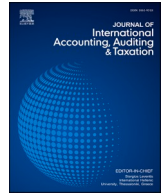


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Operational risk disclosure quality and national culture: Evidence from the E.U. Banking industry

Florence Pinto Basto^{a,*}, Ana Marques^b

^a ISEG – Universidade de Lisboa, Portugal

^b Norwich Business School, University of East Anglia, United Kingdom

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ABSTRACT

In this study, we analyze the association between national culture and voluntary operational risk disclosure quality in the European Union banking industry. Complementarily, we assess whether the potential impact of culture differs between global banks and banks with low levels of internationalization. Finally, we consider the impact of the formal institutional environment. Our sample covers 15 countries, and we construct a disclosure score based on hand-collected data. Three main results were obtained. First, banks in societies that score higher on individualism or long-term orientation and lower on uncertainty avoidance or power distance have better disclosures. Second, in global banks, where executive board members interact with stakeholders from different cultures, these associations are absent. Finally, contextual factors also affect the association between culture and disclosure, but this substitution effect is weaker than the one we document for globalization. Our results are robust to instrumental variables estimation, the use of the GLOBE project's cultural dimensions, and a subsample analysis of civil code law countries.

1. Introduction

We investigate the relationship between national culture and banks' voluntary operational risk disclosure for a sample of banks from the European Union (EU). Moreover, we assess how banks' level of internationalization and a country's formal institutional environment (specifically, the legal system and the regulatory, supervisory, and monitoring setting) affect this relationship. If voluntary operational risk disclosures vary according to cultural values and the institutional environment, regulators should consider this when determining whether operational risk disclosures should remain voluntary or be made compulsory to improve market discipline.

Banks' ability to manage risks effectively is essential for their profitability and survival, and their risk disclosures should be analyzed separately from non-financial firms (Linsley & Shrivs, 2006). Motivated by the importance of risk reporting for market efficiency, Barakat and Hussainey (2013) analyze the association between operational risk disclosure quality and country- and individual-level governance

mechanisms. They find that regulations promoting bank competition and several corporate governance mechanisms contribute to enhanced quality of operational risk disclosures in the EU banking industry. However, these authors failed to consider the role of informal institutions in this process, culture being the most relevant one.

Hooi (2007) examines the relationship between banking disclosures and a country's culture in 2003–2004. However, this author does not consider the influence of bank-level or country-level controls, thus, failing to control for the influence of bank governance and a country's formal institutional environment on disclosures.¹ We expand this literature by bringing together both formal and informal institutions, and assessing whether they are complementary or substitutes, when it comes to one specific type of disclosure: risk disclosure. By focusing on a set of countries that follow the same set of regulations and a specific type of disclosure (which is essential for market efficiency), and using a more careful and robust methodology, we believe we can shed a new light on the interplay of formal and informal institutions.

We focus on the EU banking industry for three reasons: First, the

* Corresponding author at: Instituto Superior de Economia e Gestão, Rua Miguel Lúpi, 20, 1200-781 Lisboa, Portugal.

E-mail addresses: fbasto@iseg.ulisboa.pt (F. Pinto Basto), ana.marques@uea.ac.uk (A. Marques).

¹ Hooi (2007) differs considerably from our study in terms of sample and methodology: first, that sample is composed of 37 banks from 17 countries, of which only four countries belong to the EU; second, the sample period is prior to ours and includes one year of data around 2003–2004; and third, there is a high correlation between the national culture variables (as expected) and these are included in the regressions all at the same time raising multicollinearity concerns (in one regression the coefficient for individualism is the opposite sign to what is predicted).

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banking industry is essential for the development of national economies, especially in countries where firms depend more on banks than on capital markets to finance themselves (as is the case in most of the EU). Financial institutions are usually removed from studies' samples due to their specific nature and regulations, but the financial crisis that started in 2008 has shown the importance of this industry. Second, the EU setting allows us to capture variations in terms of cultural and institutional settings (economic, legal, and cultural). Third, regulatory requirements in the EU are homogenous, enabling us to isolate voluntary disclosure.

We analyze disclosures about operational risk, which is defined in the Capital Requirements Directive (CRD) by the European Parliament and of the Council (European Parliament, 2006, p.14) as "the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events, and includes legal risk". This type of risk is especially relevant for evaluating banks' discretionary disclosure patterns because, contrary to market and credit risks, it is not regulated by accounting standards. It is uniquely disclosed in annual reports and risk reports; therefore, we hand-collect data from these reports. Using this data, we develop a score that reflects the quality of operational risk disclosure, adapting the work of Barakat and Hussainey (2013).² Cultural values are measured using Hofstede (2001) cultural score dimensions, and robustness tests are conducted using Project GLOBE's (hereafter GLOBE) scores (House et al., 2004). The study's final sample consists of 454 observations from 2008 to 2013, covering 87 banks in 15 EU countries.

Initially we focus on Gray's (1988) theoretical framework, which links Hofstede's (1980) four cultural dimensions to disclosure. We predict and find that (i) the individualism (IND) dimension is positively associated with the quality of voluntary operational risk disclosures, and (ii) both uncertainty avoidance (UA) and power distance (PD) are negatively associated with risk disclosure. Next, we go beyond this theoretical framework and explore the potential relationship between Hofstede et al.'s (2010) long-term orientation (LTO) dimension and risk disclosure. We predict and find a positive association between LTO and voluntary operational risk disclosures, indicating that this cultural dimension should be considered as an extension of Gray's (1988) framework. Thus, transparency is more important in societies where there is a higher focus on the long-term, as firms establish lasting business relationships and solidify their market position. Our result is aligned with the predictions, but not the results of Hooi (2007); we believe this difference is due to our focused sample and more robust methodology. We use GLOBE's cultural scores for additional analyses and find consistent results. Furthermore, our findings remain unchanged when we use a subsample of banks belonging to countries from civil law countries.

In the second part of our study, we focus on global banks, which we identify via geographical dispersion. We find that the influence of IND and LTO cultural values on banks' risk disclosures is not present in this specific subsample, which suggests that bank executives develop a global mindset due to their interactions with different cultures. However, this effect is present only when it comes to IND and LTO. Thus, some cultural traits remain relevant, despite globalization.

Next, based on Gray's secrecy hypothesis and following Hope et al. (2008), we create a compound cultural variable to proxy for secrecy, circumventing the multicollinearity that exists between cultural

² The index is composed of several items that aim to capture quality. As noted by Mouselli et al. (2012), there is no clear definition of quality in the disclosure literature. In this study, quality is defined as the extent of relevant disclosures that convey information on operational risk. Other studies on risk disclosure, such as Grassa et al. (2021), use the same definition of quality. As in Barakat and Hussainey (2013), relevance is determined based on the CRD requirements (European Parliament, 2006) and items used in related studies (Ford et al., 2009; Helbok & Wagner, 2006).

variables. We find a negative association between a secretive culture and voluntary operational risk disclosure, which is absent in the case of global banks. This result is consistent with our expectations, and further supports our last hypothesis. An instrumental variable approach, in which the instrumental variable represents language, also provides consistent results.

Finally, we provide evidence that bank's contextual factors, particularly their regulatory, supervisory, and monitoring settings, affect the association between national culture and voluntary operational risk disclosures. Specifically, the higher the level of regulations, supervision, and monitoring in the country where the bank is headquartered, the lower the influence of culture. This suggests that contextual factors and national culture are substitutes, as we provide evidence that the marginal contribution of culture to disclosure is higher when banks have less regulation, supervision, and monitoring. However, this substitution effect is not complete, as the association of cultural values with voluntary operational risk disclosures is still significant when we consider the interaction effect between culture and contextual factors.

These findings should be of interest to the European Central Bank and national regulators. Moreover, analysts and investors interested in the banking industry should consider how culture can influence the quality of voluntary operational risk disclosures, as risk needs to be incorporated into valuation models. Finally, due to the importance of the banking industry in an economy, creditors should also be interested in what affects the quality of banks' voluntary operational risk disclosures.

While other studies have assessed the impact of culture on disclosure, we believe we extend the literature in several ways. First, we focus on the banking industry, as operational risk disclosures are industry-specific, which is likely to influence the national culture-risk disclosure relationship. While this industry is often excluded from empirical studies due to its unique characteristics and strict regulations, EU regulations are designed to ensure that banks' own funds are sufficient to cover this type of risk along different business lines (European Parliament, 2006).

Second, our score considers several aspects of operational risk disclosure, whereas other studies focus on a single aspect of operational risk, such as internal control, or examine the quantity of operational risk disclosures while disregarding their quality. For example, Hooghiemstra et al. (2015) analyze the association between the traditional four culture variables and the quantity (but not quality) of disclosures on internal controls made by an international sample of non-financial listed firms.

Third, we run our tests in the very specific context of the EU banking industry from 2008 onwards, taking into consideration the implementation of the CRD. Therefore, the findings of studies that focus on a different setting or a single country may not be applicable. For example, ElKelish and Hassan (2014) assess risk disclosures using a sample of firms from the United Arab Emirates, a country characterized by a high level of power distance and where "growth is not followed by the adoption of proper governance practices..." (ElKelish & Hassan, 2014, p.280), and considering only organizational culture.

We also expand the literature on how geographical dispersion diminishes the impact of culture. Zarzeski (1996) finds differences in the culture-disclosure relationship for firms with high and low international dependence, and Hope et al. (2008) indicate that a firm's degree of internationalization mitigates the relationship between secrecy and auditor choice. Our specific setting allows us to build on these prior findings, as we focus on a specific industry (banking, which was not considered in these studies), a more recent period (including a significant financial crisis, which led to a higher level of monitoring of banks' disclosures), and specific regulations. In fact, the implementation of the capital requirements directive (European Parliament, 2006) introduced changes that led to higher market discipline, with the goal of lowering the levels of risk, making risk disclosures an important vehicle for monitoring.

The remainder of this paper is structured as follows: Section two

provides the background and hypotheses' development; Section three is dedicated to explaining sample selection and the hand-collection of data; Section four presents the research design; Section five elaborates on the main findings; Section six discusses additional analyses; and Section seven brings forward the conclusions of the study.

2. Background and hypotheses development

National cultural values are informal institutions that are the basis of norms, beliefs, and morals, and are reflected not only in laws and regulations (Doupnik & Tsakumis, 2004; Gray, 1988) but also in the practices of society (Adler & Gundersen, 2007). We implicitly assume that national culture differences are associated with distinct management practices.³ Our aim is to explore whether national culture is associated with differences in the voluntary disclosure of operational risk in the EU banking industry despite the existing formal institutional environment.

