

Risk-taking in the banking sector: Do cultural differences matter?

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Abstract

Research Question: Why the banking sector in some countries experienced more severe panic than the banking sector in other countries? And why some countries recovered faster than others?

Motivation: In a response to the global financial crisis, research on the motivation risk-taking or risk-aversion has been increasingly grown to investigate whether culture differences among countries affect the behaviors of individuals inside societies to be risk-taking or risk-aversion?

Idea: Test the effect of the four cultural dimensions of Hofstede (2001) i.e. (individualism, uncertainty avoidance, power distance and masculinity) on risk-taking in the banking sector.

Data: Our sample consists of 2620 bank-year observations of 262 banks from four countries covering the period from (2011 to 2020) collected from Refinitiv Eikon database.

Tools: The statistical techniques used are descriptive analysis, correlation and OLS regression.

Findings: We found the effect of national culture on risk-taking is significant for all dimensions. Individualism and masculinity are negatively related to risk-taking and uncertainty avoidance is positively related to risk-taking. For power distance dimension, we

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found power distance of Hofstede (2001) is significantly and negatively related to risk-taking, while power distance of House *et al.* (2004) is significantly and positively related to risk-taking. We confirmed our findings with robustness test.

Contribution: Our results confirmed the “cushion hypothesis” formulated by Hsee & Weber (1999). We provide evidence on the significant effect of masculinity, long-term orientation and indulgence on bank risk-taking where most previous studies either excluded or found them insignificant. The impact of all cultural dimensions has been confirmed using a small sample of countries.

Keywords: risk taking; individualism; uncertainty avoidance; power distance; masculinity, cushion hypothesis.

JEL codes: M14

1. Introduction

The success of corporations depends basically on its decision makers. Decision makers are hired to make decisions related to increasing profits, expanding with growth and improving the ability of the corporation to stand against unknown situations such as the financial crisis and bankruptcy, i.e., decisions related to risk-taking. Naeem and Khurram (2020) found that CEOs cultural background affect dividend policy. Also, Kutan *et al.*, (2021) found that culture has a significant direct effect on cash holding, risk-taking of corporations and behaviors of the financial managers inside firms.

The relationship between culture and risk taking is not recently debated; the relationship had been studied by many scholars since decades. For example, Hsee and Weber (1999) studied the effect of culture on risk preferences between Americans and Chinese. They confirmed such relation in the investment domain, where Chinese (as collectivistic society) were more risk seeking than Americans (as individualistic society). Such relation was confirmed by many other scholars (Statman, 2008; Fan & Xiao, 2011; Pyles *et al.*, 2016; Illiashenko, 2019; Illiashenko & Laidroo, 2020; Aren & Hamamci, 2021; Boey & Wooi, 2021; Hentges, 2021). In contrast, some other studies (Kanagaretnam *et al.*, 2014; Ashraf *et al.*, 2016; Lopes, 2016; Conlon *et al.*, 2017; Berger *et al.*, 2021; Boubakria *et al.*, 2023) confirmed that individualistic society takes more risks than collectivistic society.

Our purpose in this paper is to investigate the effect of national culture on risk taking. A common definition of culture is “the collective programming of the mind that distinguishes the members of one category of people from those of another” (Hofstede & Bond, 1988). We used the cultural dimensions of Hofstede (2001) to measure the effect of culture on risk taking. Specifically we test the effect of the

originally four dimensions of Hofstede (2001) i.e., individualism, uncertainty avoidance, power distance and masculinity on risk-taking measured by Z-score and $\sigma(\text{ROA})$.

Notably, four decades had passed on the original cultural framework proposed by Hofstede (1980, 2001) and the framework is considered by many scholars as the dominant cultural model and the most widely tested. We focused on the banking sector, as risk-taking can be directly tested considering that the lending nature of banks sometimes encourages decision makers to provide credit facilities and take risky decisions. Also, banks are sensitive to global events such as financial crisis, inflations, and depressions.

Our sample consists of 2620 bank-year observations of 262 banks from four countries covering the period of 2011-2020. We found a significant negative relationship between three national culture dimensions (individualism, power distance and masculinity) and risk-taking. While a significant positive relationship was found between uncertainty avoidance and risk-taking. Our results were robust to alternate measure of national culture dimensions. Three of four dimensions were confirmed by the national culture dimensions of House *et al.* (2004).

We add to literature by different ways. First; we confirm the “cushion hypothesis” formulated by Hsee & Weber (1999) which states that individuals in collectivist societies are depending on a wide group of their families and friends when needed (in financial unknown situations). The latter supply them with help and therefore collectivist societies are more tended to take financial risks compared to the counterparts in individualistic societies. Second, we provide evidence on the significant effect of masculinity on the banking sector where most previous studies either exclude or find that dimension to be insignificant. Third, our study found significant evidence of the negative impact of both long-term orientation and indulgence on bank risk-taking. Fourth; our study provides significant evidence for all cultural dimensions on bank risk-taking using a small sample of four countries.

The next part of this study is organized as follows. Section 2 provides a review of previous studies as a basis for developing hypotheses to be tested. The research model and the research sample are presented in section 3. Section 4 reports the empirical results and provides a discussion of the results reported. The conclusions, limitations, and future research for this study are reported in section 5.

2. Literature review and hypotheses development

2.1 National culture and risk taking

It was notably; while global financial crisis of (2007–2009) had been spread across the world that countries did not suffer equally from the crisis. Which, in turn, raises the debate of why the banking sectors in some countries experienced more severe

panic than the banking sectors in other countries? And why have some countries recovered faster than others? In a response to the global financial crisis, research on the motivation risk-taking or risk-aversion has been increasingly grown to investigate whether culture differences among countries affect the behaviors of individuals inside societies to be risk-taking or risk-aversion?

We reviewed studies that tested the direct effect of national culture dimensions on risk taking. Each study conducted tests in different circumstances than the others and focused on specific cultural dimensions, industry, country/countries, time horizons, and statistical methods, which mainly caused the inconsistencies of results. A comparison between prior studies is shown in Table 1 which summarizes previous studies in terms of industry, sample, statistical methods, field of study and results. Also, Table 1 compares the results of previous literature to our study. It also illustrates the inconsistencies in the results of previous studies in details by each dimension. A broad difference is the industry of being tested. Some reserchers tested mainly all industries in the country/countries being tested and did not focus on a specific industry (Kreiser *et al.*, 2010; Li *et al.*, 2013; Mihet, 2013; Shao *et al.*, 2013; Breuer *et al.*, 2014; Liu *et al.*, 2015; Yeboah, 2014; Díez-Esteban *et al.*, 2018; Alipour, 2019; Aren & Hamamci, 2021; Boey & Wooi, 2021; Frijns *et al.*, 2022). In contrast, some researchers focused on the banking sector (Kanagaretnam *et al.*, 2014; Ashraf *et al.*, 2016; Lopes, 2016; Conlon *et al.*, 2017; Illiashenko, 2019; Illiashenko & Laidroo, 2020; Berger *et al.*, 2021; Boubakria *et al.*, 2023) Due to the many differences between prior studies we reviewed and analyzed the studies in terms of the results related each dimension of national culture.

