



Dynamic cultures, dynamic responses: The impact on corporate cash holdings amid uncertainty

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ABSTRACT

Article History

Received: 7 February 2024

Revised: 30 May 2024

Accepted: 17 June 2024

Published: 6 August 2024

Keywords

Corporate cash holdings

Economic uncertainty

National culture change.

This study investigates the changes in national culture, economic uncertainty, and their joint effects on corporate cash holdings across 58 countries over the period 2004 to 2020. The study also delves into the importance of national culture in amplifying the impact of economic uncertainty in influencing corporate cash holdings. Drawing on three national cultural dimensions, trust-distrust, collectivism-individualism, and duty-joy orientation-based on the European Value Survey (EVS) and World Value Survey (WVS), we employ a panel data model with a fixed effect approach and incorporate the lag of the independent variable to mitigate potential endogeneity issues. Our findings show that transitions in national culture from collectivism to individualism do not significantly decrease corporate cash holdings. Moreover, a cultural shift from distrust to trust does not result in a decrease in corporate cash holdings. Conversely, a move towards a short-term orientation motivates firms to reduce their cash holdings. The interaction between economic uncertainty and collectivism and individualism tends to increase corporate cash holdings. However, there is no difference in the impacts of the three cultural dimensions for financially constrained and unconstrained firms on corporate cash holdings. This study offers significant practical implications, particularly for policymakers in countries where they have strong collectivistic national culture, which may amplify the effects of economic uncertainty.

Contribution/Originality: To delve into the effects of national culture on corporate cash holdings, we use dynamic cultural dimensions based on EVS and WVS to contrast with our predecessors' studies that used Hofstede's static cultural dimensions. We also observe the joint effect of economic uncertainty and the dynamic national culture on corporate cash holdings.

1. INTRODUCTION

Economic uncertainty¹ and cash holdings have been studied in various research studies over the past years. Phan, Nguyen, Nguyen, and Hegde (2019); Goodell et al. (2021) and Kang and Kim (2024) find that uncertainty

¹Economic uncertainty has been shown to influence a firm's financial decision on investment (Bolton, Wang, & Yang, 2019; Kim, Choi, & Choi, 2022; Neamtii, Shroff, White, & Williams, 2014) cash holdings (Goodell, Goyal, & Urquhart, 2021; Im, Park, & Zhao, 2017) capital structure (Im, Faff, & Ha, 2022) dividend payment (Attig, El Ghoul, Guedhami, & Zheng, 2021; Buchanan, Cao, Liljebloom, & Wehrich, 2017) cost of capital (Drobtz, El Ghoul, Guedhami, & Janzen, 2018) corporate

increases cash holdings, while Javadi, Mollagholamali, Nejadmalayeri, and Al-Thaqeb (2021) find that uncertainty decreases cash holdings. The disparity in these findings motivates this research to investigate national cultural dimensions as a potential factor for these conflicting results. Chen, Dou, Rhee, Truong, and Veeraraghavan (2015); Alipour and Yaprak (2024) and Aram and Nejadmalayeri (2023) discover national cultural dimensions are associated with the differences in the level of cash holdings. How a company reacts to economic uncertainty in their cash holdings is driven by national culture.

Culture plays a significant role in shaping managers' decision-making processes², acting as the "software of the mind" (Hofstede, Hofstede, & Minkov, 2005). It influences how individuals perceive and interpret various aspects of their financial contract environments. As an unofficial guideline, culture configures the norms, values, and expectations that inform managerial choices (Zheng et al., 2012). Thus, culture will also guide managers in navigating financial decision-making, shaping their risk preferences, and their attitudes toward facing uncertainty. By understanding the impact of culture on decision-making processes, this study aims to investigate how cultural factors shape cash holding decisions in the presence of economic uncertainty.

This study poses the following research questions: How do dynamic national cultural dimensions influence the relationship between economic uncertainty and corporate cash holdings? And, to what extent can national culture either amplify or mitigate the effects of economic uncertainty on corporate cash management strategies? Understanding the intricate interplay between economic uncertainty, national culture, and corporate financial decisions is crucial. Despite culture's recognized significance in shaping managerial decision-making, its impact on corporate responses to economic uncertainty, particularly in the realm of cash holdings, remains insufficiently explored. By examining the dynamic aspects of culture and its interaction with economic uncertainty, this study aims to provide a more nuanced understanding of corporate cash holding behaviors across diverse cultural contexts.

This study contributes to literature in several ways. Firstly, this study uses dynamic cultural dimensions to contrast with predecessors' studies that use Hofstede's static cultural dimensions (Chang & Noorbakhsh, 2009; Chen et al., 2015; El-Halaby, Abdelrasheed, & Hussainey, 2021; Fernandes & Gonenc, 2016; Orlova, Rao, & Kang, 2017). Beugelsdijk and Welzel (2018) have criticized Hofstede's cultural dimensions for presuming a string perception of the stable nature of national cultures. Each national culture's 'software of the mind' changes as computer software experiences upgrading. Socioeconomic development, such as modernization and generational replacement, is the significant driving force behind cultural shifts (Inglehart & Welzel, 2005). Even though cultural shifts in the national culture tend to move in the same direction, the changes may diversify or converge according to the country-specific historical path (Beugelsdijk & Welzel, 2018; Ronald Inglehart & Baker, 2000). Secondly, we observe the joint effect of economic uncertainty and the dynamic national culture. Economic uncertainty is the inability to know the probability distribution of future events (Baker, Bloom, & Davis, 2016) that can increase a firm's financial constraints. Additionally, national culture can intensify or mitigate the effects of the economic uncertainty on corporate cash holdings. Thirdly, it is important to note that the Hofstede's national culture data only covers 40 countries, while the European Value Survey (EVS) and World Value Survey (WVS) provide a larger

risk-taking (Zhang, Yang, & Liu, 2021) CEO incentives (Chatjuthamard, Wongboonsin, Kongsompong, & Jiraporn, 2020) and acquisitions (Bonaime, Gulen, & Ion, 2018).

² Cultural traits have been found to be an influential driver in investment (Bottazzi, Da Rin, & Hellmann, 2016; Shao, Kwok, & Zhang, 2013) corporate cash holdings (Chang & Noorbakhsh, 2009; Chen et al., 2015; Fernandes & Gonenc, 2016) capital structure (Chui, Kwok, & Zhou, 2016; Mogha & Williams, 2021) peer-to-peer lending (Hasan, He, & Lu, 2022) dividend payout (Naeem & Khurram, 2020; Shao, Kwok, & Guedhami, 2010) cost of debt (Chui et al., 2016) debt maturity (Zheng, El Ghouli, Guedhami, & Kwok, 2012) corporate risk taking (Li, Griffin, Yue, & Zhao, 2013; Shair, Sun, Shaorong, Atta, & Hussain, 2019) Initial Public Offering (IPO) underpricing (Li, Wang, & Wang, 2019) acquisitions (Ahern, Daminelli, & Fracassi, 2015) earnings management (Desender, Castro, & De Leon, 2011) earnings forecasts (Guan, Lobo, Tsang, & Xin, 2020) effectiveness of corporate governance (Frijns, Dodd, & Cimerova, 2016; Kanagaretnam & Sarkar, 2011) innovations (Boubakri, Chkir, Saadi, & Zhu, 2021) and firm performance (Boubakri, Mirzaei, & Samet, 2017).

dataset that includes more countries. This study acknowledges the broader coverage and diversity offered by the EVS and WVS datasets.