Hofstede (1980, p. 25) defines culture as "the collective programming of the mind which distinguishes the members of one human group from another". Hofstede's (1980, 2001) cultural dimensions have been widely used in cross-cultural research. Accounting studies confirm that national culture differences are associated with a series of accounting related behaviors, such as change in management accounting systems (Williams & Seaman, 2001), the design and preference for management controls (Chow et al., 1999), the disclosure of internal control material weaknesses (Kanagaretnam et al., 2016), internal control disclosures (Hooghiemstra et al., 2015), risk-taking (Kanagaretnam et al., 2014), the cost of equity capital (Gray et al., 2013), auditor choice (Hope et al., 2008), and earnings management (Kanagaretnam et al., 2011).

Hofstede's national culture dimensions are based on a large survey study comprising more than 100,000 questionnaires administered at IBM's subsidiaries in 50 countries. This enabled the identification of four cultural dimensions: individualism *versus* collectivism, uncertainty avoidance, power distance, and masculinity *versus* femininity (Hofstede, 1980, 2001). Subsequently, a fifth dimension was added: long-term *versus* short-term orientation (Hofstede, 2001; Hofstede & Bond, 1988). More recently, Minkov (2007) analysis of World Values Survey (WVS) data led to the recalculation of the fifth dimension and the addition of a sixth dimension, indulgence *versus* restraint (Hofstede et al., 2010).⁴ The scores for each dimension indicate the position of each country in relation to other countries.

Similar to other authors (Hooi, 2007; Hope et al., 2008; Kanagaretnam et al., 2011; Kanagaretnam et al., 2016), we use Gray's (1988) theoretical model as the starting point to develop our hypotheses.⁵ This model maps Hofstede's (1980) cultural dimensions (societal values) onto accounting values. Gray (1988) identifies four accounting values: professionalism *versus* statutory control, uniformity *versus* flexibility, conservatism *versus* optimism, and secrecy *versus* transparency. This latter accounting value, associated with the preference for confidentiality and restrictions on information disclosure to outside parties, relates more to disclosure (Doupnik & Tsakumis, 2004; Gray, 1988), and hence, to the quality of voluntary operational risk disclosure. However, since prior research has provided mixed findings regarding the association between disclosure and national culture (Doupnik & Tsakumis, 2004; Hooi, 2007; Hope, 2003; Jaggi & Low, 2000) and given that our research is focused on a specific industry that should be analyzed independently from non-financial firms (Linsley & Shrivess, 2006), we next discuss Gray's (1988) predictions.

³ We posit that managers are influenced by the cultural values of the countries where firms are located and make decisions on risk disclosure accordingly. This is due to the need to conform with society's values.

⁴ We address the fifth and sixth dimensions separately in section 6 since there is no theoretical framework linking them to the disclosure of accounting information.

⁵ Our analyses use the original format, non-rescaled, scores.

Hofstede (1980) defines individualism *versus* collectivism as the degree to which an individual is more important than a collective or group. Gray (1988) proposes that countries with high collectivism (individualism) scores tend to be more secretive (transparent) in the disclosure of accounting information. In individualistic societies, decisions are made based on what is best for an individual. In addition, in these societies, individuals are more competitive. Therefore, bank managers in individualistic societies are expected to be more prone to enhance quality risk disclosures to make them look better, compared to others, lowering the probability of executive turnover and increasing their career prospects. According to Hofstede (2011), individualism scores are higher in developed and Western countries, and collectivism scores are higher in less developed and Eastern countries. We find sufficient variation across the EU countries.

While Hooi (2007) predicts a positive association between individualism and overall banking disclosures, he fails to find supporting evidence. This may be due to two methodological issues: (i) the high correlation that exists among the cultural dimensions is ignored, and they are included simultaneously in the model, and (ii) the model does not include any control variables. Analyzing a sample of large non-financial firms, Hope (2003) finds that individualism is positively associated with disclosure, after controlling for legal origin. Based on these arguments, and considering that controlling for the formal institutional setting is fundamental in our research design, we state our first hypothesis as follows:

H1. Individualism (collectivism) is positively (negatively) associated with the quality of operational risk disclosures that banks voluntarily disclose in their annual and risk reports.

Uncertainty avoidance is the extent to which individuals feel uncomfortable when facing unexpected situations (Hofstede, 1980, 2001). Gray (1988) states that in countries with high uncertainty avoidance, firms tend to be more (less) secretive (transparent) in the disclosure of accounting information to maintain security and avoid conflict. Accordingly, in uncertainty-avoidant societies, bank managers can withhold the disclosure of risk information to protect themselves from unexpected reactions, especially if this information is not favorable. However, in line with legitimacy theory (Dowling & Pfeffer, 1975; Lindblom, 1994), uncertainty avoidance may prompt listed banks' management to foster higher risk disclosure quality to improve reputation and reinforce legitimacy (Oliveira et al., 2011, 2013). Resource dependence (Pfeffer & Salancik, 2003) and stakeholder (Freeman, 2010) theories provide additional arguments for a positive association between uncertainty avoidance and superior risk disclosures. First, bank management may want to use risk disclosures to convey, to current and prospective investors, an image of stability in order to reduce banks' cost of capital (Botosan, 1997; Botosan & Plumlee, 2002; Kothari et al., 2009). Second, they may want to drive away unexpected negative market reactions that could escalate to another important type of stakeholders: customers, whose lack of confidence in the banks where they hold deposits may prove decisive for the survival or extinction of banks.

Without controlling for a country's formal institutional environment and including several cultural dimensions in the same model, Hooi (2007) finds a significant negative relationship between uncertainty avoidance and banking disclosure. Controlling for legal origin and using a sample of non-financial firms, both Jaggi and Low (2000) and Hope (2003) find no significant association between this dimension and disclosure. Therefore, it is difficult to predict the association between the uncertainty avoidance dimension and risk disclosure by banks.

Power distance is the degree to which less powerful members in societies accept an unequal distribution of power. Gray (1988) proposes that firms in high-power distance societies tend to be more (less) secretive (transparent) in the disclosure of accounting information to preserve power inequalities. This proposition of a negative association between power distance and transparency is a sensible general argument

consistent with the maintenance of information asymmetry. Nonetheless, in high-power distance societies, bank management should be compelled to comply with mandatory risk disclosure requirements, since supervisors will be more powerful in the management-supervisor power relationship. Likewise, bank management could be prone to enhancing voluntary risk disclosure because shareholders will be more powerful in the management-shareholder power relationship.

Hooi (2007) finds no significant relationship between banking disclosure and power distance, and both Jaggi and Low (2000) and Hope (2003) obtain identical results after controlling for legal origin and using a sample of non-financial firms. Therefore, it is difficult to predict the association between power distance and risk disclosure by banks.

Gray (1988, p.11) states that the secrecy accounting value is likely to have “a significant but less important link with masculinity”. Masculinity *versus* femininity refers to the gap between what was then perceived as men’s values (“assertive and competitive”) and women’s values (“modest and caring”) in most societies. In more masculine societies, this gap is large, whereas in more feminine societies, it is small. Therefore, Gray (1988, p.11) concludes that low masculinity (high femininity) societies are places where “more emphasis is given to the quality of life, people, and the environment, will tend to be more open, especially as regards socially related information”. Therefore, Gray’s (1988) fourth hypothesis predicts a positive association between masculinity and secrecy.

On the one hand, following Gray’s (1988) reasoning, femininity (masculinity) is expected to be positively (negatively) associated with the quality of voluntary operational risk disclosure due to the importance of banks’ soundness in ensuring the stability of the financial system, the impact of the latter on the economy, and ultimately on society’s welfare. On the other hand, voluntary risk disclosure practices are likely to be positively associated with masculinity since this dimension relates to materialism and the achievement of high performance. Banks’ management will be willing to disclose as much information as possible to convey an image of responsibility and competence to society.

Contrary to Gray’s (1988) theoretical hypothesis, previous research excluding financial firms and controlling for legal origin found a negative association between masculinity and disclosure (Hope, 2003; Jaggi & Low, 2000). Thus, confirming that predicting a sign for this relationship is not straightforward. Based on the above discussion, we state our second hypothesis in the null form as follows:

H2: Uncertainty avoidance, power distance, and masculinity *versus* femininity are not associated with the quality of operational risk disclosures that banks voluntarily disclose in their annual and risk reports.

Gray’s (1988) theoretical framework precedes the emergence of Hofstede’s fifth and sixth dimensions (long-term *versus* short-term orientation, and indulgence *versus* restraint). Therefore, there is no theoretical foundation linking these two cultural values to accounting values and, specifically, to the disclosure of accounting information. We find no theoretical basis for indulgence to be associated with firms’ risk disclosure, and so we focus on long-term orientation.⁶ Societies that score higher on the long-term orientation dimension enhance the future to the detriment of the present, and actions taken in the present are weighted on future consequences. Individuals attribute success to effort (and failure to lack of effort) and consider perseverance to be important goals. Long-term orientation scores are higher in Eastern and Central Europe, while Southern and Northern European countries take the middle position.

⁶ The sixth dimension added by Hofstede et al. (2010), originates from Minkov’s (2007) work using data from the WVS dataset. Indulgent societies allow the satisfaction of human desires. These societies value leisure, practicing sports, freedom of speech, and happiness, but do not prioritize maintaining order.

On the one hand, we expect long-term orientation to be associated with better-quality risk disclosure practices, since listed banks’ management will be more eager to prepare disclosures that benefit banks’ future reputation and legitimacy. Bank management may also use risk disclosure to improve a bank’s competitive position relative to others. On the other hand, bank management may consider the disclosure of such information to negatively affect the banks’ future competitive position due to proprietary costs and withhold risk disclosures through publicly available sources, such as annual reports and risk reports (Verrecchia, 1983; Wagenhofer, 1990).

As previously mentioned, risk management is crucial to the success of financial institutions, and higher-quality risk disclosures could encourage competing banks to adopt improved risk management practices due to mimetic pressures. These two competing arguments point in opposite directions regarding the relationship between long-term orientation and the quality of voluntary risk disclosure. However, we conjecture that bank managers perceive long-term benefits outweighing the proprietary costs of disclosure because banks operate in a highly regulated and supervised industry, where there is a considerable demand for risk disclosures. Thus, making the costs of disclosure to play a minor role in the disclosure decision. Therefore, we expect a positive association between long-term orientation and voluntary operational risk disclosures. Based on these arguments, we propose our third hypothesis.