2.1.1 Individualism

Individualism reflects the extent to which individuals of a community care of themselves and prefer their own interests over the interest of the whole community. In high individualism communities, individuals are integrated into weak relationships. Decisions are taken by those individualistic persons who tend toward self-actualization. Low individualistic societies emphazise social relations and interdependence within one's family, community or other social groups.

The results of previous studies related to individualism were not consistent, i.e., it was found to have a positive, non-significant and even have a negative relationship with risk-taking. Some studies (Li *et al.*, 2013; Mihet, 2013; Shao *et al.*, 2013; Breuer *et al.*, 2014; Kanagaretnam *et al.*, 2014; Liu *et al.*, 2015; Ashraf *et al.*, 2016; Lopes, 2016; Conlon *et al.*, 2017; Díez-Esteban *et al.*, 2018; Berger *et al.*, 2021; Boubakria *et al.*, 2023; Frijns *et al.*, 2022) found a significant positive relationship between individualism and risk-taking. In contrast, other studies (Illiashenko, 2019; Illiashenko & Laidroo, 2020; Aren & Hamamci, 2021; Boey & Wooi, 2021) found a significant negative relationship between individualism and risk-taking. While some studies (Kreiser *et al.*, 2010; Yeboah, 2014) did not find any significant

relationship between individualism and risk-taking. Accordingly, the relationship between individualism and risk-taking could be positive or negative which yields the following hypothesis:

H₁: The relationship between individualism and risk-taking is significant

2.1.2 Uncertainty avoidance

This dimension measures the extent to which individuals behave in situations of uncertainty. In high uncertainty situations, individuals feel anxiety which interns controlling them to be more conservative in unknown situations and to avoid taking decisions accompanied by risks.

Most of the previous studies (Kreiser *et al.*, 2010; Li *et al.*, 2013; Mihet, 2013; Kanagaretnam *et al.*, 2014; Liu *et al.*, 2015; Ashraf *et al.*, 2016; Lopes, 2016; Conlon *et al.*, 2017; Díez-Esteban *et al.*, 2018; Alipour, 2019; Aren & Hamamci, 2021; Boey & Wooi, 2021; Boubakria *et al.*, 2023; Frijns *et al.*, 2022) found a significant negative relationship between uncertainty avoidance and risk-taking. Some studies (Breuer *et al.*, 2014; Yeboah, 2014; Illiashenko & Laidroo, 2020; Berger *et al.*, 2021) did not find any association between uncertainty avoidance and accounting conservatism. An exception is the studies of (Illiashenko & Laidroo, 2020; Hentges, 2021). Illiashenko & Laidroo (2020) found a significant positive relationship between uncertainty avoidance and bank risk-taking after excluding proxies for institutional environment. Hentges (2021) found a significant evidence of the positive relationship between uncertainty avoidance and bank risk-taking. Illiashenko & Laidroo (2020) concluded that in some previous literature uncertainty avoidance and individualism affected bank risk taking in opposite directions. Accordingly, we proposed the following hypothesis.

H₂: The relationship between uncertainty avoidance and risk-taking is significant

2.1.3 Power distance

This dimension measures the extent to which individuals believe and accept unequally distribution of power. Small distances in power enable less powerful individuals inside the community or company to have a share in making decisions.

Some studies (Kreiser *et al.*, 2010; Mihet, 2013; Ashraf *et al.*, 2016; Conlon *et al.*, 2017; Boubakria *et al.*, 2023) found a negative association between power distance and risk-taking. In contrast, some studies (Yeboah, 2014; Díez-Esteban *et al.*, 2018; Aren & Hamamci, 2021; Boey & Wooi, 2021) found a positive association between power distance and risk-taking. Nevertheless, some other studies (Li *et al.*, 2013; Breuer *et al.*, 2014; Kanagaretnam *et al.*, 2014; Liu *et al.*, 2015; Berger *et al.*, 2021; Frijns *et al.*, 2022) failed to find an association between power distance and risk-taking. The discussion above leads us to formulate this hypothesis for power distance dimension:

H₃: The relationship between power distance and risk-taking is significant

Table 1. Summary of previous studies

Study (year)	Field of study	Sample	Statistical methods	Results			
				IND	U.A	P.D	MASC
Kreiser <i>et al.</i> (2010)	Non-financial	Six countries (Australia, Sweden, Costa Rica, Norway, Indonesia and the Netherlands) (2000-2004)	Multivariate general linear models (GLM)	NS*	-	-	NS*
Li <i>et al.</i> (2013)	Non-financial	35 countries (1997- 2006)	Hierarchical linear models (HLM)	+	-	NS*	NS*
Mihet (2013)	Non-financial	51 countries (1999– 2012)	HLM	+	-	-	NS*
Shao <i>et al.</i> (2013)	Non-financial	44 countries (1991- 2010)	HLM	+	NT**	NT**	NT**
Breuer <i>et al.</i> (2014)	Non-financial	Germany and Singapore (2007-2008)	Ordinary least squares (OLS) regression	+	NS*	NS*	NS*
Liu <i>et al.</i> (2015)	Non-financial	China, Poland and Singapore (2007-2010)	Content analysis technique	+	-	NS*	NS*
Yeboah (2014)	Non-financial	Ghana (2010-2011)	Multiple Linear Regression	NS*	NS*	+	+
Kanagaretnam <i>et al.</i> (2014)	Financial	70 countries	OLS regression	+	-	NS*	NS*
Lopes (2016)	Financial	594 banks of 35 countries (2005- 2012)	Mann-Whitney U test	+	-	NT**	NT**

Table 1. Summary of previous studies (Continued)