We organize the remainder of the paper as follows: Section 2 provides a brief literature review and hypotheses development. In Section 3, we present the data sources and methodology used to examine the study hypotheses. Section 4 presents the empirical analysis results. Section 5, we conduct robustness tests. In Section 6, we summarize the main findings and conclude the paper.

2. RELATED LITERATURE AND HYPOTHESIS DEVELOPMENTS

2.1. *Uncertainty and Cash Holdings of the Firm*

Economic uncertainty, a lack of ability to specify the probability of events, leads to increased financing costs, exacerbates financial market frictions, and negatively impacts the firm's stability. For example, previous studies (Çolak, Gungoraydinoglu, & Öztekin, 2018; Gungoraydinoglu, Çolak, & Öztekin, 2017; Kaviani, Kryzanowski, Maleki, & Savor, 2020) give empirical evidence that when political and economic uncertainty is high, external funding costs become expensive. Furthermore, uncertainty increases the value of waiting for real options (Nicholas Bloom, 2009; Nick Bloom, Bond, & Van Reenen, 2007) and drives managers to seek additional information for investment decisions. Due to the high degree of cautiousness (Im et al., 2017) managers facing uncertainty hoard cash holdings to take delayed investments at the proper time (Goodell et al., 2021). Overall, many empirical findings indicate a positive association between economic uncertainty and corporate cash holdings (Duong, Nguyen, Nguyen, & Rhee, 2020; El Ghouli, Guedhami, Mansi, & Wang, 2023; Goodell et al., 2021; Heeney, Yang, Chowdhury, & Tan, 2023; Phan et al., 2019). In contrast, Javadi et al. (2021) suggest that firms would also want to decrease their cash holdings amid high economic policy uncertainty to mitigate agency problems and benefit shareholders, particularly in countries with stronger governance and legal protection.

2.2. *National Culture Change and Cash Holding of the Firm*

National culture affects the firm's financial decisions as an informal impetus (Nash & Patel, 2019) of a socially embedded factor configuring contract environments (Zheng et al., 2012). Chen et al. (2015) highlight that there are two channels through which national culture can influence firm financing decisions. Firstly, national culture can impact managers' views and preferences on risk-taking. National culture also influences investors' views and preferences, resulting in firm decisions that align with their preferences.

Firms in different national cultures motivate managers (Chang & Noorbakhsh, 2009; Chen et al., 2015; Fernandes & Gonenc, 2016) and investors (Orlova et al., 2017), seek heterogenous cash holding policies since each culture evaluates the value of financial flexibility and agency costs of the contracts differently. Moreover, Alipour and Yaprak (2024) show that indulgent-society companies tend to have higher cash holdings because they are more inclined to make risky investments and their managers have fewer moral restrictions.

2.2.1. *Change of Distrust-Trust and Cash Holdings*

The trust dimension (Beugelsdijk & Welzel, 2018) reflects the level of stress and anxiety experienced by individuals in unstructured situations. This dimension is not exactly same as Hofstede's uncertainty avoidance but is closely related. Minkov and Hofstede (2014) mention that uncertainty avoidance refers to interpersonal trust levels among people. Individuals in a culture of low interpersonal trust are cautious in their interactions. In addition, individuals with high uncertainty avoidance perceive the world as hostile and prefer low-risk strategies due to fear of failure (Hofstede, 2001). Firms in low-uncertainty avoidance cultures tend to participate more in innovations compared to those in high uncertainty avoidance cultures (Boubakri et al., 2021). Beugelsdijk and Welzel (2018) demonstrate that national culture has shifted from distrust to trust between 1990 and 2010. It

indicates an increase in a firm's desire to participate in innovation and a decrease in the tendency to avoid uncertainty.

Managers in high-uncertainty-avoiding cultures tend to hoard the firm's cash as a precaution against future cash shortages (Chang & Noorbakhsh, 2009; Chen et al., 2015). Studies conducted by Chang and Noorbakhsh (2009); Chen et al. (2015); Fernandes and Gonenc (2016) and Orlova et al. (2017) find that corporate cash holdings are positively associated with uncertainty avoidance. The shift of the culture from distrust to trust makes firms decrease their cash holdings.

H: Decrease of Distrust (high uncertainty avoidance) negatively affects corporate cash holdings.

2.2.2. Change of Collectivism - Individualism and Cash Holdings

The collectivism-individualism dimension in Beugelsdijk and Welzel (2018) and Hofstede (2001) describes whether cultures prioritize individual or communal goals. Individual cultures value loosely connected social ties, encouraging people to pursue their own goals. In contrast, individuals in collective culture recognize themselves as firmly tied to particular support groups and follow the prevailing values, norms, and duties of particular those support groups. Individualistic cultures replace specific support groups with impartial institutions and universal values, leading individuals to compete for personal goals rather than meeting others' expectations (Hofstede, 2001). Firms in higher individualistic cultures tend to be more actively involved in innovations (Boubakri et al., 2021), often driven by managers' overconfidence in predicting future earnings (Chen et al., 2015). Therefore, managers in individualistic cultures prefer to spend the firm's excess cash than the managers in collective cultures. Shao et al. (2013) point out that long-term investments like R&D are riskier than short-term investments such as cash equivalents. Managers in individual cultures are more willing to take on riskier assets compared to managers in collective cultures (Shao et al., 2013). Consequently, managers in strong individualistic cultures tend to hoard less cash than those in strong collective cultures.

Beugelsdijk and Welzel (2018) point out that national culture has shifted from Collectivism to Individualism between 1990 and 2010. This shift indicates that in a more individualistic culture, managers tend to take more risks and be overconfident. Consequently, they may spend more cash to achieve their individual targets. Previous studies Chen et al. (2015); Fernandes and Gonenc (2016) and Orlova et al. (2017) support the idea that individualism is negatively related to corporate cash holdings. This negative relationship would be stronger in a culture that emphasizes individualism.

H: An increase in Individualism culture negatively affects corporate cash holding policies.

2.2.3. Change of Duty-Joy Orientation and Cash Holdings

The duty-joy dimension of Beugelsdijk and Welzel (2018) studies is closely related to the short-long orientation dimension. Short-term and long-term-oriented cultures tend to be indulgent and restrained, respectively (Hofstede et al., 2005). Long-term-oriented cultures (duty culture) emphasize hard work, persistence, and patience (Hofstede, 2001). This culture places a high value on qualities like democracy and imagination in child education. Investors in long-term-oriented cultures prioritize the firm's long-term performance and value enhancement, with less pressure on short-term achievements (Chang & Noorbakhsh, 2009). Consequently, firms under duty cultures may hold more cash than those under joy cultures to take advantage of future long-term strategic motives such as acquisitions (Harford, 1999), innovation (Lyandres & Palazzo, 2016), and competition in the product market (Fresard, 2010). Chang and Noorbakhsh (2009) find that long-term orientation of national culture is positively associated with corporate cash holdings. However, Beugelsdijk and Welzel (2018) show that national culture shifted from duty to joy between 1990 and 2010. This shift implies that managers tend to pursue short-term-oriented targets compared to previous generations, resulting in a decrease in corporate cash holdings.

H: Decrease of Duty cultures negatively affect corporate cash holding policies.

2.3. Joint Effects of Uncertainty and National Culture on the Cash Holdings of the Firm

It is quite reasonable that the heterogeneous risk attitude of investors in different cultures makes each investor respond differently to economic uncertainty. Namely, heterogeneous national culture makes people react differently according to their 'software of the mind' with the surge of economic uncertainty. For example, Xu (2020) shows that countries with a higher uncertainty avoidance experience a significant impact on their stock market index when economic uncertainty surges. Subhani, Farooq, Bhatti, and Khan (2021) also demonstrate that firms in cultures with a strong uncertainty avoidance decrease debt when economic uncertainty increases.

