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Influence of National Culture on Bank Risk-taking in the European System

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10.1 Introduction

Cultural values can have a strong influence on decisions of any kind (House et al. 2004). Cultural values are important forces that shape codes of human behaviour (Markus and Kitayama 1991) and the economic behaviour of enterprises (Guiso et al. 2006).

Several studies use the concept of culture in the economy to help understand accounting and financial choices (Chui et al. 2002, 2010; Han et al. 2010; Li et al. 2012; Li and Zahra 2012; Kanagaretnam et al. 2011, 2014).

Other studies claim that culture can be a source of competitive advantage for companies (Kotter and Heskett 1992) especially when the business culture is consistent with company strategies and can allow for effective organizational learning in response to market changes.

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Culture can directly affect company's performance and risk-taking—both financially and non-financially (Li et al. 2013; Kanagaretnam et al. 2011, 2014, 2016; Mihet 2012)—through its effect on individual decision-making processes; culture can also indirectly affect companies performance and risk-taking through its effect on regulatory and institutional structures and on consequent practices in business management (Leaven and Levine 2009; Carretta et al. 2014; John et al. 2008; Acharya et al. 2011).

The present work aims to investigate the possibility that culture affects risk-taking in financial firms. We focus on the banking system, which is characterized by greater risk-taking opportunities relative to other industries, and we expect to find that cultural values are related to bank risk-taking.

The study focuses on two dimensions of national culture identified by Hofstede (1997, 2001): individualism and uncertainty avoidance. Countries exhibiting high levels of individualism emphasize self-orientation, autonomy and individual achievement. In a society characterized by high levels of individualism, there is a lack of interpersonal connection, and each person is expected to look after himself and his immediate family. Uncertainty avoidance refers to the extent to which members of a society feel threatened by uncertain or unknown situations. In a society characterized by high levels of uncertainty avoidance, people attribute value to clear rules of conduct, enjoy certainty and conformity and are intolerant towards deviant behaviour and ideas.

We hypothesize that there is a positive relation between individualism and bank risk-taking and a negative relation between uncertainty avoidance and bank risk-taking. Furthermore, we hypothesize that the influence of culture may be conditioned by bank size, which might be a proxy of managerial discretion. The paper examines these three research hypotheses based on a sample of the EU-28 countries for the 2010–2014 period, and in turn, an empirical analysis is carried out on the European banks for the period immediately following the outbreak of the financial crisis.

In using the standard deviation of Returns on Assets and Net Interest Margins and a *z-score*—a measure of bank stability that denotes the distance from insolvency (Laeven and Levine 2009; Houston et al. 2010)—as measures of bank risk-taking, the study reveals a positive association

between individualism and bank risk-taking and a negative association between uncertainty avoidance and bank risk-taking. The study also shows that the influence of cultural values is conditioned by the bank size.

The paper is structured as follows. In Sect. 10.2, we present a literature review and our research hypotheses. Section 10.3 describes the methodology and variables used in the study. Section 10.4 describes the sample, and Sect. 10.5 presents and discusses the main results and the results of several robustness checks. Section 10.6 sets forth brief conclusive assessments.

10.2 Literature Review and Research Hypotheses

Several works in the literature help explain how cultural values can affect nation-wide institutional, legal and economic environments at a macro level.

The sharing of basic cultural values is a condition that not only yields lesser coordination efforts (Peters and Waterman 1982) and therefore, lowers transaction costs but also the maximization of motivations and individual exertions. A cooperative culture can result in better delegation and control mechanisms and better coordination mechanisms (Van den Steen 2004); it can lead to a more efficient allocation of resources due to individual commitments to converge towards common goals (Carretta et al. 2011).

The literature also helps explain cross-country differences and the impacts of cultural values on various sectors and fields of business management: corporate governance (Doidge et al. 2007); capital structure decisions (Li et al. 2011); mergers and acquisitions (Carretta et al. 2007); firm dividend policies (Bae et al. 2012); earning management and quality (Kanagaretnam 2011); firm disclosure (Hope 2003); bank lending (Giannetti and Yafeh 2012); economic and market development (Guiso et al. 2006); bank system and bank foreign investment choices (Owen and Temesvary 2015; Kwok and Tadesse 2006); internal control material weaknesses (Kanagaretnam et al. 2016); bank stress test results (Fritz-Morgenthal et al. 2016); and profit reinvestment decisions (El Ghoul et al. 2016).

Several studies in the financial and management literature are specifically focused on decision-making and have found that cultural and economic environments may determine and influence risk-taking decisions. Regarding economic and legal environments, studies have focused on either financial or non-financial firms, showing that national culture may be indirectly linked to corporate risk-taking in banking and manufacturing sectors.