Study (year)	Field of study	Sample	Statistical methods	Results			
				IND	U.A	P.D	MASC
Ashraf <i>et al.</i> (2016)	Financial	1,981 banks 75 countries (2001-2007)	OLS regression	+	-	-	NS*
Conlon <i>et al.</i> (2017)	Financial	30 countries (2006-2015)	Logarithmic linear model specification-	+	-	-	NT**
Díez-Esteban <i>et al.</i> (2018)	Non-financial	35 countries (2007–2014)	Multivariate analysis OLS regression and	+	-	+	+
Illiashenko (2019)	Non-financial	25, 49, and 41 countries (2010-2014)	Ordinal logistic regression	-	NT**	NT**	NT**
Illiashenko & Laidroo (2020)	Financial	30 countries (2006-2015)	Regression analysis	-	NS*	NT**	NT**
Boey & Wooi (2021)	Non-financial	90 countries (2015-2019)	Regression analysis	-	-	+	-
Alipour (2019)	Non-financial	44 countries (1990-2017)	Hierarchical linear model	NT**	-	NT**	NT**
Aren & Hamamci (2021)	Non-financial	1934 individuals from Turkey (May, 2020-June, 2021)	Structural equation modeling (SEM)	-	-	+	NS*
Boubakria <i>et al.</i> (2023)	Financial	66 countries (2001-2014)	OLS regression	+	-	-	NS*
Berger <i>et al.</i> (2021)	Financial	92 countries (2000-2014)	OLS Regression	+	NS*	NS*	+
Hentges (2021)	Financial	168 banks from 28 countries	Regression analysis	-	+	+	NT**
Frijns <i>et al.</i> (2022)	Non-financial	111,697 firm-year observations from 48 countries from (1998 - 2019)	OLS regression	+	-	NS*	NS*

*NS means that the coefficient of the dimension is not significant

**NT means the dimensions was not tested in the study

2.1.4 Masculinity

High score of masculinity reflects the tendency of individuals toward achievements, and material success. While low score of masculinity means high score of femininity which reflects the tendency toward setting relationships and improving the quality of life. Notably, Hofstede (2001) cultural dimension (Masculinity vs. Femininity) is so different from gender diversity. Masculinity or femininity can be exhibited by

both men and women. Hofstede (2011) asserted that the dimension of masculinity vs. femininity represents societal characteristic rather than gender characteristic.

Mainly most prior literature reviewed in Table 1 had neither failed to find any significant association between masculinity and risk-taking nor exclude masculinity in investigating the effect of national culture dimensions on risk-taking. Nevertheless, a few studies (Yeboah, 2014; Díez-Esteban *et al.*, 2018; Berger *et al.*, 2021; Boey & Wooi, 2021) found a significant relationship between masculinity and risk-taking. These argument yields the following opposing hypotheses:

H₄: The relationship between masculinity and risk-taking is significant

3. Research design

3.1 Research model

In the literature, bank risk-taking was measured by different proxies such as Z-score, Return on assets (ROA), Net interest margin (NIM), and Loan loss provision (LLP). ROA helps banks understand the value, and risk associated with each deal. Z-score is a common measure used by many scholars (Laeven & Levine, 2009; Houston *et al.*, 2010; Kanagaretnam *et al.*, 2014; Chen & Chen, 2015; Ashraf *et al.*, 2016; Illiashenko & Laidroo, 2020; Berger *et al.*, 2021; Hentges, 2021) for measuring bank stability and the distance from insolvency. Where, lower Z-score indicates that the bank is more stable and less risky. As Z-score is highly skewed, we used the natural logarithm of the Z-score which is normally distributed and multiplied the results by -1 as applied by some previous studies (Laeven & Levine, 2009; Kanagaretnam *et al.*, 2014; Ashraf *et al.*, 2016).

We refer to the inverse log of Z-score by the label (Inv-Zsc), where higher Inv-Zsc implies more risk taking and vice versa. Ashraf *et al.* (2016) measured bank risk-taking using Z-score. Kanagaretnam *et al.* (2014) measured bank risk-taking by three measures Z-score, (ROA) and σ (NIM) for the same model where the correlations between the three measures were less than 1. Thus, they concluded that the three measures represent different behaviors of bank risk-taking.

In the following model, we measure bank risk taking by the Inv-Zsc and σ (ROA), the most common measures for risk-taking.

$$\text{RISK} = \gamma_0 + \gamma_1\text{CULTURE} + \gamma_2\text{SIZE1} + \gamma_3\text{REVG} + \gamma_4\text{LLP1} + \gamma_5\text{EQTY} + \gamma_6\text{TOOBIG} + \gamma_7\text{RESTRICT} + \gamma_8\text{LGDP} + \varepsilon.t \quad (1)$$

RISK is one measure of the two measures used for bank risk-taking i.e., Inv-Zsc which = (-1) log of (ROA+CAR)/ σ (ROA), or (ROA). CULTURE represents one of

the four dimensions of national culture: individualism (IND), uncertainty avoidance (UNC), power distance (PWD), and Masculinity (MASC).

SIZE represents the natural logarithm of total assets at the end of year t . GROWTH represents the growth in net interest revenue. LLP is loan loss provisions divided by total loans. EQTY represents the equity divided by total assets. TOOBIG is an indicator that the bank is too big to fail. It equals one if the bank's share of the country's total deposits is more than 10%. Table 2 defines all variables in the model and data source for each one.

Following Laeven & Levine (2009), we used the index of regulatory restrictions on the banks' activities (RESTRICT) from Barth *et al.* (2006) as a control variable and the natural log of gross domestic product per capita in constant 2020 U.S. dollars (LGDP). ε is the standard error of the regression model, it reports the average distance that the observed values fall from the regression model. Table 3 reports national culture dimensions scores and values of control variables by country.