2.3.1. Distrust-Trust, Economic Uncertainty, and Cash Holdings

Economic uncertainty negatively impacts financial stability by increasing the cost of funding (Çolak et al., 2018; Gungoraydinoglu et al., 2017; Kaviani et al., 2020). As the value of waiting for real options increases with the surge of economic uncertainty (Nicholas Bloom, 2009; Nick Bloom et al., 2007) the value of corporate cash holding also becomes more valuable.

While cash holdings tendencies tend to be strengthened under strong distrust of national cultures since people view the world as hostile and prefer taking low-risk tasks due to fear of failure (Hofstede, 2001). This leads managers to hold more cash as a precautionary measure to reduce the risk of failure. However, in cultures with a strong sense of trust, managers are less likely to hoard cash when faced with economic uncertainty. Therefore, managers in high-level uncertainty avoidance cultures tend to hoard more cash holdings to finance the delayed investment opportunities (Chen et al., 2015; Goodell et al., 2021) with the soar of economic uncertainty.

H₁: Impacts of the Uncertainty on the cash holdings tend to be strengthened in strong Distrust culture.

2.3.2. Individualism-Collectivism, Uncertainty, and Cash Holdings

In an individualistic culture, managers are often more overconfident compared to those in a collective culture (Boubakri et al., 2021; Chen et al., 2015). The effects of overconfidence as a managerial trait on the firm performance are still debated among researchers (Kim et al., 2022). In addition, managers in strong individualistic cultures may underestimate the value of delayed options and prefer to invest more during periods of high economic uncertainty. Thus, when economic uncertainty soars, managers in an individualistic culture will consume more cash to invest. Therefore, the joint effects of the economic uncertainty and individualistic cultural dimension may decrease corporate cash holdings.

H₂: Impacts of the uncertainty on the cash holdings tend to be strengthened in strong collectivism culture.

3. DATA AND EMPIRICAL MODEL

3.1. Data

This study uses four main data sources; first, the firm-level variables of 120 countries are obtained from Standard and Poor's (S&P) Capital Intelligence Quotient (IQ). We exclude utility (Standard Industrial Classification (SIC) 4900-4999) and financial firms (SIC 6000-6999) from the sample due to their unique characteristics. We also exclude firms with zero total assets and countries with fewer than 100-firm year observations. Second, this study utilizes the European Values Survey (EVS) and World Values Survey (WVS) as national cultural dimension data sources, while previous studies have relied on the Hofstede framework. The reason to utilize the EVS and WVS as national dimension data sources in this study is rooted in the recognition that culture is not static but rather dynamic and able to change over time. While Hofstede (2001) argues that national cultures are stable, evidence suggests that socioeconomic transformations can instigate shifts in cultural values, with a growing emphasis on prioritizing freedom over existential security. For example, Grossmann and Varnum (2015) state that cultural changes toward individualism from collectivism have been steady in the US. Moreover, Zhou, Yiu, Wu, and Greenfield (2018) report on China's intergenerational cultural change toward individualism. Furthermore,

Beugelsdijk and Welzel (2018) show that national cultures worldwide tend to move from Collectivism to Individualism, from duty to joy, and from distrust to trust. These findings highlight the dynamic nature of cultural values and their potential heterogeneous effects on corporate cash holdings. This study has employed the EVS and WVS to capture these dynamics. These surveys provide comprehensive data on social, political, economic, religious, and cultural values across multiple countries, allowing for a thorough exploration of the complex interplay between cultural dimensions and the phenomenon under investigation. By covering 120 countries worldwide from 1983 to 2020 at five-year intervals (EVS, 2021) the EVS and WVS enable the examination of long-term cultural trends and changes. We present the survey results from each country separately and derive three cultural dimensions from data, following Beugelsdijk and Welzel (2018). However, due to the survey's limited coverage in certain countries each year, we adjust the cultural index proportionally to the subsequent survey results. Perhaps the proportional modifications may distort the cultural dimensions, and data from the survey is applied in the robustness test.

Third, when individual firm-level corporate governance data is unavailable, we employ country-level corporate governance instead. To determine the country-level corporate governance, the "Easy doing business index" from the World Bank³ is utilized. Djankov (2016) constructed the index based on a survey of over 12500 experts dealing with business regulations across 190 countries. Lastly, the world uncertainty index (WUI), developed by Ahir, Bloom, and Furceri (2018) is used to measure the economic uncertainty. The WUI is estimated using the frequency of the word 'uncertainty' used in the quarterly Economist Intelligence Unit country reports. This sample spans from 2004 to 2020, mainly because of the availability of the national level of corporate governance index.

3.2. Empirical Models

This section proposes two empirical models to test the hypothesis. The Equation 1 is based on previous research that investigates the relationship between cultural dimensions and cash holdings (Chang & Noorbakhsh, 2009; Chen et al., 2015; Fernandes & Gonenc, 2016). The inclusion of the cultural change variable distinguishes this model from prior studies that rely on static national cultural measurements.

$$Cash_{it} = \delta_{it} + \delta_1 Unc_{z,t-1} + \delta_2 Culture_{z,t-1} + \delta_3 Culture_{z,t-1} * Unc_{z,t-1} + \sum_{k=1}^n \mu_k * ControlsX_{i,t-1} + Ind_{j,t} + Yr_t + \epsilon_{it} \quad (1)$$

The variables i and t represent the firm and year, respectively and j and k stand for the industry and the country. Industry (Ind) is defined at the two-digit SIC code, while Yr indicates year fixed effects, and ϵ_{it} is the disturbance term of the model. The dependent variable, $Cash_{it}$ is the cash holdings of an individual firm. The independent variables are the uncertainty ($WUI_{z,t-1}$) and three dimensions of national culture ($Culture_{z,t-1}$), namely DTS (Distrust-Trust), INV (Individualism-Collectivism), and DTY (Duty-Joy). The interaction of economic uncertainty and two national culture dimensions, DTS (Distrust-Trust) and INV (Individualism-Collectivism), is used to test hypotheses 4 and 5.

The model incorporates the firm-level control variables in accordance with established literature (Chen et al., 2015; Opler, Pinkowitz, Stulz, & Williamson, 1999). These variables include SIZE (firm size), BTM (book-to-market ratio), LEV (leverage), OCF (operating cash flows), RD (R&D), CFV (cash flow volatility), and NWC (net working capital except for cash holdings). Additionally, five country-level macroeconomic control variables are considered: GDP (GDP growth), INF (log difference of consumer price index), UEM (unemployment rate), MKT (log difference of the stock market index), and CGI (corporate governance). The details of variable operationalization are presented in Appendix 1.

$$Cash_{it} = \beta_{it} + \beta_1 WUI_{iz-1} + \beta_2 Culture_{z,t-1} + \beta_3 Culture_{z,t-1} * WUI_{z,t-1} + \beta_4 Culture_{z,t-1} * D_1 + \beta_5 Culture_{z,t-1} * D_2 + \sum_{k=1}^n \mu_k * ControlsX_{i,t-1} + Ind_{j,t} + Yr_t + \epsilon_{it} \quad (2)$$

³ <https://data.worldbank.org/indicator/IC.BUS.DFRN.XQ>.

The effects of cultural dimension changes on cash holdings are assessed by dividing the data into three distinct periods: 2004–2008, 2009–2014 (D1), and 2015–2019 (D2), in order to test hypotheses 1, 2, and 3. The study examined how the effects of culture changed over time by comparing the coefficients of each variable, representing national cultural dimensions. The other variables are the same in first equation.