Leaven and Levine (2009) show that bank risk-taking varies positively with the comparative power of shareholders within a corporate governance structure and that the relation between bank risk and capital regulations depends on each bank's ownership structure. Therefore, according to the authors, the same regulation may have different effects on bank risk-taking depending on a bank's corporate governance structure.

Carretta et al. (2014) provide evidence that different supervisory cultures may affect bank stability and credit risk-taking. The authors show that a culture-oriented towards collective outcomes and that focuses on the overall stability of the banking system reduces bank stability and credit risk in bank lending portfolios. The authors also show that banks seem to increase their risk-taking when supervisory authorities follow a *Power Distance*-oriented supervisory culture based on strict and inflexible supervision and regulation.

John et al. (2008) consider the relationship between investor protection and corporate risk-taking and argue that better investor protection mitigates the use of private benefits and consequently the degree of risk avoidance; they also observe that risk-taking and firm growth rates are positively related to the quality of investor protection. Acharya et al. (2011) propose that having strong creditor rights in a country may lead firms to reduce corporate risk-taking.

National cultures and cultural values may be *directly* linked to corporate risk-taking in manufacturing and banking sectors, as shown in several studies.

Li et al. (2013) investigate the role of national culture in corporate risk-taking. They postulate that cultural values affect corporate risk-taking while controlling for formal institutions and economic development across countries; they also demonstrate that cultural effects are more apparent in smaller firms and in firms with greater earnings discretion.

Using cultural values developed by Hofstede (1980, 2001) and Schwartz (1994, 2004), the authors examine whether between-country differences related to cultural values of individualism (versus collectivism), uncertainty avoidance and harmony (versus mastery) affect corporate risk-taking. They show that there is a positive association between individualism and risk-taking, a negative association between uncertainty avoidance and risk-taking, and a negative association between harmony and risk-taking. Their results also show that the influence of culture is conditioned by firm environments, as earnings discretion strengthens the effects of culture on corporate risk-taking, while a large firm size weakens the effects of culture on corporate risk-taking.

Kanagaretnam et al. (2014) examine the banking sector and study how differences in culture across countries affect accounting conservatism and bank risk-taking using an international sample of banks. The study focuses on two dimensions of national culture, individualism and uncertainty avoidance (Hofstede 2001), and shows that individualism is positively related to risk-taking and that uncertainty avoidance is negatively related to risk-taking. The study also shows that cultures that encourage higher risk-taking experienced more bank failures during the recent financial crisis.

Mihet (2012), using a comprehensive dataset covering 50,000 firms in 400 industries in 51 countries, tries to reconcile studies on direct and indirect effects of culture on risk-taking and assesses them simultaneously. The paper extends analyses that capture cross-industrial differences in risk-taking to observe whether there are differences between effects of culture on corporate risk-taking behaviour not only across countries but also across industries. The results show that cultural values are key determinants of corporate risk-taking, even after taking into account their indirect effects on institutional, economic and industrial environments. Firms operating in environments that are highly uncertainty averse, low in individualism and high in power distance tend to take on less risk. These results are particularly apparent for firms operating in industrial sectors that are more opaque. It is very interesting to observe that these results hold for domestic firms only. The behaviours of foreign firms are most likely determined by the cultural norms of societies that firms are originally based in.

Ultimately, the literature is unanimous in concluding that formal institutions, rules of law and investor protections may affect the risk-taking of financial and non-financial firms, but it equally notes that cultural values may have a direct and significant influence on risk-taking. Further, the literature shows that the same formal financial institutions and systems are influenced by cultural values. Kwok and Tadesse (2006) argue that countries characterized by high levels of uncertainty avoidance are also characterized by more risk-averse bank-based financial systems. Thus, it may be argued that the propensity for risk-taking may be lower in societies presenting high -levels of uncertainty avoidance. Uncertainty avoidant societies emphasize social conformity and rule following, and their members are less inclined towards market-oriented financial systems.

Based on the above literature review, we expect to find that cultural values are related to formal institutional financial systems and to financial firm risk-taking.

The study focuses on two dimensions of national culture identified by Hofstede (2001): individualism and uncertainty avoidance. The national cultural dimensions are derived from a psychological survey on national and organizational cultures conducted by sociologist Geert Hofstede between 1967 and 1973 in 66 countries. Subsequent studies have validated and extended Hofstede's results and have shown that scores related to cultural values have remained quite stable over time. Country scores on cultural dimensions are relative, and thus cultural values can be only used meaningfully through comparison.

The dimension of individualism describes the relationship between an individual and society. In countries presenting high levels of individualism, ties between individuals are loose, there is a lack of interpersonal connection and everyone is expected to look after himself and his immediate family. A society characterized by high levels of individualism can be defined as a society with a preference for social frameworks in which individuals are expected to take care of only themselves and their immediate families. A society presenting low levels of individualism exhibits high levels of group cohesion and larger social groups. In countries presenting low levels of individualism, social groups are larger, people take more responsibility for one

another's well-being, and individuals can expect their relatives or fellow group members to look after them.