Table 2. Variables definitions and data sources

Variable	Definition	Data source
Dependent variables		
Inv_Zsc	Measure of risk-taking. It is calculated by multiplying the log of $(ROA+CAR)/\sigma(ROA)$ with (-1). ROA is the ratio, CAR is capital-asset ratio of return on assets, and $\sigma(ROA)$ is the standard deviation of return on assets, averaged over 2011-2020.	Authors calculations
$\sigma(ROA)$	The standard deviation of return on assets averaged over 2011-2020.	Bankscope database
Independent variables		
IND	The national cultural dimension of individualism	Hofstede (2001)
U.A	The national cultural dimension of uncertainty avoidance.	Hofstede (1980, 2001)
P.D	The national cultural dimension of power distance.	Hofstede (2001)
MASC	The national cultural dimension of masculinity.	Hofstede (2001)
GRC	The national cultural dimension of in-group collectivism.	House <i>et al.</i> (2004)
UNC	The national cultural dimension of uncertainty avoidance.	House <i>et al.</i> (2004)

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Variable	Definition	Data source
POW	The national cultural dimension of power distance.	House <i>et al.</i> (2004)
ASR	The national cultural dimension of assertiveness.	House <i>et al.</i> (2004)
Bank-level control variables		
SIZE	Natural logarithm of total assets at the end of year t, averaged over 2011-2020.	Bankscope database
GROWTH	Growth in net interest revenue, averaged over 2011-2020.	Bankscope database
LLP	Loan loss provisions divided by total loans, averaged over 2011-2020.	Bankscope database
EQTY	Equity divided by total assets, averaged over 2011-2020.	Bankscope database
TOOBIG	An indicator that the bank is too big to fail. It equals one if the bank's share of the country's total deposits is more than 10% over 2011-2020, zero otherwise.	Authors calculations
Country-level control variables		
RESTRI-CT	An index of regulatory restrictions on regulatory restrictions on the banks' activities from Barth <i>et al.</i> (2006). The index ranges from 4 to 16 where higher restrictiveness is represented in higher values. This index measures how banks are restricted in the activities of insurance, securities and real estate.	Laeven & Levine (2009)
LGDP	The logarithm of gross domestic product per capita, in constant 2020 US dollars.	World Development Indicators, World Bank data

Table 3. National culture dimensions scores and control variables measures by country

Country	Egypt	Turkey	India	United Kingdom
IND	25	37	48	89
U.A	80	85	40	35
P.D	70	66	77	35
MASC	45	45	56	66
CR	2	2	2	4
LGDP	7.88	9.37	7.28	10.58

3.2 Research sample

Many scholars (in attempts to generalize the results) gathered data randomly for the largest number of countries available of being tested, the results were not consistent. Moreover, some studies (Shao *et al.*, 2013; Kanagaretnam *et al.*, 2014; Lopes, 2016; Conlon *et al.*, 2017; Illiashenko, 2019; Illiashenko & Laidroo, 2020; Berger *et al.*, 2021; Boubakria *et al.*, 2023) excluded U.S. firms and sometimes U.S. and Japan firms from the final sample to avoid the possibility that their results were driven by the countries had a large portion of their samples. In contrast, some studies focused on specific countries (Kreiser *et al.*, 2010; Breuer *et al.*, 2014; Liu *et al.*, 2015; Yeboah, 2014; Aren & Hamamci, 2021). Kreiser *et al.* (2010) justified their choice of three Pacific Rim countries (Australia, Costa Rica, and Indonesia) and three European countries (the Netherlands, Norway and Sweden) as building a sample represents large proportion of countries with both macro-economic and cultural features. Breuer *et al.*, (2014) collected data from two equally developed countries with two distinct cultures (Germany and Singapore), as they believed that the variance in cultures is sufficient without adding heterogeneity in the economic background variables.

Consistently, Liu *et al.* (2015) focused on Chinese, Singapore and Poland. The scores of the Chinese culture were similar to Singaporean culture and both were different from Polish culture. They believed that, the behaviors of individuals inside these societies could be used to study the cultural characteristics.

A few studies focused on a single country (Yeboah, 2014; Aren & Hamamci, 2021). Yeboah (2014) justified his focus on an African country (Ghana) by asserting that mainly most researches on the culture effect on entrepreneurship were applied in developed countries specially the western countries and a few studies focused on Africa, particularly Ghana. He proceeded to conclude that there is a gap between the cultural consequences in the developed countries and Africa and the relevance of such results are not applicable for Africa perspective.

In this paper, we aim to test the effect of national culture on bank risk taking using a few numbers of countries which represent a wide range of different cultures. Thus, we begin with Africa as a start and analyzed most countries for choosing an Eastern developing country has a specific criterion not found in any western developed countries taking into consideration differences in religion, language and Hofstede (2001) scores. The ideal country for these conditions was Egypt. Egypt lies on the northeast corner of Africa. Also, it is a Mediterranean country where Islam is the state religion and Arabic is the official language. Egypt scores low in individualism (25), high in avoiding uncertainty and power distance (80 and 70). The score of masculinity is moderate low (45).

We also analyzed most of developed western countries that have the opposite of criteria Egypt has and the ideal country was the United Kingdom. The United

Kingdom scores high in individualism (89), low in avoiding uncertainty and power distance (35 and 35). The score masculinity of the United Kingdom is moderate high (66). The official state religion is Christianity and the official language is English.

Our sample still needs countries representing differences in Hofstede (2001) scores, religion and language. We then add India and Turkey. India scores low in uncertainty avoidance (40) and high in power distance (77). The score of individualism is moderate low (48), and for masculinity is moderate high (56). India lies in Asia, the official state religion is Hinduism, and the official language is Hindi. Turkey scores low in individualism (37), and high in avoiding uncertainty (85). The score of power distance for Turkey is moderate low (66), and for masculinity is moderate high (45). It is a transcontinental country in Eurasia. Turkey is a secular state with no official state religion and the official language is Turkish. Figure 1 shows Hofstede's score for each dimension of the four countries.

Our final sample consists of four countries (Egypt, United Kingdom, India and Turkey). We believe that our sample represents countries lies in the biggest world continents in terms of population and area (Africa, Asia and Europe) and embraces the most three widespread religions (Christianity, Islam and Hinduism).

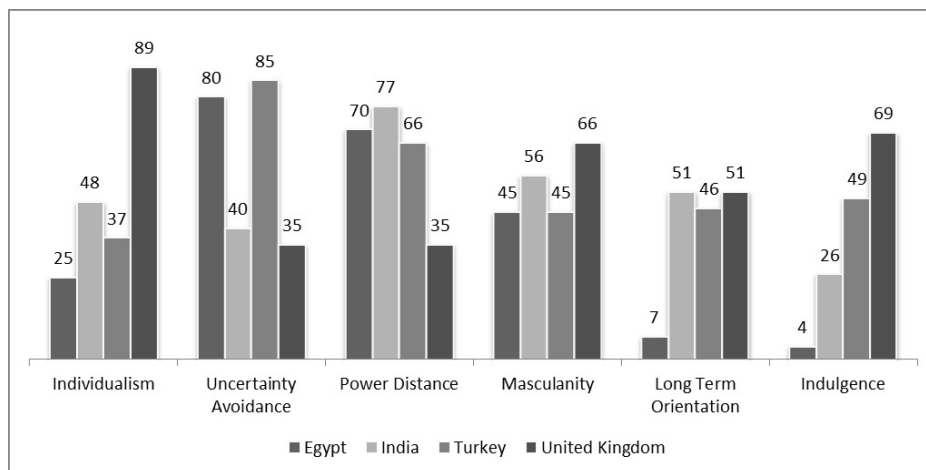


Figure 1. National culture dimensions scores by country

The official languages of these countries represent three of the top five most widely spoken languages in the world (English, Arabic and Hindi). Also, this sample includes representatives of the behaviors of individuals of both developing and developed countries. Table 4 reports the final sample in this study.