4. EMPIRICAL RESULTS AND DISCUSSION

4.1. Descriptive Statistics

Table 1 presents descriptive statistics of the variables across 58 countries. All the numbers except the observations are the medians of each variable. The table shows the dominance of US, Japanese, and Chinese firms in the sample. US firms comprise approximately 15% of the whole sample, while Chinese and Japanese firms account for 12%. Generally, firms in developed markets tend to have relatively higher cash holdings compared to those in developing markets.

The median cash holdings across the countries are approximately 9.6%, and there is considerable variation in the ratios among them. Table 2 presents evidence supporting the global trend of increasing cash holding ratios, as reported by Bates, Kahle, and Stulz (2009) in US firms.

The three cultural indexes (Collectivism-Individualism, Duty-Joy, and Distrust-Trust) based on Beugelsdijk and Welzel (2018) show large variation across the countries.

According to Beugelsdijk and Welzel (2018) report, the tendency sub-period shows the same tendency in Table 2. The average of cultural dimensions indicates an overall increase in individualistic, short-term oriented, and trustful tendencies across the countries, in contrast to the median values for these variables. Furthermore, the mean and median difference tests also confirm the dynamics of cultural changes on a global scale.

Table 1. Descriptive statistics by country.

Country	Number of obs.	Cash	Co-Ind	Duty-Joy	Dis-Trst	WUI	Size	CF	RD	BTM	Capx	CFV	NWC	Lev	ΔGDP	Mkt	UEM	INF	CGI
Argentina	794	0.033	51.5	-187.6	37.6	0.297	18.78	0.084	0.000	0.657	0.036	0.060	0.059	0.075	0.118	24.62	8.35	0.00	50.67
Australia	16888	0.150	85.8	-172.0	58.2	0.086	16.60	-0.039	0.000	0.567	0.032	0.119	-0.003	0.000	0.060	11.70	5.30	1.95	54.67
Bangladesh	1520	0.025	13.8	-191.7	85.8	0.086	17.35	0.066	0.000	0.669	0.034	0.038	0.199	0.200	0.112	-1.38	4.37	5.70	63.33
Brazil	3397	0.052	33.8	-192.9	49.7	0.286	19.93	0.048	0.000	0.555	0.024	0.056	0.032	0.142	-0.006	6.50	8.43	5.68	64.00
Bulgaria	1010	0.025	53.7	-248.8	47.7	0.312	17.20	0.034	0.000	1.013	0.006	0.041	0.080	0.064	0.046	-8.07	8.26	2.75	64.67
Canada	31361	0.103	88.5	-165.3	63.8	0.153	15.46	-0.056	0.000	0.423	0.030	0.132	-0.001	0.002	0.031	13.75	6.91	1.91	84.67
Chile	1936	0.027	44.9	-189.1	43.3	0.132	19.53	0.066	0.000	0.970	0.031	0.032	0.078	0.168	0.049	11.40	7.29	3.01	68.67
China	46600	0.147	25.7	-230.9	110.4	0.089	19.78	0.063	0.000	0.391	0.034	0.034	0.150	0.144	0.114	6.91	4.53	2.07	54.00
Colombia	574	0.021	26.8	-153.8	44.6	0.237	19.68	0.048	0.000	0.479	0.025	0.029	0.027	0.077	0.055	12.66	9.74	3.53	80.00
Cyprus	811	0.032	44.5	-183.3	72.7	0.000	18.61	0.016	0.000	2.673	0.010	0.034	0.255	0.214	0.044	-10.12	8.37	1.44	64.00
Ecuador	95	0.011	26.8	-165.1	48.8	0.291	18.88	0.067	0.000	1.054	0.015	0.027	0.001	0.001	0.093	-3.72	3.78	3.55	33.33
Egypt	1859	0.060	-40.4	-245.2	200.8	0.115	18.25	0.070	0.000	0.922	0.016	0.047	0.107	0.095	0.054	12.08	11.85	10.07	40.00
Estonia	231	0.048	47.9	-224.6	67.3	0.000	18.19	0.069	0.000	0.865	0.019	0.054	0.098	0.148	0.087	6.11	6.76	3.01	56.00
Finland	1714	0.075	82.7	-179.0	70.6	0.082	19.05	0.093	0.000	0.490	0.029	0.044	0.045	0.154	0.045	7.99	8.25	1.04	54.00
France	7320	0.094	105.2	-192.7	47.2	0.187	19.16	0.061	0.000	0.672	0.023	0.028	0.036	0.143	0.042	9.26	8.91	1.49	54.44
Germany	7625	0.095	73.6	-189.1	66.6	0.284	18.82	0.065	0.000	0.527	0.024	0.044	0.067	0.097	0.053	12.51	5.38	1.51	54.00
Ghana	146	0.055	11.7	-175.4	72.9	0.146	17.84	0.109	0.000	0.401	0.075	0.056	0.000	0.058	0.090	-17.68	5.38	11.68	60.00
Greece	2338	0.050	56.0	-214.7	54.8	0.166	18.44	0.032	0.000	1.299	0.017	0.036	0.093	0.240	-0.009	22.10	17.86	1.21	48.67
Hong Kong	15596	0.130	48.3	-227.0	96.5	0.091	19.15	0.028	0.000	0.973	0.014	0.045	0.065	0.086	0.050	0.00	3.39	2.41	84.00
India	3423	0.029	10.6	-218.6	83.6	0.122	17.21	0.073	0.000	0.500	0.000	0.037	0.095	0.074	0.074	6.09	5.42	4.95	68.67
Indonesia	6303	0.057	9.0	-195.2	73.6	0.145	18.82	0.062	0.000	0.782	0.031	0.039	0.110	0.194	0.069	9.08	4.47	5.36	72.04
Italy	2750	0.083	48.0	-205.6	55.9	0.354	19.55	0.057	0.000	0.615	0.021	0.032	0.048	0.177	0.023	3.20	10.61	1.22	58.67
Japan	47280	0.142	51.2	-243.1	87.4	0.167	19.63	0.059	0.000	0.909	0.001	0.020	0.118	0.134	0.024	9.61	4.00	0.25	64.67
Jordan	1588	0.025	6.5	-195.4	93.4	0.000	17.32	0.006	0.000	1.134	0.001	0.030	0.058	0.061	0.023	-0.35	13.10	3.49	40.67
Kazakhstan	203	0.035	34.8	-207.1	72.5	0.158	18.42	0.074	0.000	1.121	0.046	0.060	0.020	0.203	0.065	-0.97	5.20	6.88	59.33
Kuwait	1527	0.035	8.5	-365.9	253.3	0.099	19.30	0.027	0.000	1.319	0.003	0.038	0.024	0.084	0.069	0.00	2.16	3.20	62.08
Lebanon	46	0.059	-107.8	-217.2	60.9	0.286	19.60	0.076	0.000	0.812	0.006	0.046	0.111	0.176	0.011	-2.33	8.28	1.20	48.00
Malaysia	12680	0.062	29.3	-186.8	90.4	0.088	18.17	0.059	0.000	1.274	0.019	0.039	0.190	0.119	0.045	4.35	3.30	2.09	90.94
Mexico	1556	0.059	42.5	-155.3	41.4	0.348	21.00	0.082	0.000	0.669	0.037	0.029	0.036	0.204	0.043	9.88	3.87	4.02	64.00
Morocco	781	0.027	9.0	-273.6	82.6	0.118	18.64	0.073	0.000	0.519	0.024	0.047	0.255	0.154	0.033	0.48	9.28	1.29	44.67
Netherlands	1485	0.069	88.4	-198.9	63.9	0.288	20.61	0.080	0.000	0.530	0.026	0.032	0.000	0.194	0.042	11.37	4.98	1.61	46.00
New Zealand	1354	0.029	71.2	-231.8	75.5	0.205	18.96	0.073	0.000	0.540	0.029	0.042	0.011	0.172	0.038	6.74	5.15	1.62	92.00
Nigeria	1212	0.051	19.8	-181.8	60.4	0.484	17.70	0.070	0.000	0.752	0.041	0.061	0.000	0.096	0.087	-17.86	4.31	12.09	58.67
Norway	1912	0.091	100.7	-158.8	70.9	0.100	19.35	0.058	0.000	0.563	0.032	0.056	0.000	0.164	0.071	13.69	3.69	2.17	65.33
Pakistan	3968	0.016	13.9	-196.8	64.3	0.092	17.69	0.076	0.000	0.961	0.036	0.052	0.155	0.263	0.031	15.32	1.85	7.69	63.33