The dimension uncertainty avoidance denotes the extent to which members of a society feel threatened by uncertain or unknown situations. Thus, this dimension captures the extent to which individuals feel uncomfortable with uncertainty and ambiguity. People living in uncertainty avoidant cultures attribute value to institutions that provide certainty and conformity (Hofstede 2001), and individuals promote an orderly structure in their organizations, institutions and personal relations. Countries presenting high levels of uncertainty avoidance maintain rigid codes of belief and behaviour and are intolerant towards deviant behaviours and ideas. Countries presenting low levels of uncertainty avoidance maintain a more relaxed atmosphere and are more tolerant towards deviance.

The above arguments suggest that in highly individualist societies, overconfidence and risk-taking are more common. In the same way, the above arguments suggest that uncertainty avoidant societies show a lesser tendency towards risk-taking.

Based on the above literature and discussion, individualism and uncertainty avoidance may be related to formal institutional structures and to the same financial structure and may encourage or discourage corporate risk-taking in financial firms and banks. This, in turn, should manifest more or less volatile earnings, respectively. Based on this effect, the following research hypotheses regarding the effects of cultural values on bank risk-taking are formulated:

- H1:** There is a positive association between national levels of individualism and bank risk-taking.
- H2:** There is a negative association between national levels of uncertainty avoidance and bank risk-taking.

Further, cultural values may have a weaker influence on large banks, as large banks may maintain better corporate governance practices in line with the community practices of the financial system in which they are positioned; large banks may also rely more on highly controlled management systems. Based on the above considerations, the following research hypothesis is formulated:

H3: The effects of cultural values on bank risk-taking are weakened in larger highly controlled banks.

10.3 Methodology and Variables

To verify the research hypotheses, we conduct a robust standard error analysis based on the OLS model.

The dependent variables considered are, alternately, three measures of bank risk-taking: Std(ROAA), Std(NIM) (Kanagaretnam et al. 2014) and *z-score* (Stiroh and Rumble 2006; Carretta et al. 2014; Kanagaretnam et al. 2014; inter alia).

Std(ROAA) is the standard deviation of Roaa and measures the volatility of Returns on Assets. Std(NIM) is the standard deviation of the Net Interest Margin and measures the volatility of bank earnings. The standard deviations reflect the degree of bank risk-taking and are computed for 2010–2014: riskier bank operations lead to more volatile earnings.

The third dependent variable is a *z-score* that is a proxy of bank stability and that denotes the distance from insolvency (Leaven and Levin 2009).

Specifically, $Z = (\text{ROAmean} + \text{CARmean})/\sigma\text{ROAA}$.

CARmean is the mean value of the capital asset ratio computed as equity divided by total assets.

ROAmean is the mean return on average assets.

σROAA is the standard deviation of returns on average assets.

The *z-score* measures the number of standard deviations between a bank and insolvency, and thus a higher *z-score* denotes that a bank is less risky and more stable.

As *z-score* is highly skewed, we smooth extreme values using its natural logarithm (Leaven and Levine 2009; Kanagaretnam 2014; Carretta et al. 2014).

To verify the research hypotheses, we use a baseline model that includes (10.1) risk-taking measures as a function of cultural values, a number of firm-specific and country-specific controls generally recognized as related to bank risk by the literature, and a dummy variable

(*comm*) that takes value 1 when a bank is a commercial bank and a value of 0 otherwise.

$$\begin{aligned}
 Y_{ik} = & \alpha + \beta_1 lempl_i + \beta_2 loan_i + \beta_3 equity_totasset_i + \beta_4 cost_income_ratio_i \\
 & + \beta_5 imploan_grossloan_i + \beta_6 totcap_ratio_i + \beta_7 lrgdp_mean_i \\
 & + \beta_8 idv_i + \beta_9 uai_i + \beta_{10} comm_i + \varepsilon_i
 \end{aligned} \tag{10.1}$$

The cultural values considered are individualism and uncertainty avoidance (Hofstede 1985, 1997, 2001, Hofstede et al. 2014). In countries with a high individualism score, there is a low level of group cohesion and a lack of interpersonal connection. Highly individualist societies emphasize self-orientation and autonomy (Hofstede 2001), suggesting risk-taking levels may be higher than in less individualistic societies. This, in turn, should lead to overconfidence and risk-taking in the banking system and should manifest in a lower *z-score* and in financial statements with more volatile Roaa and Net Interest Margins (Kanagaretnam et al. 2014).