We collect financial statements of 262 banks from the four countries (for time series covering the recent decade (2011 to 2020)). We believe that the ten-year analysis for banks in the four countries will reveal mainly all the consequences related to taking

risks of the earlier years. For statistical tests we used Stata program, version 14 and analyzed data using linear regressions.

Table 4. The final sample of the four countries

	Egypt	Turkey	India	United Kingdom	Total
Population	46	148	123	314	631
Initial sample	34	70	61	147	312
Final sample	26	51	46	139	262
Percentage/initial	76%	73%	75%	95%	84%
Percentage/population	57%	34%	37%	44%	43%

4. Empirical results

In this section we discuss the tests we performed. We first conduct the correlation analysis to quantify the associations between variables, then we use regression analysis to draw the directions between proxies of risk-taking (the dependent variable) and the independent variables including (national culture).

4.1 Descriptive statistics

Table 5 shows the descriptive statistics of all variables included in our model. The average values of individualism (IND) is 62, uncertainty avoidance (UNC) is 53, power distance (PWD) is 54, masculinity (MASC) is 57 on scales from 0 to 100, mainly close to the means of Hofstede (2001) which are (65, 43, 57 and 49) for individualism, uncertainty avoidance, power distance and masculinity respectively, suggesting that our sample, to some degree, represents mainly the most population of countries.

Table 5. Descriptive statistics of all variables

Variable	Number of Banks	Mean	Std. Dev.	Min	Median	Max
Inv_Zsc	235	-3.81	0.98	-7.92	-3.79	-1.17
σ(ROA)	262	0.88	1.59	0.01	0.45	19.54
SIZE	262	9.88	2.01	2.56	9.79	14.78
GROWTH	262	11.70	11.61	-19.93	11.10	76.91
LLP	262	0.71	0.93	-0.14	8.60	11.83
EQUITY	262	10.29	16.78	-23.07	0.46	181.73
TOOBIG	262	0.09	0.28	0	0	1
IND	262	62	26	25	48	89

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Variable	Number of Banks	Mean	Std. Dev.	Min	Median	Max
U.A	262	53	22	35	40	85
P.D	262	54	18	35	66	77
MASC	262	57	9	45	56	66
RESTRICT	262	8.49	3.35	5	10	13
LGDP	262	9.41	1.27	7.58	9.63	10.57

4.2 Correlation

Table 6 shows the correlations between variables divided it to two panels: panel A shows the correlations between bank-level variables and panel B shows the correlations between country-level variables. In panel A the correlation between Inv_Zsc and $\sigma(ROA)$ is (0.79) which less than 1 indicating that $\sigma(ROA)$ and Inv_Zsc represent different behaviors of bank risk-taking. In panel B the correlations between the four cultural dimensions are ranged from strong between U.A and P.D to almost perfect correlation between IND and MASC. Therefore, we studied the effect of each cultural dimension individually.

Table 6. Correlation between alternative measure of risk taking and cultural dimensions

Panel A: Correlations between bank-level variables							
	Inv_Zsc	$\sigma(ROA)$	SIZE	GROWTH	LLP	EQTY	TOOBIG
Inv_Zsc	1						
$\sigma(ROA)$	0.79	1					
SIZE	-0.26	-0.31	1				
GROWTH	0.15	0.06	-0.27	1			
LLP	0.56	0.36	0.01	0.25	1		
EQTY	-0.16	-0.13	-0.16	0.53	-0.18	1	
TOOBIG	-0.15	-0.16	0.32	0.073	-0.02	0.19	1
Panel B: Correlation for country-level variables							
	IND	U.A	P.D	MASC	RESTRICT	LGDP	
IND	1						
U.A	-0.84	1					
P.D	-0.92	0.58	1				
MASC	0.97	-0.95	-0.81	1			
RESTRICT	-0.10	0.86	0.91	-0.98	1		
LGDP	0.91	-0.98	-0.72	0.99	-0.94	1	

4.3 Regression analysis

We regress the two bank risk-taking measures, Inv_Zsc and $\sigma(ROA)$ on each dimension of the four dimensions of national culture of Hofstede (2001) including the bank-industry and country-level control variables previously illustrated in section 3.2. Our Results are reported in Table 7.

4.3.1 Individualism and bank risk-taking

The coefficient α_1 of IND is negative and significant for models 1 and 5 that test the effect of uncertainty avoidance on the two measures of risk-taking. The results are consistent with H_1 where, banks in societies with low (high) degree of individualism take more (less) risks. Our results for individualism contradict the results of some studies (Kanagaretnam *et al.*, 2014; Ashraf *et al.*, 2016; Lopes, 2016; Conlon *et al.*, 2017; Berger *et al.*, 2021; Boubakria *et al.*, 2023) that found a significant positive relationship between individualism and risk-taking.

Nevertheless, our results support the “cushion hypothesis” formulated by Hsee & Weber (1999). The “cushion hypothesis” states that individuals in collectivist societies are depending on a wide group of their families and friends when needed (in financial unknown situations), the latter supplying them with help and therefore collectivist societies are more tended to take financial risks compared to the counterparts in individualistic societies. Hsee & Weber (1999) found Chinese (as a collectivist society) were more risk seeking than Americans (as a collectivist society) only in the investment. Consistency, Fan & Xiao (2011) and Pyles *et al.* (2016) found that Chinese are more risk tolerant than Americans in their financial decisions, both in attitude and behavior.

The previous studies empirically supported for the cushion hypothesis with small sample of countries (usually less than four). Alternatively, Statman (2008) conducted a survey on 4000 participants in 22 countries to explore the role of countries and culture in financial decisions and the results showed that individuals in collectivistic countries take more risk than individualistic countries because their in-groups provide them with protection. Figure 2 shows the association between degrees of individualism and propensity to risk.