H3: Long-term orientation is positively associated with the quality of operational risk disclosures that banks voluntarily disclose in their annual and risk reports.

The degree of bank internationalization could have an impact on the previously proposed relationships. According to Sanders and Carpenter (1998), the degree of internationalization reflects the geographical dispersion of a firm’s dependence on foreign markets for customers and resources. This geographical dispersion translates into banks’ boards of directors being more exposed to foreign cultures and having to abide by stakeholders’ demands in different institutional settings, which, in turn, are influenced by the cultural traits in these countries.

Hope et al. (2008) indicate that a firm’s degree of internationalization mitigates the relationship between the secrecy accounting value and auditor choice. Likewise, Zarzeski (1996) finds differences in the culture-disclosure relationship for firms with high and low international dependence. Therefore, we propose our fourth hypothesis as follows:

H4: The association between national culture values and the quality of operational risk disclosures that banks voluntarily disclose in their annual and risk reports is weaker for global banks.

3. Sample selection and data

3.1. Sample

Our period of analysis starts in 2008, when most EU countries implemented the CRD by the European Parliament and Council (European Parliament, 2006), and ends in 2013, a period when only one EU directive was in force (CRD packages I to III).⁷ Our initial sample includes all listed EU banks that are available in the Bankscope database in 2014 under the database’s five main banking specializations: bank holdings and holding companies, commercial banks, investment banks, savings banks, and cooperative banks. Restricting our sample to EU banks allows us to analyze the association between national culture and voluntary operational risk disclosure without having to control for different disclosure regulations.

The initial search yielded 171 banks. After collecting all available annual and risk reports, we found it difficult to find corporate

⁷ CRD IV came into force on 1 January 2014.

governance data for all relevant variables identified by Barakat and Hussainey (2013). Therefore, we dropped 73 banks and obtained a maximum potential number of 588 observations. We collect operational risk disclosure information for our index based on the annual and risk reports of the remaining 98 banks. We lose 45 observations for which information on operational risk disclosure is unavailable or inaccessible. Finally, due to the lack of national culture data and complete financial data, we lost 52 and 49 additional observations, respectively.

Panel A of Table 1 shows how the sample selection and data collection process led us to a final sample of 454 bank-year observations. These data cover 87 banks located in 15 EU countries. We obtain country-level controls from published sources, namely, the European Central Bank, World Bank’s World Development Indicators Database, Barth et al. (2013), La Porta et al. (1998), and Spamann (2010).

Panel B of Table 1 presents the yearly distribution of the sample, which is well-distributed across time. The lowest percentage of observations occurred in 2008 (14.1 %) and the highest in 2013 (18.7 %); the former due to lower annual and risk report availability.

Panel C of Table 1 shows the country distribution of the sample, distinguishing between global and regional/local banks. The distribution across countries is highly uneven, with Italy having the highest number of observations, followed by the United Kingdom (UK) and Denmark, and these three countries account for almost half of the observations in the sample. Moreover, the country with the highest representation of global banks is the UK, followed by France. Together, they account for over a third of global banks.

Table 1
Sample selection and distribution.

Panel A: Sample Selection				
	Banks			
Bankscope’s EU listed banks in 2014	171			
Banks for which there is not complete data on corporate governance	(73)			
	98			
	Bank-years			
Potential sample of EU listed banks 2008–2013	588			
Missing data on operational risk disclosure	(45)			
Missing data on national culture	(52)			
Missing data on other bank-level controls	(49)			
Final sample	454			
Corresponding to 87 banks in 15 EU countries for the period 2008–2013				
Panel B: Sample Distribution by Year				
Year	Frequency	%		
2008	64	14.1		
2009	72	15.9		
2010	75	16.5		
2011	78	17.2		
2012	80	17.6		
2013	85	18.7		
Panel C: Sample Distribution by Country and bank classification as either global or regional/local				
Country	Global banks		Regional/Local banks	
	Frequency	%	Frequency	%
Austria	6	4.1	16	5.2
Denmark	0	0.0	51	16.5
Finland	0	0.0	6	1.9
France	23	15.9	0	0.0
Germany	12	8.3	15	4.9
Greece	6	4.1	2	0.6
Hungary	0	0.0	6	1.9
Ireland	0	0.0	12	3.9
Italy	18	12.4	83	26.9
Netherlands	6	4.1	12	3.9
Poland	0	0.0	41	13.3
Portugal	13	9.0	6	1.9
Spain	19	13.1	15	4.9
Sweden	12	8.3	16	5.2
United Kingdom	30	20.7	28	9.1
Total	145	100.0	309	100.0

3.2. Voluntary operational risk disclosure score

The voluntary operational risk disclosure score is based on the criteria of Barakat and Hussainey (2013). Although the disclosure items and sub-items are almost identical, two adjustments to the criteria were made due to the distinct disclosure patterns found in the data. First, we added the definition of operational risk and information on operational risk-weighted assets. When collecting the data, we found differences in the definition of operational risk since not all banks provide a definition. Additionally, some banks present information on operational risk-weighted assets. Second, we separate Barakat and Hussainey’s (2013) item “internal audit function/internal control system” into two distinct items, one measuring internal audit function and another measuring internal control system disclosures. We perform this split because not all banks that disclose information about the internal audit function provide information on the internal control system. The changes to the score make this more precise.

The score is composed of 17 items, each with its respective subitems. One point is added each time information regarding each sub-item is disclosed (zero otherwise), leading to a maximum of 65. The score is composed of 6 mandatory items (according to Pillar 3 of the CRD) and 59 voluntary items. Therefore, for each bank, the voluntary operational risk disclosure score is obtained by subtracting the value for the mandatory items from the total operational risk disclosure score. Appendix A provides a description of the items and sub-items used in the operational risk disclosure score.

4. Research design

The first and third hypotheses argue that individualism and long-term orientation are positively associated with voluntary operational risk disclosure quality, whereas the second hypothesis argues that uncertainty avoidance, power distance, and masculinity are not. To test these expectations, the following model is used:

$$\begin{aligned}
 DISC_SCORE_{i,s,k,t} = & \alpha_0 + \alpha_1 CUL_k + \alpha_2 Bank_subs_{i,s,k,t} + \alpha_3 Racar_{i,s,k,t} \\
 & + \alpha_4 Size_{i,s,k,t} + \alpha_5 Cross_list_{i,s,k,t} + \alpha_6 Ama_{i,s,k,t} \\
 & + \alpha_7 Gov_BoD_{i,s,k,t} + \alpha_8 Nonexec_BoD_{i,s,k,t} \\
 & + \alpha_9 Exec_own_{i,s,k,t} + \alpha_{10} Largest_own_{i,s,k,t} \\
 & + \alpha_{11} Gov_own_{i,s,k,t} + \alpha_{12} Ac_size_{i,s,k,t} + \alpha_{13} Risk_com_{i,s,k,t} \\
 & + \alpha_{14} Bank_Stability_{i,s,k,t} + \alpha_{15} Concentration_k \\
 & + \alpha_{16} GDP_capita_{k,t} + \alpha_{17} Bank_k,t + \alpha_{18} Legal_k + \alpha_{19} Invp_k \\
 & + \lambda Year_t + \varphi Specialization_s + \epsilon_{i,s,k,t}
 \end{aligned}
 \tag{1}$$

where the dependent variable *DISC_SCORE* is the voluntary operational risk disclosure score of bank *i* with specialization *s* in country *k* in year *t*. *CUL* is the score for each cultural dimension, which are taken into consideration alternatively in the model. These cultural dimensions are IND, UA, PD, MAS, and LTO. All cultural dimensions are measured at the country level and are obtained from Hofstede et al. (2010). The focus of the analysis is the coefficient of *CUL* (α_1). Consistent with hypotheses 1 to 3, we expect α_1 to be significantly positive when national culture is measured as IND and LTO and not significant if national culture is measured as UA, PD, or MAS.

We include several bank-level controls. *Bank_subs* is an indicator variable coded as one when a bank is a subsidiary of another bank and zero otherwise. We expect a positive coefficient for this variable, because there could be more incentives for a subsidiary to provide risk disclosures for the parent company’s consolidated report. *Racar* is the natural logarithm of the risk-adjusted capital assets ratio. We expect the coefficient for this variable to be negative, since lower-capitalized banks will enhance their risk disclosure levels to attract financial resources. *Size* is the natural logarithm of the total assets. Larger firms tend to disclose more information (Ahmed & Courtis, 1999; Barakat &

Hussainey, 2013; Hope, 2003; Zarzeski, 1996), so we expect a positive coefficient for this variable. *Cross_list* is an indicator variable coded as one when a bank is registered with the United States Securities and Exchange Commission (SEC) and zero otherwise. This variable controls for a possible positive association between cross-listing status and disclosure (Ahmed & Courtis, 1999; Hooghiemstra et al., 2015). *Ama* is an indicator variable coded as one when a bank uses the advanced measurement approach (AMA) for operational risk and zero otherwise. We expect banks using AMA to provide higher-quality risk disclosures because it involves more sophisticated measurement techniques that need to be explained.

Gov_BoD is an indicator variable coded as one when a bank has at least one member of the board appointed by the government and zero otherwise. We include this control because some failed banks, albeit a few, were rescued through financial stability funds without the government participating as a shareholder. A negative association is expected between this variable and the quality of risk disclosures since managers of troubled banks have disincentives for disclosure.

Nonexec_BoD, *Exec_own*, *Largest_own*, and *Gov_own* are bank-level governance variables to control for, respectively, the proportion of non-executive members of the board, the proportion of voting rights held by executives, the proportion of voting rights held by the largest shareholder, and government ownership of five percent or more of the voting rights. A positive association is expected between the proportion of non-executive members on the board of directors and our voluntary operational risk disclosure score, since this variable has been linked to higher transparency (Barakat & Hussainey, 2013; Frankel et al., 2011). According to agency theory, concentrated executive ownership may be associated with higher disclosure levels due to the closer alignment between shareholders and management's interests (Jensen & Meckling, 1976). Alternatively, considering the management entrenchment theory, it may be associated with lower disclosure levels, since bank management will be more inclined to withhold information to obtain private benefits. We expect a positive coefficient for both *Largest_own* and *Gov_own*, since a shareholder or government with considerable voting rights may be an effective outside monitor of bank management and demand higher-quality risk disclosures. *Ac_size* represents the size of the Audit Committee. An excessive number of individuals in the audit committee may hamper the committee's effectiveness, as occurs in relation to board size (Wang & Hsu, 2013), so we expect a negative coefficient for this variable. *Risk_com* is an indicator variable coded as one when a bank has set up a risk committee separately from the audit committee and zero otherwise. The existence of a risk committee may indicate a higher concern with risk; therefore, we anticipate a positive sign for this variable's coefficient. *Bank_stability* is calculated as the standard deviation of daily stock returns per year. We expect the coefficient of this variable to be negative, with more stable banks providing less risk disclosure.