The second cultural dimension considered in the analysis is uncertainty avoidance, which is defined by Hofstede (1991) as the “extent to which the members of a culture feel threatened by uncertain or unknown situations”. According to the above definition, countries presenting high levels of uncertainty avoidance may be characterized by a (relatively) lower propensity for risk-taking. This lower propensity for risk-taking may, in turn, affect the financial system, and therefore uncertainty avoidant societies may be characterized by more risk averse bank systems, and banks may be more likely to avoid high-levels of risk-taking (Kanagaretnam et al. 2014). This in turn should lead to a higher *z-score* and less volatility in earnings, and thus a positive relationship is expected between uncertainty avoidance and *z-score* and a negative relationship is expected between uncertainty avoidance and the standard deviation of Returns on Assets and Net Interest Margins.

The analysis includes several bank level variables to control for bank characteristics that may influence the relationship between national culture and bank risk-taking. These control variables are related to bank size, the financial characteristics of a bank and the quality of a bank’s lending. We control for bank size measured as the logarithm of the number of

employees (*lempl*). We control for the incidence of loans on total assets (*loans*) measured as the percentage ratio of total loans to total assets. The cost income ratio (*cost_income_ratio*) is also used as a control variable to consider bank cost efficiency. The ratio of equity to total assets (*equity_totasset*) and the total capital ratio (*tot_cap_ratio*) are control variables related to the soundness of a bank. Finally, the ratio of impaired loans to gross loans (*imploan_grossloan*) controls for loan quality.

For some firms, the variable considered is not available for the first year, so we replace it with the first available one to transform all firm-specific variables that vary over time into time-invariant ones.

We also include a country level variable to isolate the effect of national culture from the effect of other country characteristics on bank risk-taking. The country level variable considered in the model (10.1) is the Gross Domestic Product. We transform this country specific variable, which varies over time, into a time-invariant one and computes the mean value to obtain a variable that is equal for all banks in the same country and for all years under observation.

$$\begin{aligned}
 Y_{ik} = & \alpha + \beta_1 lempl_i + \beta_2 lempl_i * idv + \beta_3 lempl_i * uai + \beta_4 loan_i \\
 & + \beta_5 equity_totasset_i + \beta_6 cost_income_ratio_i \\
 & + \beta_7 imploan_grossloan_i + \beta_8 totcap_ratio_i + \beta_9 lrgdp_mean_i \\
 & + \beta_{10} idv_i + \beta_{11} uai_i + \beta_{12} comm_i + \varepsilon_i
 \end{aligned} \tag{10.2}$$

From the baseline specification, model (10.1) is augmented with the interaction between bank size (*lempl*) and cultural dimensions (*lempl * idv*; *lempl * uai*) to verify the third research hypothesis. Effects of individualism and uncertainty avoidance may be mitigated in larger banks because such banks may employ better corporate governance practices and highly controlled management systems that may affect corporate risk-taking and govern attitudes defined by the cultural characteristics of a given country.

The interaction in the model (10.2) captures any nonlinear effect in the relation between bank size and bank risk-taking, which may be moderated by cultural dimensions.

Models (10.1) and (10.2) are used to test the research hypotheses on a sample initially composed of the EU-15 countries (Austria, Finland,

Sweden, Spain, Portugal, Greece, Denmark, Ireland, the United Kingdom, Belgium, Germany, France, Italy, Luxembourg and the Netherlands).

Subsequently, to verify the robustness of the results, the analysis is repeated on a sample of the EU-28 countries but considering only those countries for which observations are available for more than 3 years.

10.4 Sample and Data

The reference sample includes the European banks for which balance sheets are available through the Bankscope Bureau Van Dijk database.

The banks present the following characteristics:

- Legal status: active banks;
- Specialization: commercial banks; cooperative banks; saving banks;
- Unconsolidated statement;
- World region: the European Union 28;
- Financial statement availability: for 2010–2014.

Before starting the analysis, observations of both extreme 1% tails of the sample distribution were trimmed. Moreover, only banks with non-missing observations of the dependent variables for at least 5 consecutive years are included.

Descriptive statistics of the panel data are presented in Table 10.1.

Panel data are used to determine a new database consisting of time-invariant variables to perform the OLS analysis. The dependent time-invariant variables have been computed. Variables not available for the first year have been replaced with the first available one.

To smooth extreme values, the logarithmic transformation of the *z-score* and *employee* variables has been used.

Descriptive statistics of the OLS bank variables and the distribution of banks across the EU-15 and the EU-28 countries (considering only those countries for which there are observations for more than 3 years) are presented in Tables 10.2, 10.3 and 10.4.