Peru	1246	0.028	16.4	-200.9	31.6	0.162	18.96	0.082	0.000	1.252	0.032	0.041	0.050	0.114	0.081	17.39	3.69	2.94	72.00
Philippines	2975	0.066	34.9	-201.5	80.6	0.139	18.28	0.034	0.000	0.759	0.010	0.035	0.052	0.115	0.070	21.67	3.50	3.60	30.00
Poland	6618	0.050	36.0	-206.4	59.4	0.179	16.67	0.062	0.000	0.733	0.025	0.060	0.087	0.059	0.046	2.42	8.17	2.08	52.00
Qatar	409	0.093	7.4	-170.5	265.0	0.000	20.55	0.071	0.000	0.659	0.021	0.040	0.002	0.090	0.034	2.19	0.31	2.32	51.33
Romania	910	0.029	31.8	-199.2	53.2	0.257	17.65	0.052	0.000	1.492	0.016	0.059	0.091	0.031	0.108	9.80	6.80	3.98	64.00
Russia	1382	0.034	43.8	-225.1	63.6	0.222	20.34	0.080	0.000	0.627	0.047	0.069	0.039	0.184	0.078	7.70	5.56	7.82	45.33
Saudi Arabia	1826	0.044	28.0	-208.4	404.3	0.150	19.91	0.094	0.000	0.566	0.034	0.043	0.074	0.102	0.046	4.39	5.67	2.24	73.33
Singapore	6824	0.115	50.0	-195.5	90.3	0.087	18.51	0.048	0.000	1.102	0.016	0.046	0.172	0.113	0.031	9.97	3.90	0.60	92.00
Slovenia	286	0.016	76.0	-206.1	42.2	0.134	19.36	0.066	0.000	1.100	0.040	0.028	0.057	0.153	0.038	2.92	6.56	1.77	72.67
South Africa	2514	0.064	51.9	-193.5	57.1	0.529	20.01	0.103	0.000	0.660	0.036	0.045	0.027	0.125	0.029	15.54	26.54	5.18	80.00
South Korea	23371	0.067	48.6	-209.5	62.0	0.262	18.70	0.052	1.000	0.911	0.029	0.040	0.189	0.169	0.067	7.22	3.36	1.94	66.67
Spain	1960	0.053	72.2	-200.0	53.0	0.328	19.90	0.046	0.000	0.593	0.015	0.031	0.000	0.219	0.030	1.50	17.22	1.68	66.00
Sweden	6870	0.103	110.7	-158.5	76.1	0.158	17.26	0.035	0.000	0.379	0.009	0.067	0.007	0.077	0.015	18.04	6.99	1.36	64.00
Switzerland	2724	0.106	82.1	-171.9	71.9	0.092	20.14	0.092	0.000	0.437	0.028	0.030	0.070	0.146	0.018	14.12	4.48	0.53	30.00
Thailand	8492	0.048	31.2	-207.4	86.5	0.083	18.22	0.088	0.000	0.714	0.029	0.044	0.180	0.156	0.082	11.91	0.72	1.90	82.67
Tunisia	644	0.043	-106.9	-232.2	58.3	0.269	17.66	0.089	0.000	0.503	0.038	0.043	0.288	0.250	-0.002	-3.08	15.16	4.44	55.33
Turkey	4283	0.049	27.5	-191.1	82.5	0.264	18.59	0.043	0.000	0.931	0.020	0.054	0.113	0.123	-0.010	12.04	10.54	8.76	72.00
Ukraine	168	0.028	38.1	-216.6	43.0	0.168	19.36	0.112	0.000	0.882	0.029	0.064	0.167	0.071	0.166	-1.30	8.19	10.95	37.33
United Kingdom	12415	0.093	77.6	-172.6	69.8	0.372	18.59	0.065	0.000	0.525	0.018	0.045	0.000	0.083	0.019	5.84	5.30	2.29	84.67
United States of America	57337	0.093	74.4	-175.3	59.0	0.157	18.81	0.044	0.000	0.340	0.020	0.057	0.015	0.174	0.035	11.39	5.28	2.07	77.59
Vietnam	5159	0.067	36.8	-199.2	116.9	0.128	17.34	0.087	0.000	1.096	0.027	0.055	0.237	0.173	0.083	3.57	1.74	6.59	43.94
Zambia	148	0.047	30.1	-201.5	68.6	0.306	18.42	0.129	0.000	0.701	0.027	0.050	0.033	0.081	0.054	-3.47	10.87	7.81	52.00
Zimbabwe	116	0.074	19.4	-198.8	67.6	0.160	18.39	0.139	0.000	7.801	0.042	0.108	0.009	0.060	0.015	0.00	4.80	0.89	50.67
Total	378560	0.096	51.2	-196.8	69.8	0.140	18.81	0.052	0.000	0.560	0.021	0.042	0.073	0.123	0.040	7.63	4.61	1.95	64.67

Table 2. Descriptive statistics by period.