We also include *Concentration*, *GDP_capita*, *Bank*, *Legal*, and *Invp* as country-level controls. *Concentration* measures the level of competition in the banking industry. We expect a negative coefficient for this variable since higher (lower) competition (concentration) may influence banks' management decision to disclose more risk information (Barakat & Hussainey, 2013). The gross domestic product (GDP) per capita (*GDP_capita*) measures economic development as prior research shows that it affects reporting quality (Christensen et al., 2013; Kanagaretnam et al., 2011). We expect a negative sign for this coefficient (Grassa et al., 2021) because banks in EU countries with lower economic development may need to increase disclosures to attract financial resources. *Bank* measures banks' regulatory, supervisory, and monitoring settings that may impact disclosure (Barakat & Hussainey, 2013). These settings may have a positive or negative impact on voluntary risk disclosure, depending on whether the positive effect of supervisor power, independence, and private monitoring indices outweighs the negative effect of the activity restrictions index on our risk disclosure score. *Legal* is an indicator variable coded as one when a civil law legal system exists in a

country and zero otherwise. We expect a negative coefficient for this variable because previous research found higher disclosure from firms in common-law countries (Ball et al., 2000; Hope, 2003). *Invp* measures investor protection. We expect a positive coefficient because better investor protection is associated with higher-quality disclosure (Francis et al., 2005; Hooghiemstra et al., 2015).

Finally, *Year* captures time fixed-effects (year 2008 is used as the reference point) and *Specialization* captures specialization fixed-effects ("bank holdings and holding companies" specialization is used as the reference category). Appendix B provides detailed definitions and sources of all variables used in the regressions.

To test our fourth hypothesis, which states that the association between national culture and the quality of voluntary operational risk disclosures for EU banks is weaker in the case of global banks, we use the following model.

$$\begin{aligned}
 DISC_SCORE_{i,s,k,t} = & \beta_0 + \beta_1 CUL_k + \beta_2 GLOBAL_{i,s,k,t} + \beta_3 GLOBAL_{i,s,k,t} \times CUL_k \\
 & + \beta_4 Bank_subs_{i,s,k,t} + \beta_5 Racar_{i,s,k,t} + \beta_6 Size_{i,s,k,t} \\
 & + \beta_7 Cross_list_{i,s,k,t} + \beta_8 Ama_{i,s,k,t} + \beta_9 Gov_BoD_{i,s,k,t} \\
 & + \beta_{10} Nonexec_BoD_{i,s,k,t} + \beta_{11} Exec_own_{i,s,k,t} \\
 & + \beta_{12} Largest_own_{i,s,k,t} + \beta_{13} Gov_own_{i,s,k,t} + \beta_{14} Ac_size_{i,s,k,t} \\
 & + \beta_{15} Risk_com_{i,s,k,t} + \beta_{16} Bank_Stability_{i,s,k,t} \\
 & + \beta_{17} Concentration_{k,t} + \beta_{18} GDP_capita_{k,t} + \beta_{19} Bank_{k,t} \\
 & + \beta_{20} Legal_k + \beta_{21} Invp_k + \theta Year_t + \tau Specialization_s \\
 & + \nu_{i,s,k,t}
 \end{aligned}
 \tag{2}$$

where *GLOBAL* is an indicator variable coded as one when the bank is considered global, and zero otherwise. Sullivan (1994) indicates that financial measures alone may not be good proxies for the degree of internationalization, so *GLOBAL* focuses on geographical dispersion. A bank is considered global if it is present on at least three continents; it must have at least one subsidiary/branch in each continent and may have several representative offices. The definitions of the remaining variables and expected coefficients have been discussed previously.

We focus on the coefficient of the interaction between *GLOBAL* and *CUL* (β_3). Consistent with H4, β_3 is expected to have the opposite sign to the coefficient of *CUL* (β_1) and be statistically significant to show a weaker association between cultural values and voluntary operational risk disclosures in the case of global banks.

The models are estimated using weighted least squares regression (WLS) because, as previously mentioned, the number of observations per country is highly uneven. The weight of each observation is inversely proportional to the number of observations per country. This avoids bias in our results for more heavily represented countries in the sample. Following Petersen (2009), to account for the existence of both firm and

Table 2
Descriptive statistics for bank-level variables.

Variable	Num. Obs.	Min	Median	Mean	SD	Max
DISC_SCORE	454	0.00	10.00	10.23	4.88	22.00
GLOBAL	454	0.00	0.00	0.32	0.47	1.00
Bank_subs	454	0.00	0.00	0.17	0.37	1.00
Racar	454	0.66	3.22	3.16	0.72	5.22
Size	454	6.15	10.77	10.79	2.26	14.74
Cross_list	454	0.00	0.00	0.11	0.31	1.00
Ama	454	0.00	0.00	0.19	0.39	1.00
Gov_BoD	454	0.00	0.00	0.05	0.22	1.00
Nonexec_BoD	454	35.71	72.73	75.52	17.11	100.00
Exec_own	454	0.00	0.02	1.44	6.49	54.10
Largest_own	454	0.00	14.98	28.28	27.44	100.00
Gov_own	454	0.00	0.00	0.13	0.34	1.00
Ac_size	454	0.00	4.00	4.31	1.82	12.00
Risk_com	454	0.00	0.00	0.37	0.48	1.00
Bank_stability	454	0.13	2.50	2.79	1.47	14.86

Note: Refer to Appendix B for variables' definitions.

time effects, we cluster standard errors by bank and include year and specialization dummies.

Following Zheng et al. (2012) and El Ghoual and Zheng (2016) and given that the cultural variables are highly correlated (discussed below), we estimate the equations for each cultural variable one at a time to avoid multicollinearity issues. To circumvent this multicollinearity problem, as in Hope et al. (2008) we use Gray's secrecy hypothesis as the basis for a compound cultural variable. Secrecy is calculated as the sum of UA, PD, and MAS minus the sum of IND and LTO. A higher value indicates a more secretive culture.

5. Results

5.1. Descriptive statistics and pairwise correlations

Table 2 presents descriptive statistics for our bank-level variables. The average score for the voluntary operational risk disclosure quality index is 10.23, with a minimum value of 0 and a maximum of 22, out of a possible maximum of 59.⁸ Thus, there is still ample room for improvement in banks' voluntary disclosure quality levels, for this type of risk. The GLOBAL mean value indicates that 32 percent of our sample is composed of global banks.

Table 3 presents the scores of the country-level variables for each country in the sample. We find a wide variation in the values of the culture variables. For example, Secrecy ranges between -59 and 149. This level of variability means that our sample comprises countries with diverse cultural patterns. Finally, the level of variability of the control variables justifies their inclusion in the models.

Table 4 displays Pearson's correlations. Correlations that are statistically significant at a 5 percent confidence level are reported in bold. The voluntary operational risk disclosure score is significantly and positively correlated with Hofstede's power distance (value is 0.107) and long-term orientation (value is 0.292), and negatively correlated with masculinity (value is -0.172). These correlations are further assessed in the multivariate analyses.

Among the country-level institutional variables, some correlations are high with absolute values higher than 60 percent. Regarding Hofstede's scores, uncertainty avoidance is highly negatively correlated with individualism and highly positively correlated with power distance. These high correlations indicate that to avoid multicollinearity issues, we should be cautious when conducting analyses where we include some of these variables simultaneously. For each regression, we calculate the variance inflation factors (VIF) and assume no severe multicollinearity issues as long as the VIF values are below 10 (Gujarati, 2003).

5.2. Association between voluntary operational risk disclosure quality and cultural dimensions

Table 5 reports estimation results for model (1). In column (1), a positive significant coefficient for IND (0.102) indicates a higher risk disclosure quality in countries higher levels of individualism. Economically, this means that an increase in individualism by one standard deviation (16.34) contributes to an increase in our voluntary risk disclosure score of 1.67. Considering that the average disclosure score is 10.23, this represents an increase of 16 percent of the sample average.

Contrary to our expectations, columns (2) and (3) of Table 5 show evidence of a significant negative association between voluntary

⁸ Barakat and Hussainey (2013) reported a minimum value of 0, a mean value of 9.19 and a maximum value of 24 for their voluntary operational risk disclosure index for the period of 2008–2010 for a sample of 85 EU banks.

Table 3 Country-level variables for each sample country.

	Austria	Denmark	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Netherlands	Poland	Portugal	Spain	Sweden	United Kingdom
IND	55	74	63	71	67	35	80	70	76	80	60	27	51	71	89
UA	70	23	59	86	65	112	82	35	75	53	93	104	86	29	35
PD	11	18	33	68	35	60	46	28	50	38	68	63	57	31	35
MAS	79	16	26	43	66	57	88	68	70	14	64	31	42	5	66
LTO	60	35	38	63	83	45	58	24	61	67	38	28	48	53	51
Secrecy	45	-52	17	63	16	149	78	37	58	-42	127	143	86	-59	-4
IGC	4.89	3.63	4.23	4.66	4.38	5.28	5.31	5.12	4.99	3.79	5.55	5.64	5.53	3.46	4.08
UA_G	5.10	5.32	5.11	4.66	5.27	3.52	3.26	4.25	3.85	4.81	3.71	3.96	3.95	5.36	4.70
PD_G	5.00	4.14	5.08	5.68	5.59	5.50	5.57	5.13	5.45	4.32	5.09	5.50	5.53	4.94	5.26
AST	4.59	4.04	4.05	4.44	4.72	4.55	4.71	3.93	4.12	4.46	4.11	3.75	4.39	3.41	4.23
Pronoun_drop	0	0	0	0	0	1	1	0	1	0	1	1	1	0	0
Politeness	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Strong_fr	0	0	0	1	0	1	1	1	1	0	1	1	1	0	1
Language	-1.63	-1.63	-1.63	-0.18	-1.63	1.21	3.04	-0.18	1.21	-1.63	1.21	1.21	1.21	-1.63	-0.18
Supervisor (2008–2010)	13	12	11	10.5	9	11	17.5	14	9	12.2	11	17	13.5	10	8
Supervisor (2011–2013)	15	13	8	13	12	10	16	9	14	13	13	15	12	10	8
Restrict (2008–2010)	5	7	7	7	5	6	9	5	9	5	7	9	5	8	3
Restrict (2011–2013)	4	7	5	8	5	6	9	4	7	5	11	5	5	8	4
Monitor (2008–2010)	6	10	8	8	9	8	9	10	8	11	8	7	9	7	10
Monitor (2011–2013)	8	8	7	10	7	8	8	11	8	8	9	6	9	7	10
Bank (2008–2010)	1.24	-0.56	0.26	0.14	-1.28	-0.54	1.79	-0.63	0.33	-1.59	0.26	2.73	-0.22	0.82	-2.58
Bank (2011–2013)	0.39	0.73	-0.46	-0.06	0.48	-0.25	0.89	-2.60	0.96	0.19	1.28	1.71	-0.57	0.82	-2.31
Legal	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0
Invp	2.5	4	3.5	3	2.5	2	2	4	2.5	3	2	2.5	5	3.5	5

Note: Refer to Appendix B for variables' definitions.