Table 10.1 Descriptive statistics of the panel data

Variable	Obs	Mean	Std. Dev.	Min	Max
Roaa	9180	0.31	0.47	-3.31	2.64
Net interest margin	8977	2.37	0.71	0.13	5.95
Loan	8977	1,430,157.00	3,389,467.00	6858.56	4,850,000,000.00
Total asset	9037	2,552,589.00	6,362,218.00	26,585.25	9,770,000,000.00
Equity/total asset	9079	8.94	4.06	1.45	51.52
Employee Cost	8375	366.22	602.89	7.00	6276.00
income ratio	8958	65.89	12.96	22.40	135.48
Imparier loans/gross loans	4855	6.96	6.06	0.14	35.35
Total capital ratio	6700	17.31	5.20	8.77	46.19

Source Elaboration by the author

Table 10.2 Descriptive statistics of OLS financial variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Sdroaa	1337	0.169	0.251	0.001	2.001
Sdnim	1336	0.203	0.134	0.017	1.362
Lzscore	1315	4.882	1.379	1.688	8.034
Lempl	1337	4.992	1.251	1.946	8.744
Loan	1337	61.423	14.581	6.610	92.312
Equity_totasset	1337	8.151	3.580	1.971	38.239
Cost_incom_ratio	1337	68.055	11.763	22.881	131.250
Imploan_grossloan	1337	5.084	3.830	0.141	35.346
Totcap_ratio	1337	16.698	4.866	8.790	41.190

Source Elaboration by the author

10.5 Results

The results of the estimation of the model (10.1) are shown in Tables 10.5 and 10.6. From the first baseline specification, it is possible to observe in Table 10.5 on the EU-15 countries that the coefficient

Table 10.3 Distribution of banks across countries: the EU-15

Country	Banks
Denmark	28
France	2
Germany	857
Greece	1
Italy	332
Luxembourg	1
The Netherlands	2
Portugal	6
Spain	13
Sweden	54
The United Kingdom	7

Source Elaboration by the author

Table 10.4 Distribution of banks across countries: the EU-28

Country	Banks
Croatia	6
Czech Rep	7
Denmark	28
Germany	857
Italy	332
Poland	9
Portugal	6
Slovenia	5
Spain	13
Sweden	54
The United Kingdom	7

Source Elaboration by the author

on the two cultural value variables—individualism and uncertainty avoidance—are both significant and have the predicted sign.

For countries presenting high levels of individualism, self-orientation and autonomy are emphasized, and this should lead to overconfidence and risk-taking. Countries presenting high levels of uncertainty avoidance are less tolerant of deviance, and tendencies towards risk-taking may be lower. Therefore, a significant positive relation is expected between individualism and bank risk-taking, and a significant and negative relation is expected between uncertainty avoidance and bank risk-taking.

Table 10.5 Estimation results: MOD 1—the EU-15

	Dep: std(roaa)				Dep: std(nim)				Dep: lz-score			
	Coef.	Std. Err.	t	P > t	Coef.	Std. Err.	t	P > t	Coef.	Std. Err.	t	P > t
Lempl	-0.008	0.006	-1.300	0.194	-0.008	0.003	-2.550	0.011	0.250	0.032	7.760	0.000
Loan	0.000	0.001	0.140	0.891	-0.002	0.000	-3.390	0.001	-0.003	0.003	-1.060	0.288
Equity_	0.011	0.003	3.170	0.002	0.004	0.002	2.140	0.032	-0.005	0.014	-0.320	0.748
totasset												
Cost_	0.003	0.001	3.720	0.000	0.000	0.000	0.850	0.395	-0.007	0.003	-2.160	0.031
income_												
ratio												
Imploan_	0.011	0.003	4.290	0.000	0.002	0.001	1.470	0.141	-0.031	0.009	-3.280	0.001
grossloan												
Totcap_	0.002	0.002	0.970	0.330	-0.001	0.001	-1.160	0.246	0.018	0.009	2.020	0.044
ratio												
lrgdp_mean	-1.014	0.252	-4.030	0.000	-0.443	0.112	-3.950	0.000	5.648	1.461	3.870	0.000
ldv	-0.004	0.002	-1.600	0.110	0.004	0.001	4.020	0.000	-0.021	0.009	-2.360	0.018
Uai	-0.011	0.003	-4.060	0.000	-0.003	0.001	-2.790	0.005	0.050	0.015	3.300	0.001
Comm	0.135	0.040	3.340	0.001	0.053	0.020	2.650	0.008	-0.916	0.196	-4.680	0.000
Cons	11.308	2.886	3.920	0.000	4.813	1.269	3.790	0.000	-56.076	16.577	-3.380	0.001
Number of obs	1303 F(10,129)				Number of obs 1303 F(10,129)				Number of obs 1283 F(10,127) 69,71			
	36,79				26,55							
Prob > F	0.0000 R-squared				Prob > F 0.0000 R-squared				Prob > F 0.0000 R-squared 0.3669			
	0.3827				0.2619							