Mean	Cash	Col-Ind	Duty-Joy	Dst-Trs	WUI	Size	CF	RD	BTM	Capx	CFV	NWC	LEV	GDP	MKT	UEM	INF	CGI
Period1	0.146	50.65	-212.92	83.83	0.123	18.43	-0.069	0.168	0.762	0.052	0.123	0.045	0.235	0.1042	24.24	5.54	2.47	66.23
Period2	0.160	52.13	-207.09	80.75	0.190	18.62	-0.075	0.167	1.014	0.050	0.149	0.037	0.229	0.0551	6.09	5.96	2.79	67.00
Period3	0.174	58.05	-197.99	77.62	0.234	18.68	-0.090	0.219	0.845	0.040	0.159	0.016	0.230	0.0177	4.50	5.11	2.02	68.83
Total	0.163	54.49	-204.19	79.97	0.196	18.61	-0.080	0.191	0.885	0.046	0.150	0.029	0.230	0.0483	9.09	5.49	2.38	67.84
Median																		
Period1	0.083	50.92	-195.17	69.06	0.090	18.61	0.056	0.000	0.511	0.025	0.033	0.028	0.135	0.1026	16.75	4.73	2.27	64.67
Period2	0.096	48.72	-196.91	69.76	0.155	18.82	0.053	0.000	0.631	0.023	0.044	0.087	0.121	0.0436	7.26	5.10	2.37	64.67
Period3	0.105	55.49	-196.35	71.17	0.164	18.91	0.049	0.000	0.538	0.017	0.043	0.078	0.120	0.0248	2.65	4.44	1.73	66.00
Total	0.096	51.22	-196.80	69.76	0.140	18.81	0.052	0.000	0.560	0.021	0.042	0.073	0.123	0.0402	7.63	4.61	1.95	64.67
Standard dev.																		
Period1	0.182	27.02	51.97	48.77	0.123	2.56	0.688	0.374	1.262	0.077	0.369	0.608	0.485	0.0790	25.49	3.02	2.28	15.22
Period2	0.189	27.62	37.43	36.57	0.161	2.61	0.704	0.373	1.545	0.075	0.389	0.667	0.502	0.1014	31.72	3.23	2.92	14.37
Period3	0.200	28.29	27.20	33.85	0.249	2.67	0.708	0.413	1.396	0.064	0.405	0.721	0.515	0.0668	18.17	3.30	3.20	13.34
Total	0.192	28.00	37.49	38.35	0.204	2.63	0.703	0.393	1.427	0.071	0.394	0.681	0.504	0.0890	26.23	3.25	2.96	13.99
Number of obs.																		
Period1	89,740	69,418	69,418	69,418	69,418	69,418	69,418	39,728	69,418	69,418	36,761	69,418	69,418	69,418	69,418	69,418	69,418	31,810
Period2	125,265	116,405	116,405	116,405	116,405	116,405	116,405	70,475	116,405	116,405	103,546	116,405	116,405	116,405	116,405	116,405	116,405	116,405
Period 3	163,555	152,547	152,547	152,547	152,547	152,547	152,547	152,547	103,540	152,547	136,733	152,547	152,547	152,547	152,547	152,547	152,547	152,547
Total	378,560	338,370	338,370	338,370	338,370	338,370	338,370	262,750	289,363	338,370	277,040	338,370	338,370	338,370	338,370	338,370	338,370	300,762

Additionally, a positive correlation exists between the Collectivism-Individualism and Duty-Joy dimensions, while negative correlations are observed between the Distrust-Trust dimension and both Collectivism-Individualism, as well as Distrust-Trust and Duty-Joy dimensions. Tables 1 and 2 show that the median of R&D expenses is zero since it is set as zero in cases of missing R&D expenses of the firm (Bates et al., 2009; Chen et al., 2015). Other firm-specific and macro-economic variables also show significant differences among countries.

Table 2 shows that WUI (World Economic Uncertainty) steadily increased during the observed period. Furthermore, the subperiod of GDP growth indicates a decrease in the world economic growth rate. Throughout the sample period, the national corporate governance level improves, and the Corporate Governance Index (CGI) standard deviation falls monotonically.

4.2. Effects of Cultural Dynamics of Culture on Cash Holdings

Table 3 illustrates the positive effects of the WUI (world economic uncertainty) on corporate cash holdings, as firms tend to anticipate increased economic uncertainty by increasing their cash holdings. This result reaffirms the findings of Demir and Ersan (2017); Goodell et al. (2021); Im et al. (2017) and Kim et al. (2022).

Column 1 in Table 3 reveals that the Collectivism-Individualism dimension of the culture has a negative impact on the firm's cash holdings. Even though the interaction variables, Coll-Ind*Period2 and Coll-Ind*Period3 are positive, the total effects of this dimension are still negative on the cash holdings. This result is consistent with the findings of previous studies (Chen et al., 2015; Fernandes & Gonenc, 2016; Orlova et al., 2017).

In contrast, an increase in the individualistic tendency of the culture reduces the negative effects on the corporate cash holdings. This finding is contradictory to H2, which predicts an increase in individualistic culture leads to increased cash holdings. Perhaps decreasing the negative effects on cash holdings during Period 2 (2009-2014) and Period3 (2015-2020) may relate to the subprime mortgage crisis that shook the global economy in 2008. The worldwide economic crisis in 2008 hinders the chief executive officer (CEO)'s risk-taking, like the 'Great Depression Babies' (Malmendier, 2021; Malmendier, Tate, & Yan, 2011). Despite the cultural shift towards individualism, the experience of the global crisis remains more dominant than the changes in culture alone.

Column 2 in Table 3 shows the effect of the Duty-Joy dimension of culture on cash holdings. The coefficient of Duty-Joy is not significant, while the interaction variables, Duty-Joy*Period2 and Duty-Joy*Period3 are both significant and have a negative impact on the corporate cash holdings. As hypothesized in H2, the firm's cash holdings decrease when the culture transitions from a long-term oriented (Duty) to short-term oriented (Joy) culture. Firms in a Joy culture tends to use their cash holdings for activities such as acquisitions (Harford, 1999; Servaes & Tamayo, 2014) and innovations (He & Wintoki, 2016; Lyandres & Palazzo, 2016).

Column 3 in Table 3 shows the impact of the Distrust-Trust dimension on cash holdings. Contrary to H3 and previous findings (Chang & Noorbakhsh, 2009; Chen et al., 2015; Fernandes & Gonenc, 2016; Orlova et al., 2017), the results reveal that during Period 2 (2009-2014) and Period 3 (2015-2020), this dimension actually leads to an increase in corporate cash holdings. Perhaps the impact of worldwide economic crises in 2008 also plays a role. Firms that experience large shocks are reluctant to reduce their cash reserves (Malmendier, 2021; Malmendier et al., 2011), even when the social trust level increases.

Most of the firm characteristics variables mostly show significant effects on cash holdings, except for R&D and NWC (net working capital). The observed negative effects align with findings of Chen et al. (2015) and Opler et al. (1999). Moreover, the country-level variables UEM (unemployment rate) and MKT (stock market return) also exhibit statistical significance. However, the influences of firm-specific characteristics appear to be more pronounced compared to the macroeconomic variables.

Table 3. Dynamics of national culture to cash holdings[†].

Independent variables/Model	(1)	(2)	(3)
WUI	0.025*** (0.008)	0.022*** (0.007)	0.024*** (0.007)
Coll-ind	-0.0003* (0.0002)		
Coll-ind*period2	0.0002*** (0.00002)		
Coll-ind*period3	0.0003*** (0.0001)		
Duty-joy		0.00001 (0.00001)	
Duty-joy*period2		-0.0001*** (0.00001)	
Duty-joy*period3		-0.0001*** (0.00001)	
Distrust-trust			-0.0001 (0.0001)
Distrust-trust*period2			0.0002*** (0.0000)
Distrust-trust*period3			0.00025*** (0.00004)
SIZE	-0.040*** (0.001)	-0.041*** (0.001)	-0.041*** (0.001)
R&D	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.001)
BTM	-0.004*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)
CAPX	-1.151*** (0.010)	-1.147*** (0.010)	-1.149*** (0.010)
CF	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)
NWC	-0.002 (0.001)	-0.002 (0.001)	-0.002 (0.001)
LEV	-0.011*** (0.002)	-0.011*** (0.002)	-0.011*** (0.002)
CFV	0.022*** (0.004)	0.021*** (0.004)	0.021*** (0.004)
ΔGDP	-0.008 (0.019)	0.003 (0.020)	0.0002 (0.019)
MKT	0.0001 (0.0001)	0.0001*** (0.0000)	0.0001* (0.0001)
UEM	-0.002*** (0.0004)	-0.002*** (0.0004)	-0.001*** (0.0003)
INF	0.0002 (0.0003)	0.0003 (0.0003)	0.0003 (0.0002)
CGI	0.0002 (0.0002)	-0.0001 (0.0002)	-0.0001 (0.0002)
Intercept	0.916*** (0.031)	0.930*** (0.031)	0.928*** (0.030)
Observations	174248	174248	174248
Pseudo R ²	0.0609	0.0624	0.0617

Note: Standard errors are in parentheses *** p<0.01, * p<0.1.