Table 4
Pairwise Pearson correlations for country-level variables used in regressions.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	
(1) DISC_SCORE	1.000																		
(2) Secrecy	-0.131	1.000																	
(3) IND	0.069	-0.704	1.000																
(4) UA	-0.015	0.915	-0.686	1.000															
(5) PD	0.107	0.727	-0.387	0.773	1.000														
(6) MAS	-0.172	0.476	0.073	0.329	0.063	1.000													
(7) LTO	0.292	-0.262	0.376	0.038	-0.064	0.189	1.000												
(8) IGC	-0.145	0.936	-0.588	0.800	0.603	0.586	-0.280	1.000											
(9) UA_G	0.245	-0.802	0.307	-0.695	-0.681	-0.504	0.245	-0.827	1.000										
(10) PD_G	0.105	0.670	-0.311	0.641	0.587	0.549	0.186	0.641	-0.515	1.000									
(11) AST	0.043	0.227	0.084	0.379	0.058	0.565	0.600	0.237	-0.210	0.272	1.000								
(12) Language	-0.230	0.758	-0.238	0.651	0.680	0.509	-0.202	0.791	-0.961	0.596	0.176	1.000							
(13) GLOBAL	0.293	0.176	-0.242	0.271	0.314	-0.104	0.175	0.058	-0.011	0.306	0.085	0.035	1.000						
(14) Concentration	-0.053	-0.065	-0.256	0.032	0.053	-0.637	-0.372	-0.211	0.001	-0.412	-0.222	-0.108	-0.009	1.000					
(15) GDP_capita	-0.254	-0.345	0.433	-0.332	-0.290	-0.013	0.060	-0.268	-0.002	-0.232	-0.034	0.130	-0.292	0.050	1.000				
(16) Bank	-0.106	0.322	-0.402	0.421	0.231	-0.066	-0.037	0.288	-0.202	0.115	-0.152	0.267	-0.031	0.092	0.286	1.000			
(17) Legal	-0.002	0.168	-0.358	0.470	0.255	-0.284	0.322	0.057	-0.011	-0.009	0.168	0.026	0.071	0.223	0.163	0.666	1.000		
(18) Invp	0.103	-0.473	0.312	-0.598	-0.305	-0.315	-0.244	-0.355	0.360	-0.224	-0.285	-0.291	0.020	-0.029	-0.111	-0.577	-0.550	1.000	

Notes: Correlations statistically significant at the 5% level or higher are reported in bold. See Appendix B for the variable definitions.

operational risk disclosure quality and (i) uncertainty avoidance and (ii) power distance. Our uncertainty avoidance result is not consistent with previous empirical research that controls for legal origin (Hope, 2003; Jaggi & Low, 2000), but is consistent with the findings of Hooi (2007) and the prediction of Gray(1988). Regarding power distance, our results are consistent with Gray's (1988) theoretical framework but differ from previous empirical studies that find PD to not be significant (Hooi, 2007; Hope, 2003; Jaggi & Low, 2000). According to Gray (1988), in societies with more uncertainty avoidance, there is more secrecy towards accounting disclosure to avoid any conflicts, and in societies with more power distance, there is more secrecy towards accounting disclosure to preserve power inequalities. As shown in column (4) of Table 5 and as predicted in H2, masculinity is not associated with the quality of voluntary operational risk disclosure.

As proposed in H3, column (5) of Table 5 confirms that there is a significant positive association between long-term orientation and the quality of voluntary operational risk disclosure (coefficient is 0.129). The economic meaning of the coefficient is that an increase in long-term orientation by one standard deviation (15.39) contributes to an increase in our disclosure score of 1.99, which, considering an average score of 10.23, represents an increase of 19 percent of the sample's average. This result supports H3.

Regarding bank-level control variables, we find that banks that (i) have a lower capitalization, (ii) are larger, (iii) use an advanced measurement approach, (iv) have no member of the board appointed by the government, (v) have a low proportion of voting rights held by executives, and (vi) have lower returns' stability are associated with higher quality voluntary operational risk disclosures. This is consistent with our expectations. Regarding country-level controls, we find that banks in countries with lower economic development provide better quality disclosures.

5.3. Interaction effects of internationalization on the association between voluntary operational risk disclosure quality and cultural dimensions

Next, we test H4, which states that the association between cultural values and the quality of voluntary operational risk disclosures is weaker among global banks. Table 6 presents the results of estimating model (2). Overall, regardless of the cultural value being considered (IND, UA, PD, or LTO), as expected the coefficient of the interaction term between CUL and GLOBAL (β_3) has the opposite sign to the coefficient of the culture variable (β_1). However, the coefficient of the interaction term is statistically significant only for individualism and long-term orientation. In column (1), we find that the coefficient for IND is 0.169, and that the coefficient for the interaction between GLOBAL and IND is -0.144. Column (5) shows that the coefficient for LTO is 0.163 and that for the interaction between GLOBAL and LTO it is -0.160. In both cases, the sum of the two coefficients is not statistically significant (sum = 0.025 with a p-value = 0.701 and sum = 0.003 with a p-value = 0.967 for IND and LTO, respectively). Thus, these results provide initial support for H4.

To test the robustness of our results, we use Secrecy, a compound cultural variable based on Gray's (1988) secrecy hypothesis. Based on the literature review, we presume that firms in a more secretive culture will disclose less and provide lower quality disclosures. We expect Secrecy, calculated as the sum of UA, PD, and MAS minus the sum of IND and LTO, to be negatively associated with voluntary operational risk disclosures.⁹ Table 7 presents the results of this analysis. Column (1) shows a significantly negative association between secrecy and

⁹ Gray (1988) proposes that societies characterized by high uncertainty avoidance, high power distance, high masculinity, and low individualism are more secretive. Long-term orientation is not included in Gray's (1988) framework and, consistent with our H3 and with the sign of the coefficient for this variable in Column (5) of Table 5, we predict that societies that score higher in long-term orientation will be less secretive.

Table 5
Regressions of Hofstede’s cultural dimensions (*IND*, *UA*, *PD*, *MAS*, and *LTO*) on voluntary operational risk disclosure quality.

Dependent Variable: DISC_SCORE										
	(1)		(2)		(3)		(4)		(5)	
	CUL = IND		CUL = UA		CUL = PD		CUL = MAS		CUL = LTO	
CUL	0.102 (2.060)	**	-0.054 (-2.060)	**	-0.059 (-2.110)	**	-0.038 (-1.320)		0.129 (3.230)	***
Bank subs	1.292 (0.850)		1.479 (0.910)		1.766 (1.010)		0.559 (0.350)		1.690 (1.220)	
Racar	-1.503 (-3.110)	***	-1.355 (-2.390)	**	-1.276 (-2.340)	**	-1.434 (-2.690)	***	-1.391 (-2.780)	***
Size	1.363 (5.390)	***	1.386 (5.020)	***	1.393 (5.080)	***	1.218 (4.590)	***	1.094 (3.820)	***
Cross_list	-0.669 (-0.620)		-0.046 (-0.040)		-0.279 (-0.220)		0.065 (0.050)		-0.615 (-0.530)	
Ama	1.682 (1.850)	*	2.250 (2.630)	***	2.569 (3.090)	***	2.417 (2.800)	***	1.956 (2.180)	**
Gov_BoD	-2.971 (-2.770)	***	-3.765 (-3.110)	***	-3.980 (-3.130)	***	-4.030 (-3.230)	***	-3.060 (-2.740)	***
Nonexec_BoD	0.011 (0.460)		0.027 (1.110)		0.032 (1.300)		0.027 (1.030)		0.029 (1.500)	
Exec_own	-0.099 (-3.220)	***	-0.059 (-1.810)	*	-0.057 (-1.740)	*	-0.075 (-2.470)	**	-0.113 (-3.940)	***
Largest_own	-0.012 (-0.600)		-0.013 (-0.530)		-0.008 (-0.320)		-0.002 (-0.080)		-0.003 (-0.130)	
Gov_own	1.228 (1.460)		0.843 (1.000)		1.331 (1.640)		0.946 (1.020)		1.903 (2.220)	**
Ac_size	-0.127 (-1.050)		-0.308 (-2.240)	**	-0.437 (-2.400)	**	-0.131 (-1.090)		-0.163 (-1.490)	
Risk_com	0.102 (0.090)		0.029 (0.030)		-0.027 (-0.020)		-0.147 (-0.130)		-0.062 (-0.060)	
Bank stability	-0.657 (-3.330)	***	-0.634 (-3.210)	***	-0.624 (-3.150)	***	-0.640 (-3.300)	***	-0.657 (-3.540)	***
Concentration	0.081 (3.100)	***	0.059 (2.130)	**	0.065 (2.320)	**	0.029 (0.830)		0.109 (4.160)	***
GDP_capita	-1.594 (-5.060)	***	-1.408 (-3.340)	***	-1.255 (-3.510)	***	-0.841 (-1.250)	**	-1.050 (-3.110)	***
Bank	0.347 (0.680)		-0.066 (-0.110)		-0.123 (-0.210)		-0.375 (-0.630)		0.717 (1.340)	
Legal	0.735 (0.390)		0.928 (0.500)		0.198 (0.110)		-1.458 (-0.730)		-4.288 (-2.610)	**
Invp	-0.151 (-0.370)		-0.837 (-1.770)	*	-0.363 (-0.800)		-0.816 (-1.250)		0.534 (1.100)	
Constant	6.280 (1.080)		16.338 (2.760)	***	12.153 (2.100)	**	13.182 (1.780)	*	1.538 (0.240)	
Year dummies	Yes		Yes		Yes		Yes		Yes	
Specialization dummies	Yes		Yes		Yes		Yes		Yes	
N	454		454		454		454		454	
Max VIF	3.82		3.53		3.34		4.31		4.51	
F	29.79	***	38.52	***	36.56	***	32.68	***	25.66	***
R ²	0.581		0.576		0.568		0.558		0.606	
Adj. R ²	0.554		0.548		0.540		0.529		0.580	

Notes: ***, **, and * indicate significance at the 1%, 5%, and 10% levels (two-tailed), respectively. See Appendix B for the variable definitions.

voluntary operational risk disclosure quality, consistent with our expectations. Column (2) shows that the coefficient for *Secrecy* is -0.040, while the coefficient for the interaction between *GLOBAL* and *Secrecy* is 0.042. The sum of the two coefficients (0.002) is not statistically different from zero, indicating that in the case of global banks, there is no association between the cultural compound variable and the quality of voluntary operational risk disclosures. This finding provides further support for H4.