Source Elaboration by the author

Table 10.6 Estimation results for MOD 1—the EU-28

	Dep: std(roaa)			Dep: std(nim)			Dep: lz-score						
	Coef.	Std. Err.	t	P > t	Coef.	Std. Err.	t	P > t	Coef.	Std. Err.	t	P > t	
Lempl	-0.010	0.006	-1.640	0.101	-0.009	0.003	-2.880	0.004	0.261	0.030	8.650	0.000	
Loan	0.000	0.001	0.760	0.450	-0.001	0.000	-3.040	0.002	-0.006	0.003	-1.960	0.050	
equity_	0.013	0.003	3.880	0.000	0.005	0.002	2.550	0.011	-0.017	0.013	-1.320	0.188	
totasset													
cost_	0.003	0.001	4.580	0.000	0.001	0.000	1.610	0.108	-0.010	0.003	-3.030	0.002	
income_													
ratio													
implan_	0.012	0.003	4.410	0.000	0.003	0.001	2.390	0.017	-0.038	0.009	-4.110	0.000	
grossloan													
totcap_ratio	0.002	0.002	0.920	0.359	-0.001	0.001	-1.020	0.307	0.019	0.009	2.000	0.046	
lrgdp_mean	-0.509	0.113	-4.490	0.000	-0.284	0.052	-5.480	0.000	3.184	0.364	8.740	0.000	
ldv	0.000	0.002	-0.040	0.964	0.004	0.001	4.770	0.000	-0.034	0.008	-4.450	0.000	
Uai	-0.006	0.002	-3.990	0.000	-0.002	0.001	-3.110	0.002	0.029	0.005	6.070	0.000	
Comm	0.124	0.039	3.190	0.001	0.048	0.019	2.580	0.010	-0.807	0.137	-5.890	0.000	
Cons	5.434	1.265	4.290	0.000	3.021	0.571	5.290	0.000	-27.715	4.029	-6.880	0.000	
Number of obs	1324 F(10,131)			Number of obs			1323 F(10,131)			Number of obs			1302 F(10,129) 69,92
	35,97			27,41									
Prob >F	0.0000	R—squared		Prob >F	0.0000	R—squared		Prob >F	0.0000	R—squared		0.3519	
	0.3631			0.2526									

Source Elaboration by the author

For the same reasons, a significant negative relation is expected between individualism and *z-scores*, and a significant and positive relation is expected between uncertainty avoidance and *z-scores*. Indeed, the *z-score* is a proxy for bank stability, as it measures a bank's distance to default. Therefore, a high *z-score* implies a lower probability of default, and thus individualism is expected to be associated with a lower *z-score*, and their relationship is expected to be negative; uncertainty avoidance is expected to be associated with a higher *z-score*, and so this relationship is expected to be positive.

From the results and while considering the standard deviation of *roaa*—*std(roaa)*—as a dependent variable, a significant and negative relation is observed with uncertainty avoidance, and thus the cultural variable is negatively and significantly associated with bank risk-taking, while individualism is not significantly associated with bank risk-taking.

When the standard deviation of net interest margins—*std(nim)*—is used as the dependent variable, the coefficients of the two cultural value variables are significant and have the predicted sign. Uncertainty avoidance is negatively and significantly associated with bank risk-taking, while individualism is positively and significantly associated with bank risk-taking.

Finally, when using the natural logarithm of the *z-score* as the dependent variable, the two cultural value variables are significant with the predicted sign. Individualism is negatively and significantly associated with the *z-score*, and uncertainty avoidance is significantly and positively associated with the *z-score*.

Ultimately, results related to the first specification and to the EU-15 sample are consistent with the first and second research hypotheses.

From the control variables, we find that the ratio of equity and total assets is positively associated with bank risk-taking (i.e. the standard deviation of returns on average assets and net interest margins). Additionally, the incidence of impaired loans to gross loans and the *cost income ratio* are positively associated with bank risk-taking; specifically, the two control variables are positively associated with the standard deviation of returns on average assets and are negatively associated with the *z-score*.

The country level variable considered in the model, the Gross Domestic Product, is positively associated with bank risk-taking.

The dummy variable *comm* takes a value of 1 when a bank is a commercial bank. The coefficient of the dummy variable is significant and positive for the *std(roaa)* and *std(nim)* dependent variables and is significant and negative for the *z-score* dependent variable. These results allow to argue that commercial banks are riskier than savings and cooperative banks.

In moving on to consider the results of model (10.1) for the EU-28 sample—that only includes countries for which there are observations available for more than 3 years—it is possible to observe that the empirical analysis is in line with the results of the EU-15 sample and that it is consistent with the first and second research hypotheses (Table 10.6).

