-fixed effect	Yes	Yes	Yes				
Year-fixed effect	Yes	Yes	Yes				
Adj. R^2	0.035	0.039	0.020				
N	170,187	170,187	170,187				
Coefficient difference	-0.034**	-0.020***	-0.018*				
	[-2.57]	[-3.15]	[-1.71]				

Table 12: The Impact of Individualism on Crash Risk: Global Financial Crisis and IFRS Adoption

This table presents the impact of global financial crisis (Panel A) and IFRS adoption (Panel B) on the relation between individualism and crash risk. *Crisis* is a dummy variable indicating the global financial crisis period of 2008–2009. *Post_Crisis* is a dummy variable indicating the post-crisis period of 2010–2013. *IFRS* is equal to 1 if a firm follows the full set of international standards or IFRS in a given year, and 0 otherwise. Variable definitions are provided in Appendix A.1. 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.

	NCSKEW [1]	***DUVOL*** [2]	***COUNT*** [3]
Panel A: Global Financial Crisis			
IDV	0.150***	0.070***	0.104***
	[12.68]	[12.28]	[11.59]
IDV × Crisis	0.069***	0.040***	0.037**
	[3.78]	[4.40]	[2.46]
IDV × Post_Crisis	-0.005	0.001	-0.019
	[-0.33]	[0.20]	[-1.63]
Crisis	0.051**	0.028**	0.025
	[2.25]	[2.56]	[1.37]
Post _Crisis	-0.099***	-0.060***	-0.032*
	[-4.45]	[-5.62]	[-1.79]
Controls	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes
Adj. R^2	0.038	0.043	0.021
N	181,604	181,604	181,604
Panel B: IFRS Adoption			
1990–2013			
IDV	0.193***	0.090***	0.127***
	[17.44]	[17.22]	[15.45]
IDV × IFRS	-0.034*	-0.010	-0.048***
	[-1.75]	[-1.11]	[-3.17]
IFRS	0.000	-0.004	0.018*
	[0.03]	[-0.60]	[1.89]
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	0.227***	0.109***	0.145***
	[16.26]	[17.04]	[14.48]
IDV × IFRS	-0.069***	-0.030***	-0.067***
	[-3.30]	[-3.02]	[-4.16]
IFRS	0.017	0.005	0.028***
	[1.35]	[0.88]	[2.76]
Controls	Yes	Yes	Yes
Industry-fixed effect	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes
Adj. R^2	0.042	0.046	0.022
N	131,781	131,781	131,781