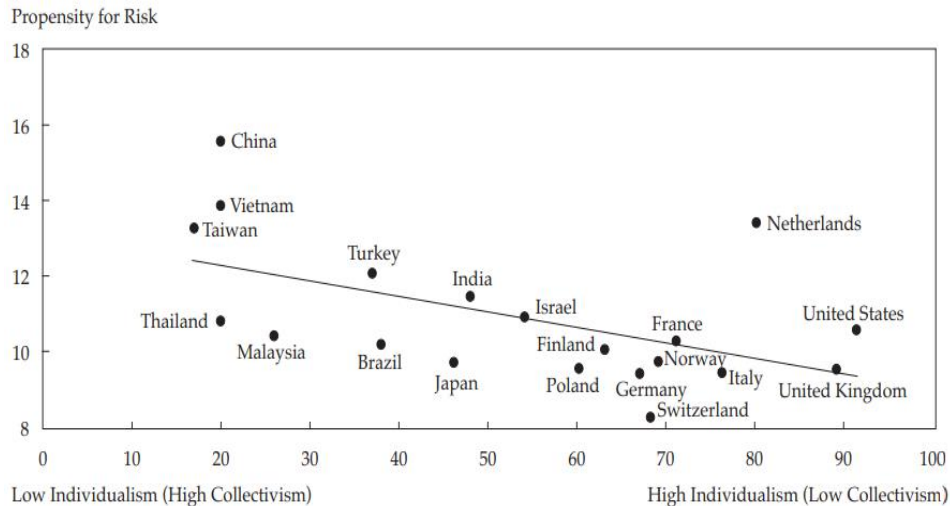


Figure 2. The association between degrees of individualism and propensity to risk
Source: Statman (2008), p. 43

In the banking sector, the cushion hypothesis was empirically supported by some studies (Illiashenko, 2019; Illiashenko & Laidroo, 2020; Hentges, 2021) that found the relationship between individualism and bank risk-taking is significantly negative. In sum, our results of individualism are consistent with many studies (Hsee & Weber, 1999; Statman, 2008; Fan & Xiao, 2011; Pyles *et al.*, 2016; Illiashenko, 2019; Illiashenko & Laidroo, 2020; Aren & Hamamci, 2021; Boey & Wooi, 2021; Hentges, 2021) Thus, H₁ is empirically supported.

4.3.2 Uncertainty avoidance and bank risk-taking

The coefficient α_1 of U.A is positive and significant in models 2 and 6 of the two measures of risk-taking. Confirming Illiashenko & Laidroo (2020) and Hentges (2021), mainly uncertainty avoidance and individualism affect bank risk-taking in opposite directions. We provide evidence that banks in societies with high (low) degree of uncertainty avoidance take more (less) risks. In the banking sector our result is consistently with Hentges (2021). Thus, H₂ is empirically supported.

4.3.3 Power distance and bank risk-taking

The coefficient α_1 of P.D is negative and significant models 3 and 7. Banks in societies with small (large) power distance take more (less) risks. Our result is consistent with many studies (Kreiser *et al.*, 2010; Mihet, 2013; Ashraf *et al.*, 2016; Conlon *et al.*, 2017; Boubakria *et al.*, 2023) of which two studies conducted in the banking sector (Ashraf *et al.*, 2016; Conlon *et al.*, 2017). Thus, H₃ is empirically supported.

4.3.4 Masculinity and bank risk-taking

The coefficient of MASC is negative and significant for models 4 and 8. Banks in societies with low (high) degree of masculinity take more (less) risks. Our result is consistent with Boey & Wooi (2021). In Ashraf *et al.* (2016) the relationship between masculinity and bank risk-taking was insignificantly negative. Nevertheless, the alternative measure of masculinity (assertiveness dimension from House *et al.* (2004) was significantly negative to bank risk-taking. Thus, H₄ is empirically supported.

For bank-level controls, we find that larger banks take less risk. The coefficient of SIZE is statistically significant for all models. Our explanation is that large banks in term of assets have high diversity and stability in earning which in turns restrict them to be risk-averse. These results are consistent with Ashraf *et al.* (2016). The coefficient of LLP is positively statistically significant indicating that banks with higher loan loss provision take more risk consistently with Kanagaretnam *et al.* (2014) and Ashraf *et al.* (2016). In addition, we find banks with higher equity-to-assets ratio take less risk. The coefficient of EQUITY is statistically significant for the first four models related to Inv_Zsc.

For institutional variables, we find that banks with high rate of restrictions (in lending activities) in large power distance countries take more risks than their counterparts in high masculinity countries. Banks are less risky in individualistic countries with higher economic well-being (LGDP). Furthermore, we observe that R² of the first four models related to Inv_Zsc is higher than R² of the other four models related to σ(ROA). This means that the variations of bank's risk-taking behaviors measured by Inv_Zsc are explained better by national cultural dimensions and other control variables than using σ(ROA) to measure bank's risk-taking behaviors in the same model which is reflected in the high score of R².

Table 7. Regression analysis between Risk-taking measures and Hofstede's cultural dimensions

Variable	Dependent variable = Inv_Zsc				Dependent variable = σ(ROA)			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
IND	-0.55***				-0.23***			
U.A		0.09***				0.04***		
P.D			-0.07***				-0.03**	
MASC				-1.51**				-0.63***
SIZE	-0.09***	-0.09***	-0.09***	-0.09***	-0.12***	-0.12***	-0.12***	-0.12***
GROWTH	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
LLP	0.92***	0.92***	0.92***	0.92***	0.36***	0.36***	0.36***	0.36***

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Variable	Dependent variable = Inv_Zsc				Dependent variable = $\sigma(\text{ROA})$			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
EQUITY	-0.02***	-0.02***	-0.02***	-0.02***	-0.001	-0.001	-0.001	-0.001
TOOBIG	-0.15	-0.15	-0.15	-0.15	-0.11	-0.11	-0.11	-0.11
RESTRCT	-4.87***	0.36***	0.75***	-1.84***	-2.04	-0.13**	0.29***	-0.78**
LGDP	-1.76***	2.46***	1.11***	6.34***	-0.71	1.04***	0.48***	2.65***
_cons	88.71***	-34.50***	-16.51***	38.53***	39.7	-11.40**	-3.94*	18.89***
R ²	0.49	0.49	0.49	0.49	0.31	0.31	0.31	0.31
Adjusted R ²	0.47	0.47	0.47	0.47	0.28	0.28	0.28	0.28
OBS	235	235	235	235	262	262	262	262

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
 OBS means number of bank-year observations

Table 8 summarizes the previous studies that addressed the effect of national culture on risk-taking in the banking sector only. We compare our study to previous studies in terms sample size, the average values of culture dimensions and R² of the regression model. Using sample of four countries, our R² is ranged from 28 to 47 which is higher than most previous studies considering that the latter used a sample of large countries consisting numerous bank-year observations.