In order to address endogeneity concerns and following Ashraf et al. (2016), we use *Language* as an instrumental variable in the analysis of the association between *Secrecy* and the quality of voluntary operational risk disclosure.¹⁰ We re-estimate equation (1) by adopting the two-step

¹⁰ Language is intricately connected with culture. Kashima and Kashima (1998) argue that the constant use of pronouns is present in more individualistic societies, and Davis and Abdurazokzoda (2016) provide a measure of the share of a country’s population that speaks a language that allows the first-person singular pronoun drop in an independent clause. Additionally, Kashima and Kashima (1998) assert that the use of multiple second-person pronouns indicates societies with a higher degree of social distance, and Davis and Abdurazokzoda (2016) suggest that this language feature is indicative of societies with more power inequalities. The latter authors provide measures of politeness distinctions in second-person pronouns. Finally, Chen (2013) claims that grammatically separating the present from the future is associated with behavior oriented towards the future. Empirically, we consider (i) *Pronoun_drop* as the share of a country’s population that speaks a language that allows the first-person singular pronoun drop in an independent clause, (ii) *Politeness* as the share of a country’s population that uses multiple politeness distinctions in second-person pronouns or avoids pronouns for politeness, and (iii) the indicator variable *Strong_ftr*, coded as one for countries with strong future time references. Next, we run a principal component analysis of these three variables, which leads to the creation of a single factor with an eigenvalue greater than one. We call this factor *Language*.

generalized method of moments (IV GMM), which minimizes any potential measurement errors and alleviates the omitted variable bias. This estimator provides efficiency gains over the traditional instrumental variable two-stage least squares (IV/2SLS) estimator. *Language* gathers the necessary attributes of an appropriate instrument because (1) it is highly correlated with *Secrecy* and (2) it is not likely to impact voluntary operational risk disclosure quality, except through its effect on national culture. The results of this analysis are presented in columns (3) – (6) of Table 7. In columns (3) and (4), we find that the association between *Secrecy* and *Language* is statistically significant and that the estimated coefficient for the interaction between *GLOBAL* and *Secrecy* is not statistically different from zero.¹¹

Columns (5) and (6) of Table 7 presents the results of the second-stage estimation for equation (2), where *DISC_SCORE* is our dependent variable. We find that *Secrecy* is negatively associated with our risk disclosure score (coefficient = -0.034), and that the coefficient of the interaction term with *GLOBAL* is statistically positive (coefficient = 0.037). The sum of these coefficients is not statistically different from zero. Thus, the results of the instrumental variable approach are consistent with those presented in columns (1) and (2) of Table 7 and further support H4. A possible reason for it is that managers from international banks develop a global mindset, since they are exposed to different cultures, and that fosters a higher cultural intelligence that influences the way they communicate and interact with others in the

¹¹ To test the validity of our instrument, we run a test for instrument relevance and a weak instrument test. The F test of the excluded instruments is statistically significant at the one percent confidence level, which supports the relevance of the instrument in explaining the variation in *Secrecy*. In addition, the Kleibergen and Paap (2006) test of under-identification confirms that the excluded instrument is correlated with *Secrecy* and that the model is well identified.

Table 6

Regressions of Hofstede’s cultural dimensions (*IND, UA, PD, MAS, and LTO*), and interaction of culture with *GLOBAL*, on voluntary operational risk disclosure quality.

Dependent Variable: DISC_SCORE										
	(1)		(2)		(3)		(4)		(5)	
	CUL = IND		CUL = UA		CUL = PD		CUL = MAS		CUL = LTO	
CUL	0.169 (3.490)	***	-0.070 (-2.510)	**	-0.079 (-2.300)	**	-0.055 (-2.400)	**	0.163 (4.520)	***
GLOBAL	-2.172 (-1.840)	*	-1.059 (-0.830)		-0.971 (-0.730)		-0.588 (-0.440)		-1.462 (-1.390)	
GLOBAL x CUL	-0.144 (-1.930)	*	0.053 (1.120)		0.075 (1.520)		0.060 (1.440)		-0.160 (-1.910)	*
Bank subs	1.690 (1.230)		1.539 (0.990)		1.946 (1.130)		0.018 (0.010)		1.528 (1.200)	
Racar	-1.368 (-3.550)	***	-1.106 (-2.570)	**	-1.086 (-2.340)	**	-1.296 (-2.670)	***	-1.542 (-3.160)	***
Size	1.637 (6.170)	***	1.479 (6.090)	***	1.423 (5.620)	***	1.380 (5.120)	***	1.316 (4.970)	***
Cross_list	-0.492 (-0.450)		0.517 (0.390)		-0.123 (-0.100)		0.331 (0.270)		-1.532 (-1.280)	
Ama	2.057 (2.590)	**	2.273 (2.660)	***	2.748 (3.390)	***	2.280 (2.930)	***	3.230 (4.060)	***
Gov_BoD	-2.932 (-3.180)	***	-4.157 (-4.160)	***	-4.002 (-3.770)	***	-3.819 (-3.940)	***	-2.680 (-2.630)	***
Nonexec_BoD	0.024 (1.040)		0.031 (1.270)		0.034 (1.370)		0.023 (0.890)		0.039 (2.040)	**
Exec_own	-0.063 (-1.840)	*	-0.036 (-1.280)		-0.041 (-1.510)		-0.066 (-2.540)	**	-0.091 (-3.460)	***
Largest_own	-0.017 (-0.930)		-0.014 (-0.650)		-0.014 (-0.620)		0.008 (0.340)		-0.003 (-0.180)	
Gov_own	1.035 (1.200)		0.458 (0.490)		0.933 (1.040)		0.701 (0.840)		2.157 (2.460)	**
Ac_size	-0.028 (-0.210)		-0.308 (-2.280)	**	-0.420 (-2.190)	**	-0.183 (-1.430)		-0.018 (-0.130)	
Risk_com	-0.359 (-0.320)		-0.065 (-0.060)		0.308 (0.260)		-0.393 (-0.370)		-0.055 (-0.060)	
Bank stability	-0.670 (-3.570)	***	-0.636 (-3.150)	***	-0.584 (-3.020)	***	-0.637 (-3.240)	***	-0.614 (-3.690)	***
Concentration	0.078 (3.470)	***	0.053 (2.010)	**	0.058 (2.140)	**	0.027 (0.810)		0.105 (4.810)	***
GDP_capita	-1.729 (-5.380)	***	-1.395 (-3.310)	***	-1.265 (-3.550)	***	-0.889 (-2.180)	**	-0.967 (-3.710)	***
Bank	0.235 (0.490)		-0.136 (-0.240)		-0.119 (-0.200)		-0.295 (-0.480)		0.396 (0.900)	
Legal	1.470 (0.930)		1.001 (0.550)		0.434 (0.240)		-1.878 (-1.010)		-3.540 (-2.280)	**
Invp	-0.053 (-0.130)		-0.975 (-1.750)	*	-0.476 (-0.960)		-0.900 (-1.460)		0.659 (1.370)	
Constant	10.347 (2.460)	**	11.888 (2.190)	**	9.714 (1.750)	*	10.430 (1.470)		3.596 (0.710)	
Year dummies	Yes		Yes		Yes		Yes		Yes	
Specialization dummies	Yes		Yes		Yes		Yes		Yes	
N	454		454		454		454		454	
Max VIF	5.31		4.49		3.44		5.14		4.59	
F	34.73	***	28.79	***	34.01	***	35.44	***	32.69	***
R ²	0.623		0.589		0.580		0.572		0.646	
Adj. R ²	0.597		0.560		0.550		0.542		0.621	

Notes: ***, **, and * indicate significance at the 1%, 5%, and 10% levels (two-tailed), respectively. See Appendix B for the variable definitions.

working environment (Ang et al., 2015; Liao & Thomas, 2020). Thus, overall, the impact of national culture can be reversed by internationalization, even though the impact of some cultural traits seems to be more difficult to dissipate.

6. Additional analyses

6.1. GLOBE’s alternative measures of cultural values

Hofstede’s work is not immune to criticism, and some have argued that his culture scores are outdated. However, Hofstede counter-argues that the scores retain validity as correlations with related updated data remain strong and that culture tends to remain relatively stable over long periods of time (Hofstede, 2011). GLOBE (House et al., 2004) is a more recent project. Six of the nine cultural dimensions originated conceptually from Hofstede’s work (House et al., 2004, p.13), which enables us to draw a parallel between the measures of these two projects.

Hofstede’s individualism versus collectivism dimension was divided into two separate dimensions: in-group collectivism and institutional collectivism, the first being more correlated and closer in meaning to Hofstede’s study (House et al., 2004, p.474).¹² When comparing the country rankings of GLOBE’s in-group collectivism practices scores and Hofstede’s individualism scores, House et al. (2004) find that these are highly consistent. In our sample of EU banks, and in line with House et al. (2004) findings, individualism and in-group collectivism practices scores (IGC) are negatively correlated (value is - 0.588), and so we

¹² House et al.’s (2004) in-group collectivism and Hofstede’s (1980) individualism scores correlate negatively since the former measures collectivism, and the latter measures individualism. Therefore, we expect House et al.’s (2004) in-group collectivism and Hofstede’s (1980) individualism to have opposite signs in their association with the operational risk disclosure index.

expect to find a significantly negative association between in-group collectivism and voluntary operational risk disclosure quality.

GLOBE maintained uncertainty avoidance as a dimension of national culture but measured it somewhat differently. Notwithstanding, in our sample of EU banks, Hofstede’s uncertainty avoidance and GLOBE’s uncertainty avoidance practices scores (UA_G) are negatively correlated (- 0.695), which is consistent with the findings from GLOBE’s study (House et al., 2004, p.626).