[†] We choose fixed effect model based on the results of Hausman test and redundant fixed effect test. We examined assumptions of heteroskedasticity, autocorrelation, and cross dependency using the modified ML test, Wooldridge test, and Pesaran test. Since we observed the phenomena of heteroskedasticity, auto correlation, and cross dependency, we employed Driscoll-Kraay standard errors in fixed effects models to address these violations in unbalanced panel data. The same procedures were followed for reporting each table.

4.3. Effects of Joint Effects of Uncertainty and National Culture on Cash Holdings

Table 4 shows the joint effects of the economic uncertainty (WUI) and the two cultural dimensions, according to the Beugelsdijk and Welzel (2018). Results in Column 2 show that the Collectivism-Individualism dimension does not influence the corporate cash holdings. However, the interaction variable WUI*Coll-Ind has a significant positive impact on cash holdings. In periods of high economic uncertainty, the negative association between Collectivism-Individualism weakens, and the dominance of the economic uncertainty surge leads to a positive effect on cash holdings. This finding contradicts the findings of Kang, Kang, Kang, and Kim (2018), which suggested that increasing uncertainty prompts overconfident CEOs to increase investment, potentially reducing cash holdings. On the other hand, our findings indicate that the intensified effects of economic uncertainty have a more prominent influence on CEO traits associated with an increased individualistic tendency, which is overconfidence. Moreover, column (3) shows that Distrust-Trust dimension and its joint effects with economic uncertainty do not affect corporate cash holdings. This result is inconsistent with H1 and H4, respectively.

Table 4. Joint effects of uncertainty and national culture on cash holdings.

Independent variables/Models	(1)	(2)	(3)
WUI	0.028*** (0.008)	-0.004 (0.014)	0.038** (0.018)
Coll-ind		-0.0000 (0.0001)	
WUI*coll-ind		0.0005** (0.0002)	
Distrust-trust			-0.000002 (0.00004)
WUI*distrust-trust			-0.0001 (0.0002)
Size	-0.040*** (0.001)	-0.040*** (0.001)	-0.040*** (0.001)
R&D	-0.001 (0.001)	0.001 (0.002)	-0.001 (0.002)
BtM	-0.004*** (0.0004)	-0.004*** (0.0005)	-0.004*** (0.0004)
Capx	-0.156*** (0.009)	-0.154*** (0.009)	-0.155*** (0.009)
CF.	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)
NWC	-0.002 (0.001)	-0.002* (0.001)	-0.002 (0.001)
Lev	-0.011*** (0.002)	-0.011*** (0.002)	-0.011*** (0.002)
CFV	0.023*** (0.004)	0.022*** (0.004)	0.023*** (0.004)
GDP	-0.017 (0.016)	-0.017 (0.016)	-0.017 (0.017)
Mkt	0.00001 (0.0001)	0.00001 (0.0001)	0.00001 (0.0001)
UEM	-0.001*** (0.0004)	-0.001*** (0.0002)	-0.001*** (0.0004)
INF	-0.0001 (0.0003)	-0.0001 (0.0002)	-0.0001 (0.0002)
CGI	0.0003* (0.0002)	0.0002 (0.0002)	0.0003 (0.0002)
Intercept	0.893*** (0.035)	0.895*** (0.038)	0.896*** (0.038)
Observations	174248	174248	174248
Pseudo R ²	0.0603	0.0603	0.0600

Note: Standard errors are in parentheses *** p<0.01, ** p<0.05, * p<0.1.

5. ROBUSTNESS TESTS

5.1. Original Cultural Index

Not every country consistently conducted the three cultural dimensions derived from the EVS survey every year. This could potentially lead to inaccurate measurements. Therefore, in this robustness test, we excluded countries that only had surveys in a single period and focused on companies in countries that had polls conducted in multiple periods. As a result, in Tables 5 and 6, the number of firm-year observations significantly decreased. The results are consistent with the main findings in Table 3, except for the impact of the economic uncertainty on cash holdings in column (1). This confirms the linear modification of the three variables of cultural dimension used in the main findings.

Table 5. Cultural change and cash holdings.

Independent variables /Models	(1)	(2)	(3)
WUI	-0.027*** (0.010)	0.273*** (0.070)	0.035*** (0.011)
Coll-indi	0.0001 (0.0002)		
WUI*indi	-0.001** (0.0002)		
Coll-indi*period2	0.0002** (0.0001)		
Coll-indi *period3	0.0002 (0.0001)		
Duty-joy		0.00003 (0.0001)	
WUI*duty-joy		0.002*** (0.0004)	
Duty-joy*period2		-0.0001*** (0.00002)	
Duty-joy*period3		-0.0001*** (0.00003)	
Distrust-trust			0.0001 (0.0001)
WUI*distrust-trust			-0.001*** (0.0002)
Distrust-trust*period2			0.0002*** (0.0001)
Distrust-trust*period3			0.0002** (0.0001)
Cons	0.937*** (0.049)	0.923*** (0.035)	0.943*** (0.048)
Controls	Yes	Yes	Yes
Observations	44881	44881	44881
Pseudo R ²	0.0722	0.0738	0.0736

Note: Standard errors are in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Table 6. Joint effects of the economic uncertainty and national culture on cash holdings.

Independent variables/ Models	(1)	(2)	(3)	(4)
WUI	-0.024*** (0.007)	0.200** (0.080)	0.020* (0.010)	0.249*** (0.085)
Coll-indi	0.0002 (0.0002)			0.0003** (0.0001)
WUI* coll-indi	-0.0003* (0.0002)			-0.0007*** (0.0001)
Duty-joy		0.000 (0.0001)		-0.0001 (0.0002)
WUI*duty-joy		0.0012*** (0.0004)		0.0012** (0.0005)
Distrust-trust			0.0001** (0.0001)	0.0001** (0.000)
WUI*distrust-trust			-0.001*** (.0001)	-0.0007*** (0.0002)
Intercept	0.920*** (0.058)	0.914*** (0.04)	0.928*** (0.053)	0.902*** (0.040)
Controls	Yes	Yes	Yes	Yes
Observations	44881	44881	44881	44881
Pseudo R ²	0.0717	0.0724	0.0722	0.0732

Note: Standard errors are in parentheses *** p<0.01, ** p<0.05, * p<0.1.

5.2. Financially Constrained and Unconstrained Firms Based on Size

We specifically target financially constrained and unconstrained firms with an additional robustness test. To differentiate between these groups, the average total assets of each year are used as a dividing criterion. We classify firms with total assets below the mean as financially constrained.

Table 7 displays the results of our robust model's estimation for both financially constrained and unconstrained firms. The larger and statistically significant coefficient of WUI for constrained firms indicates that economic uncertainty has a greater impact on financially constrained firms. During periods of high economic uncertainty, these firms face more severe challenges in accessing external financing markets (Kaviani et al., 2020).

Most of the three cultural dimensions exhibit consistent results with the main finding in Table 3. However, the Duty-Joy culture dimension for financially constrained firms (column 4 in Table 7) shows significantly negative effects on corporate cash holdings, in contrast to Table 3. This result is consistent with H3. Distrust-Trust negatively affects the cash holdings of only financially unconstrained firms. This result is consistent with H2 and the findings of previous studies by Chen et al. (2015); Fernandes and Gonenc (2016) and Orlova et al. (2017). Nevertheless, the variation in national culture across different periods for financially constrained and unconstrained firms shows consistent results in Table 3. The cultural dimensions' coefficients do not significantly differ in magnitude.