The coefficients of the two cultural value variables are significant and have the predicted sign. Individualism is positively and significantly associated with the standard deviation of net interest margins and is negatively and significantly associated with the *z-score* dependent variable. Uncertainty avoidance is negatively and significantly associated with the standard deviation of returns on average assets and the net interest margin; it is positively and significantly associated with the *z-score* dependent variable.

Results related to the control variables are consistent with those observed for the EU-15 sample. In addition, for the EU-28 sample, equity to total assets, impaired loans to gross loans and the cost income ratio are positively associated with bank risk-taking. More specifically, the equity to total asset ratio are positively associated with the standard deviation of returns on assets and with the standard deviation of net interest margins. The cost income ratio is positively associated with the standard deviation of returns on assets and is negatively associated with the *z-score*. The impaired loans to gross loans ratio are positively associated with the standard deviation of returns on assets and with the standard deviation of net interest margins and are negatively associated with the *z-score*.

The country level variable shows a positive relationship with bank risk-taking for the EU-28, and the dummy variable reiterates higher levels of risk-taking in commercial banks.

Tables 10.7 and 10.8 present the estimation results of the model (10.2), including the interaction terms used.

As was expected, when considering the EU-15 sample and the $std(roaa)$ dependent variable, the positive influence of individualism on risk-taking is mitigated in larger banks. Both cultural value variables are significant and with the predicted sign, but the coefficient of the interaction term $lempl * idv$ is significant and negative, so the positive influence of individualism on bank risk-taking is mitigated in larger banks, which is consistent with the third hypothesis.

Similar results are observed when considering the $std(nim)$ dependent variable for the EU-15 sample. Indeed, also in this case the positive influence of individualism on risk-taking is mitigated in larger banks, as the interaction term $lempl * idv$ is significant and negative.

Finally, similar results are observable when considering the $z-score$ dependent variable of the EU-15 sample. In this instance, the cultural value variable of uncertainty avoidance is positively associated with the dependent variable and has a positive influence on bank stability. However, this positive relationship is weaker for larger banks.

The reported results of the EU-15 sample are also observed for the EU-28 sample, as illustrated in Table 10.8.

These findings are consistent with the third research hypothesis and support the assumption that managers of large banks, through the use of highly disciplined and controlled financial management systems, may be less subject to the effects of their cultural background, as stated previously in the literature (Li et al. 2013).

Results on bank and country level control variables remain largely the same when the interaction terms are included.

10.6 Conclusion

This paper focuses on the relevance of cultural values in bank risk-taking. Using data related to the European banking system (the EU-15 and the EU-28) for the period following the outbreak of the financial crisis (2010–2014), the study aims to test the existence of a positive association between national levels of individualism and bank risk-taking and

Table 10.7 Estimation results for MOD 2—EU-15

	Dep: std(roaa)			Dep: std(nim)			Dep: lz-score								
	Coef.	Std. Err.	t	P > t	Coef.	Std. Err.	t	P > t	Coef.	Std. Err.	t	P > t			
Lempl	0.180	0.101	1.780	0.075	0.139	0.043	3.230	0.001	0.806	0.363	2.220	0.027			
lemp1 * idv	-0.003	0.001	-2.310	0.021	-0.002	0.001	-3.190	0.001	-0.003	0.005	-0.670	0.503			
lemp1 * uai	0.000	0.001	0.510	0.613	0.000	0.000	-1.370	0.170	-0.005	0.002	-2.370	0.018			
Loan	0.000	0.001	0.000	1.000	-0.002	0.000	-3.320	0.001	-0.003	0.003	-0.900	0.368			
equity_	0.009	0.003	2.860	0.004	0.004	0.002	2.050	0.041	-0.002	0.014	-0.170	0.863			
totasset															
cost_	0.002	0.001	3.100	0.002	0.000	0.000	0.370	0.715	-0.007	0.003	-2.230	0.026			
income_															
ratio															
implan_	0.011	0.003	4.320	0.000	0.002	0.001	1.440	0.150	-0.031	0.009	-3.330	0.001			
grossloan															
totcap_ratio	0.001	0.002	0.900	0.368	-0.001	0.001	-1.270	0.205	0.018	0.009	1.970	0.049			
lrgdp_mean	-0.954	0.233	-4.090	0.000	-0.441	0.114	-3.850	0.000	5.481	1.455	3.770	0.000			
ldv	0.013	0.007	1.820	0.069	0.013	0.003	4.500	0.000	-0.008	0.025	-0.330	0.741			
Uai	-0.012	0.003	-3.780	0.000	-0.001	0.001	-0.990	0.320	0.070	0.014	4.920	0.000			
Comm	0.145	0.040	3.670	0.000	0.059	0.020	2.980	0.003	-0.908	0.199	-4.560	0.000			
Cons	9.640	2.718	3.550	0.000	4.084	1.322	3.090	0.002	-56.507	16.710	-3.380	0.001			
Number of obs	1303			F(12,129)			Number of obs			1303			F(12,129)		
	32,06			24,29			Number of obs			1283			F(12,127)		
Prob > F	0.0000			R-squared			Prob > F			0.0000			R-squared		
	0.3939			0.2724			Prob > F			0.0000			R-squared		