GLOBE defines power distance is very similar to Hofstede (2001). House et al. (2004) note that Hofstede’s power distance index retains the validity and robustness established in three posterior replication studies using more recent data from different industries, namely Helmreich and Merritt (1998), Hoppe (1993), and Shane (1994). GLOBE’s power distance practices scores correlate positively with Hofstede’s power distance index (0.587) in our sample of EU banks. This positive correlation between Hofstede’s power distance score and GLOBE’s power distance practices score is consistent with the findings of House et al., (2004, p.543).

GLOBE also split Hofstede’s masculinity dimension (MAS) into assertiveness and gender egalitarianism. House et al. (2004) find that Hofstede’s masculinity scores were uncorrelated with gender egalitarianism practices scores, and significantly positively correlated with assertiveness practices scores. In our sample, the assertiveness practices scores (AST) are also positively correlated (0.565) with MAS.

We re-estimate model (1) by replacing one at a time IGC, UA_G, PD_G, and AST for CUL. Table 8 presents the results, and we find that the coefficient of IGC is negative, as expected, but only significant at 0.10. The coefficient of UA_G is significantly positive. Given the negative coefficient of UA in Table 5 and the negative correlation between these two variables, this coefficient is consistent with the main results. The negative and significant at 0.10 coefficient of PD_G is also consistent with our main findings. Finally, the coefficient for AST is not statistically significant. Considering that the coefficient of MAS in Table 5 is not

Table 7
Regressions of *Secrecy*, and interaction of *Secrecy* with *GLOBAL*, on voluntary operational risk disclosure quality.

WLS	Dependent Variable: DISC_SCORE (1)		Dependent Variable: DISC_SCORE (2)		IV GMM First stage regression	Dependent Variable: Secrecy (3)		Dependent Variable: Secrecy (4)	
Secrecy	-0.027	***	-0.040	***	Language	31.402	***	30.025	***
	(-2.660)		(-4.040)			(18.410)		(15.050)	
GLOBAL			-1.315		GLOBAL x Language			5.581	(1.320)
			(-1.200)						
GLOBAL x Secrecy			0.042	**	Controls included	Yes		Yes	
Bank_subs	1.935	(1.280)	1.960	(1.450)	F test of excluded instruments	339	***	164.82	***
Racar	-1.381	**	-0.984	**	Underidentification test	19.68	***	23.77	***
	(-2.430)		(-2.540)						
Size	1.349	(5.090)	1.489	(6.860)	Panel C: IV GMM Second stage regression				
						Dependent Variable: DISC_SCORE (5)		Dependent Variable: DISC_SCORE (6)	
Cross_list	0.036	(0.030)	1.315	(1.140)	Instrumented Secrecy	-0.023	**	-0.034	***
Ama	1.997	(2.190)	2.220	(2.890)		(-2.290)		(-3.580)	
Gov_BoD	-3.451	***	-3.992	***	GLOBAL			-1.301	
	(-2.970)		(-4.140)					(-1.210)	
Nonexec_BoD	0.026	(1.190)	0.036	(1.710)	GLOBAL x Secrecy			0.037	(2.160)
Exec_own	-0.063	**	-0.029	*	Bank_subs	1.739	(1.140)	1.707	(1.260)
	(-2.170)		(-1.140)						
Largest_own	-0.018		-0.014		Racar	-1.382	***	-1.030	***
	(-0.810)		(-0.780)			(-2.590)		(-2.800)	
Gov_own	0.866	(1.070)	0.477	(0.560)	Size	1.336	(5.210)	1.474	(6.920)
Ac_size	-0.333	**	-0.306	**	Cross_list	-0.028		1.023	(0.940)
	(-2.500)		(-2.480)			(-0.030)			
Risk_com	0.126	(0.120)	-0.143		Ama	2.074	(2.400)	2.313	(3.160)
			(-0.140)						
Bank_stability	-0.603	***	-0.574	***	Gov_BoD	-3.530	***	-3.982	***
	(-3.050)		(-3.100)			(-3.080)		(-4.370)	
Concentration	0.052	(1.950)	0.036	(1.700)	Nonexec_BoD	0.026	(1.210)	0.035	(1.700)
GDP_capita	-1.501	***	-1.396	***	Exec_own	-0.066	**	-0.035	
	(-3.690)		(-3.560)			(-2.330)		(-1.490)	
Bank	0.248	(0.440)	0.128	(0.240)	Largest_own	-0.015		-0.011	
						(-0.660)		(-0.610)	
Legal	-0.825		-1.030		Gov_own	0.941	(1.190)	0.584	(0.720)
	(-0.540)		(-0.680)						
Invp	-0.878	**	-1.157	**	Ac_size	-0.307	**	-0.278	**
	(-2.030)		(-2.160)			(-2.320)		(-2.240)	
Constant	17.191	(3.240)	13.575	(2.720)	Risk_com	0.080	(0.080)	-0.161	
								(-0.170)	
Year dummies	Yes		Yes		Bank_stability	-0.613	***	-0.589	***
						(-3.220)		(-3.280)	
Specialization dummies	Yes		Yes		Concentration	0.054	(2.030)	0.040	(1.830)
									*
N	454		454		GDP_capita	-1.410	***	-1.311	***
						(-3.730)		(-3.610)	
Adj. R ²	0.573		0.617		Bank	0.164	(0.300)	0.041	(0.080)
					Legal	-0.749		-0.884	
						(-0.510)		(-0.620)	
					Invp	-0.775	*	-0.992	**
						(-1.890)		(-1.970)	
					Constant	15.653	(3.010)	12.131	(2.400)
					Year dummies	Yes		Yes	
					Specialization dummies	Yes		Yes	
					N	454		454	
					Adj. R ²	0.571		0.615	

Notes: ***, **, and * indicate significance at the 1%, 5%, and 10% levels (two-tailed), respectively. The tests of under-identification are based on Kleibergen and Paap (2006). See Appendix B for the variable definitions.

statistically significant either, this finding is also consistent with the main results. Thus, this robustness test supports previous findings using Hofstede’s cultural dimensions.

6.2. The influence of contextual factors

To consider how contextual factors may affect the association between national culture and voluntary operational risk disclosure, we next assess whether the differences between common law and civil code law countries affect our results. For this purpose, we re-estimate

equations (1) and (2) using only a subsample of firms in civil code law countries. This subsample includes 384 observations (representing 74 banks from 13 countries). The untabulated results are similar to those reported in Tables 5 and 6. Moreover, when using the instrumental variable *Language* and *CUL = Secrecy* in regressions such as those in Table 7, the results are qualitatively the same. This means that our results are not driven by the inclusion of common law countries (UK and Ireland) in the sample.

Next, we test whether bank regulation, supervision, and monitoring (variable *Bank*) affects the relationship between national culture and

Table 8
Regressions of Globe’s cultural dimensions (IGC, UA_G, PD_G, and AST) on voluntary operational risk disclosure quality.

Dependent Variable: DISC_SCORE								
	(1)		(2)		(3)		(4)	
	CUL = IGC		CUL = UA_G		CUL = PD_G		CUL = AST	
CUL	-1.665 (-1.980)	*	1.647 (2.230)	**	-2.197 (-1.910)	*	1.116 (0.810)	
Bank subs	0.871 (0.580)		0.909 (0.590)		0.902 (0.570)		0.676 (0.430)	
Racar	-1.395 (-2.490)	**	-1.221 (-2.030)	**	-1.564 (-3.080)	***	-1.319 (-2.690)	***
Size	1.283 (4.730)	***	1.289 (4.740)	***	1.461 (5.160)	***	1.263 (4.540)	***
Cross_list	0.083 (0.070)		0.229 (0.190)		-0.326 (-0.270)		-0.564 (-0.440)	
Ama	2.105 (2.300)	**	2.044 (2.280)	**	2.468 (3.010)	***	2.425 (2.780)	***
Gov_BoD	-3.730 (-2.950)	***	-3.600 (-2.860)	***	-4.269 (-3.500)	***	-3.943 (-2.990)	***
Nonexec_BoD	0.031 (1.290)		0.033 (1.350)		0.023 (0.900)		0.027 (1.060)	
Exec_own	-0.081 (-2.920)	***	-0.061 (-1.980)	*	-0.065 (-1.910)	*	-0.088 (-2.820)	***
Largest_own	-0.003 (-0.140)		-0.005 (-0.200)		-0.011 (-0.460)		0.003 (0.130)	
Gov_own	1.021 (1.210)		0.895 (1.030)		1.044 (1.210)		1.582 (1.740)	*
Ac_size	-0.259 (-1.970)	*	-0.385 (-2.400)	**	-0.331 (-2.190)	**	-0.207 (-1.690)	*
Risk_com	0.098 (0.090)		0.240 (0.210)		-0.413 (-0.360)		-0.241 (-0.210)	
Bank stability	-0.596 (-2.970)	***	-0.583 (-2.910)	***	-0.646 (-3.310)	***	-0.672 (-3.480)	***
Concentration	0.040 (1.260)		0.050 (1.730)	*	0.044 (1.570)		0.068 (2.280)	**
GDP_capita	-1.195 (-3.250)	***	-0.958 (-2.540)	**	-1.197 (-3.030)	***	-0.948 (-2.530)	**
Bank	0.136 (0.230)		-0.064 (-0.110)		-0.209 (-0.340)		-0.105 (-0.190)	
Legal	-1.020 (-0.680)		-1.038 (-0.690)		-0.339 (-0.200)		-0.837 (-0.520)	
Invp	-0.500 (-1.100)		-0.653 (-1.520)		-0.499 (-1.020)		-0.006 (-0.010)	
Constant	19.884 (3.030)	***	2.018 (0.290)		23.004 (2.430)	**	2.292 (0.270)	
Year dummies	Yes		Yes		Yes		Yes	
Specialization dummies	Yes		Yes		Yes		Yes	
N	454		454		454		454	
Max VIF	3.16		3.16		3.50		3.47	
F	37.91	***	36.09	***	31.77	***	26.11	***
R ²	0.576		0.579		0.563		0.552	
Adj. R ²	0.548		0.551		0.534		0.523	

Notes: ***, **, and * indicate significance at the 1%, 5%, and 10% levels (two-tailed), respectively. See Appendix B for the variable definitions.

voluntary operational risk disclosure. Our goal is to assess whether *CUL* and *Bank* may be viewed as substitutes or complements. Following [Enache and Hussainey \(2020\)](#), we use a model like equation (2) where *Bank* is the variable that interacts with *CUL*. If we estimate a coefficient for the interaction variable with a sign opposite to that of the coefficient *CUL*, this suggests that *Bank* weakens the relationship between cultural values and voluntary operational risk disclosure quality. [Table 9](#) presents the results of the analysis. We find that as bank regulation, supervision, and monitoring increases, the relationships between disclosure and individualism, uncertainty avoidance, and long-term orientation all weaken (but two of the interaction effects are only significant at 0.10). This effect suggests that there is a substitution effect between culture and bank regulation, supervision, and monitoring. However, this substitution seems to be only partial, as for individualism and long-term orientation, the sum of the coefficients ($\beta_1 + \beta_3$) is statistically different from zero (at the 10 percent and five percent confidence levels, respectively).