Table 8 shows how economic uncertainty and national culture work together to affect corporate cash holdings for financially constrained and unconstrained firms. The results for Collectivism-Individualism differ from those in Table 4. Columns (2) and (4) in Table 7 reveal that a shift toward individualistic culture leads firms to reduce cash holdings, aligning with previous studies by Chen et al. (2015); Fernandes and Gonenc (2016) and Orlova et al. (2017). Despite individualistic nation-culture fostering managerial overconfidence, firms increase their cash holdings during periods of high economic uncertainty.

Table 7. Change of national culture on cash holdings for financially constrained and unconstrained firms.

Independent variables/ Models	Big	Small	Big	Small	Big	Small
	(1)	(2)	(3)	(4)	(5)	(6)
WUI	0.017*** (0.005)	0.029*** (0.008)	0.015*** (0.005)	0.025*** (0.008)	0.016*** (0.005)	0.027*** (0.009)
Coll-indi	-0.001*** (0.0001)	-0.001* (0.0003)				
Coll-indi*period2	0.0003*** (0.00002)	0.0002*** (0.0001)				
Coll-indi*period3	0.0002*** (0.00005)	0.0003*** (0.0001)				
Duty-joy			0.0001 (0.00004)	-0.0001* (0.0001)		
Duty-joy*period2			-0.0001*** (0.00001)	-0.0001*** (0.00001)		
Duty-joy*period3			-0.0001*** (0.00002)	-0.0001*** (0.00002)		
Distrust-trust					-0.0001* (0.0000)	-0.00001 (0.0001)
Dist-trust*period2					0.0002*** (0)	0.0002*** (0.00001)
Dist-trust*period3					0.0002*** (0.00002)	0.0002*** (0.00004)
Intercept	0.624*** (0.037)	1.001*** (0.03)	0.668*** (0.045)	0.956*** (0.027)	0.643*** (0.041)	0.991*** (0.033)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	92156	81451	92156	81451	92156	81451
Pseudo R ²	0.0427	0.0549	0.0440	0.0559	0.0425	0.0554

Note: Standard errors are in parentheses *** p<0.01, * p<0.1.

Columns (5) and (6) in Table 7 highlight the positive effects of Distrust-Trust dimension on corporate cash holdings. While Table 4 shows these variables are insignificant, while columns (5) and (6) reveal a significant positive coefficient for Distrust-Trust. This means that as trust levels increase, firms reduce their cash holdings, consistent with H1 and previous research (Chen et al., 2015; Goodell et al., 2021). However, the joint effect of Distrust-Trust and economic uncertainty does not support H4.

Table 8. Joint effects of economic uncertainty and national culture on cash holdings for financially constrained and unconstrained firms.

	Big		Small		Big		Small	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
WUI	0.0187*** (0.0048)	0.004 (0.0097)	0.031*** (0.0084)	-0.0205 (0.02)	0.0118*** (0.0036)	0.0207* (0.012)	0.0305*** (0.009)	0.0461* (0.0241)
Coll-indi	-0.0003** (0.0001)	-0.0003** (0.0001)	-0.0001 (0.0002)	-0.0003** (0.0001)				
WUI*coll-indi		0.0002* (0.0001)		0.0007** (0.0003)				
Distrust-trust					0.0001*** (0.00003)	0.0001*** (0.00004)	0.00002 (0.0001)	0.00004 (0.0001)
WUI*dis-trust						-0.0001 (0.0001)		-0.0002 (0.0003)
Intercept	0.6005*** (0.0381)	0.6015*** (0.039)	0.9876*** (0.0287)	0.9945*** (0.0341)	0.1409*** (0.0123)	0.1399*** (0.0125)	0.9808*** (0.0371)	0.9795*** (0.0359)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	92156	92156	81451	81451	92156	92156	81451	81451
Pseudo R ²	0.0402	0.0404	0.0544	0.0550	0.0204	0.0204	0.0544	0.0545

Note: Standard errors are in parentheses *** p<0.01, ** p<.05, * p<0.1.

6. CONCLUSIONS

National cultures are shifting towards increased individualism, short-term goals, and greater risk tolerance. This study delves into how these national cultural changes, along with economic uncertainty, affect corporate cash holdings. From 2004 to 2020, Beugelsdijk and Welzel (2018) investigated three-dimensions of national culture in 58 countries. We confirm that economic uncertainty consistently leads to higher corporate cash holdings. Additionally, a shift from Collectivism-Individualism does not reduce cash holdings. Similarly, shifting to a more trusting culture from distrust does not decrease corporate cash holdings. This may be due to lingering risk aversion from the 2008 global economic crisis.

These phenomena are also observed in the joint effects of economic uncertainty and the cultural dimension of Collectivism-Individualism. Increased economic uncertainty and a shift toward greater individualism can lead to higher cash holdings, while a shift towards a more short-term-oriented culture can reduce cash reserves. We find no significant difference in the effects of changes in cultural dimensions on cash holdings between financially constrained and unconstrained firms. Similarly, the joint effects of Collectivism-Individualism and economic uncertainty do not differ significantly between these firms. However, the joint effects of Distrust-Trust and economic uncertainty on cash holdings are more pronounced for financially unconstrained firms.

For policy implications, our findings suggest that governments would better improve information accessibility, especially in countries where national culture might amplify the impact of economic uncertainty. This shows the importance of transparency in mitigating uncertainty's effect on corporate financial decisions. This study has limitations in capturing cultural changes using 17-year-olds, which may not be long enough to bring about cultural change. Future research could extend the period to around 30 years to better understand the long-term dynamics between national culture, economic uncertainty, and corporate cash holdings.

Funding: This study received no specific financial support.

Institutional Review Board Statement: Not applicable.

Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.

Competing Interests: The authors declare that they have no competing interests.

Authors' Contributions: All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

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Appendix 1. Operationalization of variables.

Variable	Definition
Dependent variable	
Cash ratio (Cash)	Cash and cash equivalent/ Total assets
Independent variables	
Uncertainty (U)	The world uncertainty index (WUI) developed by Ahir et al. (2018) .
Collectivism-individualism (INV)	Each dimension of index is defined by Beugelsdijk and Welzel (2018) based on EVS and WVS.
Duty-Joy (DUT)	
Distrust-Trust (DST)	
Control variables	
Firm size (Size)	Natural logarithm of total assets
Capital expenditure (Capx)	Capital expenditure/Total assets
Book-to-market ratio (BM.)	Book value of equity / Market value of equity
Cash flow (CF.)	$[(EBITDA - interest - taxed - common dividends)] / Total\ assets$
Cash flow volatility (CFV)	Standard deviation of cash flows for the previous 10 years (Minimum 3 years observations).
Net working capital (NWC)	$[(Current\ assets_{i,t} - Cash\ and\ cash\ equivalents_{i,t}) - (Current\ liabilities_{i,t-1} - Short\ term\ debts_{i,t})] / Total\ assets_{i,t-1}$
Capital expenditure (Capex)	Capital expenditure / Total asset
Research & development (RD.)	R&D expenses / Sales, if R&D data missing set as zero
Leverage (Lev)	$[(Short-term\ debt + Long-term\ debts)] / Total\ assets$
Age of the firm (Age)	Log (1+ years from IPO)
Corporate governance index (CGI)	Minority protection index from 'easy 'easy of doing business index' from the world bank
Growth of gross domestic product (GDP)	$[(GDP_t - GDP_{t-1})] / GDP_{t-1}$
Unemployment rate (UEM)	Unemployment rate
Market return (MKT)	$[(Stock\ index_t - Stock\ index_{t-1})] / Stock\ index_{t-1}$

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