Source: Elaboration by the author

Table 10.8 Estimation results for MOD 2—theEU-28

	Dep: std(roaa)			Dep: std(nim)			Dep: lz-score							
	Coef.	Std. Err.	t	P > t	Coef.	Std. Err.	t	P > t	Coef.	Std. Err.	t	P > t		
Lemp1	0.116	0.114	1.010	0.310	0.128	0.044	2.920	0.004	0.881	0.382	2.310	0.021		
lemp * idv	-0.002	0.002	-1.550	0.123	-0.001	0.001	-2.510	0.012	-0.004	0.005	-0.840	0.402		
lemp * uai	0.001	0.001	0.940	0.346	-0.001	0.000	-1.610	0.107	-0.005	0.002	-2.060	0.040		
Loan	0.000	0.001	0.540	0.587	-0.001	0.000	-2.900	0.004	-0.005	0.003	-1.810	0.071		
equity_	0.011	0.003	3.450	0.001	0.005	0.002	2.460	0.014	-0.016	0.013	-1.230	0.218		
totasset														
cost_	0.003	0.001	4.230	0.000	0.000	0.000	1.280	0.201	-0.010	0.003	-3.220	0.001		
income_														
ratio														
imploan_	0.012	0.003	4.430	0.000	0.002	0.001	2.220	0.026	-0.039	0.009	-4.250	0.000		
grossloan														
totcap_ratio	0.001	0.002	0.810	0.421	-0.001	0.001	-1.140	0.253	0.018	0.009	1.950	0.051		
lrgdp_mean	-0.456	0.124	-3.670	0.000	-0.281	0.056	-4.980	0.000	3.088	0.399	7.740	0.000		
ldv	0.014	0.008	1.670	0.096	0.012	0.003	3.890	0.000	-0.014	0.026	-0.530	0.599		
Uai	-0.008	0.003	-3.100	0.002	0.000	0.001	0.140	0.888	0.047	0.009	5.230	0.000		
Comm	0.131	0.039	3.370	0.001	0.052	0.018	2.840	0.005	-0.797	0.141	-5.650	0.000		
Cons	4.126	1.540	2.680	0.007	2.339	0.698	3.350	0.001	-29.417	5.147	-5.720	0.000		
Number of obs	1324			F(12,131)			Number of obs			1302			F(12,128) 59.63	
	32,04			24,91										
Prob > F	0.0000			R-squared			Prob > F			0.0000			R-squared	
	0.3724			0.2620									0.3547	

Source Elaboration by the author

the existence of a negative association between national levels of uncertainty avoidance and bank risk-taking. The paper also aims to verify whether the influence of cultural values on bank risk-taking may be weakened in larger, heavily controlled banks.

The results demonstrate that individualism shows a positive association with bank risk-taking and that uncertainty avoidance shows a negative association with bank risk-taking. Significant and positive (negative) relationships are observable between individualism (uncertainty avoidance) and the standard deviation of returns on average assets and the standard deviation of net interest margins. Significant and negative (positive) relationships are observable between individualism (uncertainty avoidance) and the *z-score*, a proxy for bank stability and riskiness. The results also show that as banks expand, the relationship between culture and bank risk-taking weakens.

The findings of the paper are of relevance to the financial system. While economic theories suggest that bank risk-taking decisions should be determined by economic and financial considerations and by formal compliance with rules, our empirical analysis suggests that cultural values may guide risk-taking decisions and may lead to the use of new practices.

Results are related to the highly globalized European financial system, which is governed by uniform rules of supervision and risk management. However, despite this, cultural values matter, and banks operating in less individualistic countries presenting high levels of uncertainty avoidance prefer lower levels of risk, and have lower levels of net interest margin volatility, lower levels of earnings volatility and higher *z-scores*.

Therefore, this study reiterates that culture may interact with social, economic and political forces to produce results and outcomes, and so cultural values may constitute important forces in addition to institutions and regulations. These findings may improve bank management practices and may spur a new awareness that even in globalized financial systems, the formal observance of common rules is not sufficient to ensure proper risk management; it is necessary to consider the relief of informal institutions (e.g. culture) to improve financial decisions.

This study is subject to several limitations. First, the sample is unbalanced in that many more observations are available for some countries than others. Second, relationships between national culture and risk-taking are associations and cannot be defined as causal relations. Third, the OLS model does not control for any endogeneity problem. Future developments in empirical research should overcome such limitations by expanding the reference sample and by applying econometric models capable of addressing endogeneity problems and considering causal relations.

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