4.4 Robustness test

Our robustness test for the main results is using alternate cultural dimensions from House *et al.* (2004). Their investigation was called the Global Leadership and Organizational Behavior Effectiveness (GLOBE). House *et al.* (2004) extended the framework of Hofstede (1980) and Hofstede (2001) by setting nine dimensions.

Table 8. Summarizing the results of previous studies conducted in the banking sector

Study (year)	Sample	Statistical methods	proxies of risk taking		Results			
					IND	U.A	P.D	MASC
Lopes (2016)	2392 OBS of 594 banks from 35 countries (2005-2012)	Mann-Whitney U test	Loan loss provision	Mean Result	N.D +	N.D -		
	R ²			20-36	17-36	NT**	NT**	
Kanagaretnam <i>et al.</i> (2014)	6622 banks from 70 countries	Ordinary least squares (OLS)	Z-score, $\sigma(\text{ROA})$ and $\sigma(\text{NIM})$	Mean Result	44 +	67 -		
	R ²			14-15	11-16	NT**	NT**	
Ashraf <i>et al.</i> (2016)	1974 banks 75 countries	OLS	Z-score and $\sigma(\text{NIM})$	Mean Result	38 +	65 -	64 -	47 NS*
	R ²			25	25	25	25	

Study (year)	Sample	Statistical methods	proxies of risk taking	Results				
				IND	U.A	P.D	MASC	
Conlon <i>et al.</i> (2017)	(2001-2007) 1442 banks from 30 countries	Logarithmic-linear model specification	Operational losses	Mean Result	70 +	55 -	48 -	NT**
				R ²	21-30	19-30	23-31	
Illiashenko (2019)	5572 OBS of 447 banks from 49 countries (2010-2014)	OLS and Ordinal logistic regression	portfolio's monthly returns across	Mean Result	64 -	61 NS*		NT**
				R ²	1-23	1-23		
Illiashenko & Laidroo (2020)	467 banks from 56 countries (2006-2015)	Regression analysis	Accounting based Z-score, σ (ROA) and Market based Z-score	Mean Result	50 -	64 NS*		NT**
				R ²	15-17	27-43		
Berger <i>et al.</i> (2021)	15693 OBS of 1541 banks from 92 countries (2000-2014)	OLS	Bank failure: A dummy equal to one in the time period that a bank fails	Mean Result	40 +	66 NS*	62 NS*	49 +
				R ²	5-22	5-21	5-21	5-21

Table 8. Summarizing the results of previous studies conducted in the banking sector (Continued)

Study (year)	Sample	Statistical methods	proxies of risk taking	Results				
				IND	U.A	P.D	MASC	
Boubakria <i>et al.</i> (2023)	132832 OBS of 13,550 banks covering 66 countries (2001-2014)	OLS	Bank liquidity creation, Asset components of bank liquidity creation, Liability components of bank liquidity creation, Off-balance sheet components of bank liquidity creation.	Mean	81	59	52	45
				Results	+	-	-	NS*
				R ²	5-22	5-22	5-21	5-22

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Study (year)	Sample	Statistical methods	proxies of risk taking	Results				
				IND	U.A	P.D	MASC	
Hentges (2021)	168 banks from 26 countries (2009-2019) 2620 OBS of 262	Regression analysis	$\sigma(\text{ROA})$ and Z-score	Mean	57	52	58	NT**
				Results	-	+	+	
				R ²	N.D	N.D	N.D	
This study	banks from 4 countries (2011-2020)	OLS	Z-score and $\sigma(\text{ROA})$	Mean	57	52	58	56
				Results	-	+	-	-
				R ²	28-47	28-47	28-47	28-47

*NS means that the coefficient of the dimension is not significant.

**NT means the dimensions was not tested in the study.

N.D means not defined in the study

OBS means number of bank-year observations

Collectivism (the opposite of individualism) in Hofstede's framework, turned it into two types of collectivism (institutional and in-group). Masculinity turns it into gender egalitarianism and assertiveness. House *et al.* (2004) kept the dimensions' names of power distance and uncertainty avoidance, but they adjusted the way of measuring, particularly uncertainty avoidance (Hadwick, 2011). The last three dimensions are humane, performance orientation and future orientation.

We replaced the four dimensions of Hofstede (2001) with the four dimensions of House *et al.* (2004): in-group collectivism (GRC), uncertainty avoidance (UNC), power distance (POW) and assertiveness (ASR).

Table 9 reports the results of the regression of Inv-Zsc and cultural dimensions of House *et al.* (2004). The coefficient of GRC is positive and significant in models 9 and 13. Banks in low in-group collectivism (high individualism) take high risks. This result is consistent with the result of Models 1 and 5 of Table 7. Thus, H₁ is accepted.

The coefficient of UNC is positive and significant in models 10 and 14. Banks in high uncertainty avoidance take high risks. This result is consistent with the result of Models 2 and 6 of Table 7. Thus, H₂ is accepted.

The coefficient of POW is positive and significant for model 11 and 15. Banks in high power distance take high risks. This result is not consistent in sign with the result of Models 3 and 7 of Table 7. Our explanation is that the correlation between P.D and POW is negative in our sample.

House *et al.* (2004) adjusted the manner of measuring the dimensions of power distance and uncertainty avoidance, where these two dimensions of House *et al.* (2004) become dissimilar (in the concept and in the methodology) from the same two dimensions of Hofstede's framework. Furthermore, in the previous studies, both the positive and negative signs were significantly confirmed. Accordingly, we do not

confirm the negative sign over the negative sign and vice versa. We report that power distance dimension of House *et al.* (2004) is positively related to risk taking. While, power distance dimension of Hofstede (2001) is negatively related to risk taking.

The coefficient α_1 for ASR is negative and significant for models 12 and 16. Banks in high assertiveness take high risks. This result is consistent with the result of models 4 and 8 of Table 7. Thus, H_4 is accepted.

4.5 Additional test

In 1991, Hofstede extended his cultural frame work by adding the fifth-dimension long-term orientation to the original four dimensions. The sixth-dimension indulgence vs. restraint dimension was added in 2010. Díez-Esteban *et al.* (2018) and Boey & Wooi (2021) found a significant positive relationship between long-term orientation and corporate risk-taking. While Aren & Hamamci (2021) found insignificant positive relationship between long-term orientation and risky investment. In contrast, Abdelrahim (2021) found insignificant positive (negative) relationship between long-term orientation and risk-averse (risk-taking). For the sixth dimension, Abdelrahim (2021) found that indulgence has significant positive (negative) impact on the country's risk aversion (risk-taking). Also, Boey & Wooi (2021) found that indulgence has a significant negative impact on risk-taking.

Table 9. Regression analysis between risk-taking measures and House *et al.* (2004) cultural dimensions Variables

Variable	Dependent variable = Inv_Zsc				Dependent variable = $\sigma(ROA)$			
	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14	Model 15	Model 16
GRC	23.90***				9.91***			
UNC		2.16***				0.90***		
POW			1.22***				0.50***	
ASR				-1.79***				-0.74***
SIZE	-0.09***	-0.09***	-0.09***	-0.09***	-0.12***	-0.12***	-0.12***	-0.12***
GROWTH	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
LLP	0.92***	0.92***	0.92***	0.92***	0.36***	0.36***	0.36***	0.36***
EQUITY	-0.02***	-0.02***	-0.02***	-0.02***	-0.001	-0.001	-0.001	-0.001
TOOBIG	-0.15	-0.15	-0.15	-0.15	-0.11	-0.11	-0.11	-0.11
RESTRICT	2.55***	-0.35***	0.01	0.88***	1.04***	-0.16**	-0.01	0.35***
LGDP	7.76***	-0.37***	-0.10	2.71***	3.24***	-0.13	-0.02	1.15***
_cons	-230.75***	-6.55***	-5.79***	-29.82***	-92.78***	0.19	0.51	-9.46***

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Variable	Dependent variable = <i>Inv_Zsc</i>				Dependent variable = $\sigma(\text{ROA})$			
	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14	Model 15	Model 16
R ²	0.49	0.49	0.49	0.49	0.31	0.31	0.31	0.31
Adj. R ²	0.47	0.47	0.47	0.47	0.28	0.28	0.28	0.28
OBS	235	235	235	235	262	262	262	262

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

OBS means number of bank-year observations

As an additional test, we test the effect of both dimension long-term orientation and indulgence on risk-taking in the banking sector. We found both long-term orientation and indulgence have a significant negative effect on the two measures of bank risk-taking. Results are reported in Table 10.

5. Conclusion, limitations and further future research

We analyzed the effect of cultural dimensions on risk-taking in the banking sector. In contrast to most previous studies, we tried to choose a sample of a few numbers of countries representing a wide range of population of countries to test whether the effect of national culture will be significant or not? With a sample of four countries representing countries lies in the biggest world continents in terms of population and area (Africa, Asia and Europe), countries embrace the most three widespread religions (Christianity, Islam and Hinduism), countries where the official languages of these countries represent three of the top five positions for the most widely spoken languages in the world (English, Arabic and Hindi). Also, the sample represents both developing and developed countries and different scores for cultural dimensions.

Table 10. Regression analysis between risk taking measures and Hofstede’s cultural dimensions (long term orientation and indulgence)

Variable	Dependent variable = <i>Inv_Zsc</i>		Dependent variable = $\sigma(\text{ROA})$	
	Model 17	Model 18	Model 19	Model 20
LTO	-0.02***		-0.01***	
INDU		-0.04**		-0.02***
SIZE	-0.09***	-0.09**	-0.12***	-0.12***
GROWTH	0.00	0.00	0.00	0.00
LLP	0.92***	0.92***	0.36***	0.36***
EQUITY	-0.02***	-0.02***	-0.001	-0.001
TOOBIG	-0.15	-0.15	-0.11	-0.11
RESTRICT	-0.05	-0.01*	-0.04	-0.06
LGDP	-0.08	0.39***	-0.01	0.18**
_cons	-1.07	-4.16***	2.46*	1.18
R ²	0.4	0.4	0.3	0.3

Variable	Dependent variable = Inv_Zsc		Dependent variable = $\sigma(\text{ROA})$	
	Model 17	Model 18	Model 19	Model 20
Adjusted R ²	0.36	0.36	0.25	0.25
OBS	138	138	138	138

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

OBS means number of bank-year observations

We applied ordinary least square (OLS) regression and the effect of national culture on risk-taking is proved, as all the coefficients of culture dimensions are significant. Our robustness tests include a test with an alternate measure of Hofstede’s cultural dimensions by using House *et al.* (2004) cultural dimensions. We confirm our findings and accept hypotheses H₁, H₂ and H₄. Individualism and masculinity are negatively related to risk-taking and uncertainty avoidance is positively related to risk-taking. While for power distance dimension, we found power dimension of Hofstede (2001) is significantly negative related to risk-taking while, while power distance of House *et al.* (2004) is significantly positive to risk-taking.

We found that smaller banks and banks with higher loan loss provision take more risk. Banks with higher equity-to-assets ratio take less risk only when measuring bank's risk-taking with Inv_Zsc. For institutional variables, we find that banks with high rate of restrictions (in lending activities) in large power distance countries take more risks than their counterparts in high masculinity countries. Banks are less risky in individualistic countries with higher economic well-being (LGDP). Furthermore, we find the variations of bank's risk-taking behaviors measured by Inv_Zsc are explained better by national cultural dimensions and other control variables than using $\sigma(\text{ROA})$ to measure bank's risk-taking behaviors in the same model.

We add to literature by different ways. First; we confirm the “cushion hypothesis” formulated by Hsee & Weber (1999) which states that individuals in collectivist societies are depending on a wide group of their families and friends when needed (in financial unknown situations), the latter supplying them with help and therefore collectivist societies are more tended to take financial risks compared to the counterparts in individualistic societies. Second; we provide evidence on the significant effect of masculinity on banking sector where most previous studies either exclude or find the dimension not significant. Third; our study provides evidence of the negative impact of both long-term orientation and indulgence on bank risk-taking. Fourth; our study provides significant evidence on the impact of all cultural dimensions on bank risk-taking using a small sample of four countries. Our study is subject to several limitations. First, our study is limited to the banking sector; future research can focus on another sector. Second, we robust our findings by using cultural dimensions of House *et al.* (2004); future research can extend the research to include cultural dimensions rather than House *et al.* (2004). Third; we confirmed previous studies using a small sample of four countries; future research can extend the sample to include more countries.

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