In order to investigate this issue further, and following [Oh et al. \(2018\)](#), we conduct slope tests for the interaction between *CUL* and *Bank* on *DISC_SCORE*. In case *CUL* and *Bank* interact as complements, the marginal gain between a high level of *Bank* and a low level of *Bank* should be greater when there is a higher level of *CUL* comparatively to a lower level of *CUL*. On the other hand, if there is a substitution effect between *CUL* and *Bank*, the marginal gain between the high level of *Bank* and the low level of *Bank* should be more pronounced when there is a lower level of *CUL* comparatively to a higher level of *CUL*. This analysis is conducted by examining slopes in the graph, for each pair of *CUL*-*Bank* interaction. As suggested by [Aiken et al. \(1991\)](#), we plot the simple slopes of one *CUL* variable – *DISC_SCORE* regression at one standard deviation below the mean and one standard deviation above the mean of *Bank*. We perform the analysis for *IND*, *UA*, and *LTO*, the three cases where the interaction term *Bank* x *CUL* is statistically significant.

[Table 9](#) shows the interaction term *Bank* x *CUL*, when *CUL* = *IND*, is negative and significant ($\beta_3 = -0.063$, p-value < 0.05). A simple-slope test also indicates that the relationship between *IND* and *DISC_SCORE* is not significant when *Bank* is high (simple slope = 0.07, not statistically significant) but is significant when *Bank* is low (simple slope = 0.22, p-value < 0.01). These results, presented in [Fig. 1](#), suggest that individualism contributes more to promoting higher quality operational risk disclosures when there is a low level of bank regulation, supervision, and monitoring. When there is a high level of bank regulation, supervision and monitoring, an additional degree of individualism does not make a significant marginal contribution to disclosure. Thus, there is a substitution effect of individualism and the level of bank regulation, supervision, and monitoring on voluntary operational risk disclosure quality.

[Table 9](#) shows that the interaction term *Bank* x *CUL*, when *CUL* = *UA*, is positive and significant ($\beta_3 = 0.038$, p-value < 0.10). A simple-slope test also indicates that the relationship between *UA* and *DISC_SCORE* is not significant when *Bank* is high (simple slope = -0.03, not statistically significant) but is significant when *Bank* is low (simple slope = -0.13, p-value < 0.01). The graphical representation presented in [Fig. 2](#) suggests that uncertainty avoidance contributes more to promoting higher quality operational risk disclosures when there is a low level of bank regulation, supervision, and monitoring. An additional degree of uncertainty avoidance does not make a significant marginal contribution to disclosure when there is a high level of bank regulation, supervision, and monitoring. Therefore, we find a substitution effect of uncertainty avoidance and the level of bank regulation, supervision, and monitoring on voluntary operational risk disclosure quality.

Finally, [Table 9](#) shows that the interaction term *Bank* x *CUL*, when *CUL* = *LTO*, is negative and statistically significant ($\beta_3 = -0.041$, p-value < 0.10). A simple-slope test also indicates that the relationship between *LTO* and *DISC_SCORE* is significant when *Bank* is high (simple slope = 0.09, p-value < 0.10) and when *Bank* is low (simple slope = 0.18, p-value < 0.01), but the slope is greater when *Bank* is low.

Table 9

Regressions of Hofstede’s cultural dimensions (*IND*, *UA*, *PD*, *MAS*, and *LTO*), and interaction of culture with *Bank*, on voluntary operational risk disclosure quality.

Dependent Variable: DISC_SCORE										
	(1)		(2)		(3)		(4)		(5)	
	CUL = IND		CUL = UA		CUL = PD		CUL = MAS		CUL = LTO	
CUL	0.144 (3.670)	***	-0.079 (-2.980)	***	-0.089 (-2.990)	***	-0.058 (-1.900)	*	0.134 (3.440)	***
Bank	-0.357 (-1.010)		-0.430 (-1.000)		-0.240 (-0.480)		-0.218 (-0.390)		0.471 (1.120)	
Bank x CUL	-0.063 (-2.330)	**	0.038 (1.920)	*	0.052 (1.610)		0.019 (1.300)		-0.041 (-1.830)	*
Bank_subs	1.152 (0.740)		2.026 (1.230)		2.344 (1.330)		0.807 (0.530)		1.124 (0.770)	
Racar	-1.662 (-3.330)	***	-1.327 (-2.520)	**	-1.145 (-2.190)	**	-1.467 (-2.820)	***	-1.402 (-2.820)	***
Size	1.317 (5.720)	***	1.412 (5.450)	***	1.428 (5.340)	***	1.245 (4.910)	***	1.066 (4.020)	***
Cross_list	-1.002 (-0.960)		-0.332 (-0.310)		-0.433 (-0.370)		0.014 (0.010)		-0.807 (-0.690)	
Ama	1.081 (1.180)		2.022 (2.380)	**	2.474 (3.010)	***	2.314 (2.740)	***	1.708 (1.920)	*
Gov_BoD	-1.298 (-1.090)		-2.639 (-2.240)	**	-3.315 (-2.720)	***	-3.914 (-3.400)	***	-2.435 (-2.150)	**
Nonexec_BoD	0.030 (1.170)		0.037 (1.510)		0.040 (1.680)	*	0.021 (0.850)		0.043 (2.020)	**
Exec_own	-0.105 (-3.620)	***	-0.043 (-1.300)		-0.033 (-0.940)		-0.075 (-2.470)	**	-0.117 (-4.130)	***
Largest_own	-0.016 (-0.760)		-0.024 (-0.920)		-0.017 (-0.660)		-0.008 (-0.360)		0.002 (0.120)	
Gov_own	0.889 (0.930)		0.257 (0.280)		0.861 (0.990)		0.969 (1.050)		2.106 (2.420)	**
Ac_size	-0.054 (-0.400)		-0.286 (-2.040)	**	-0.412 (-2.230)	**	-0.149 (-1.250)		-0.124 (-0.990)	
Risk_com	0.668 (0.640)		0.403 (0.390)		0.205 (0.190)		-0.132 (-0.110)		0.080 (0.080)	
Bank stability	-0.438 (-3.020)	***	-0.473 (-3.030)	***	-0.514 (-3.080)	***	-0.667 (-3.500)	***	-0.611 (-3.810)	***
Concentration	0.043 (1.820)	*	0.039 (1.640)		0.050 (2.040)	**	0.017 (0.500)		0.089 (3.750)	***
GDP_capita	-1.115 (-3.700)	***	-1.313 (-3.540)	***	-1.156 (-3.600)	***	-0.977 (-2.880)	***	-0.752 (-2.770)	***
Legal	4.933 (3.500)	***	5.388 (2.670)	***	2.691 (1.860)	*	-2.717 (-1.360)		-4.906 (-2.790)	***
Invp	-0.034 (-0.100)		-0.690 (-1.600)		-0.143 (-0.310)		-0.943 (-1.510)		0.590 (1.280)	
Constant	3.140 (0.520)		6.261 (1.200)		4.482 (0.820)		15.319 (2.600)	**	4.473 (0.830)	
Year dummies	Yes		Yes		Yes		Yes		Yes	
Specialization dummies	Yes		Yes		Yes		Yes		Yes	
N	454		454		454		454		454	
Max VIF	5.63		7.44		5.05		7.16		4.63	
F	29.86	***	37.04	***	35.15	***	31.85	***	24.99	***
R ²	0.620		0.602		0.585		0.562		0.622	
Adj. R ²	0.594		0.574		0.557		0.532		0.596	

Notes: ***, **, and * indicate significance at the 1%, 5%, and 10% levels (two-tailed), respectively. See Appendix B for the variable definitions.

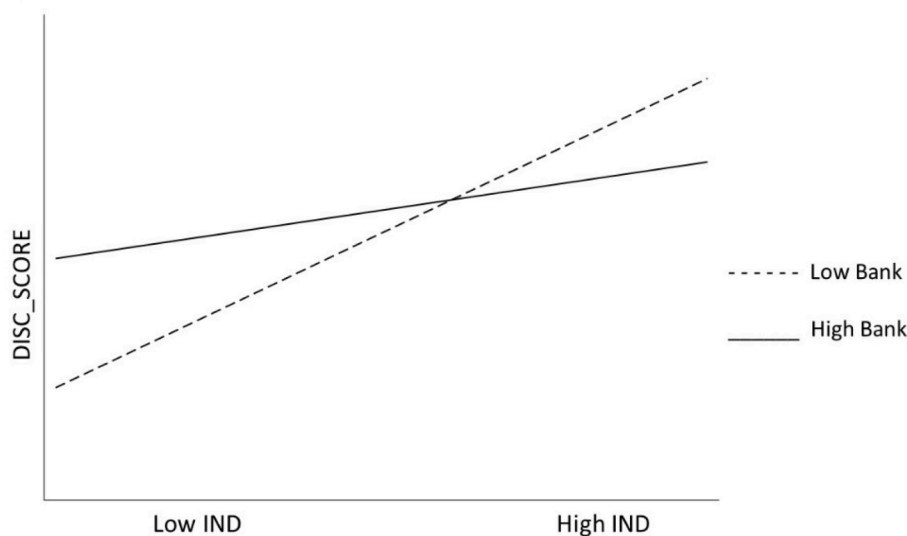


Fig. 1. Substitution effect of IND and Bank on DISC_SCORE.

The results shown in Fig. 3 suggest that long-term orientation contributes more to promoting higher quality operational risk disclosures when there is a low level of bank regulation, supervision, and monitoring. When there is a high level of bank regulation, supervision, and monitoring, an additional degree of long-term orientation still makes a significant marginal contribution to disclosure but to a lower extent than when there is a low level. Therefore, there is a substitution effect of long-term orientation and the level of level of bank regulation, supervision, and monitoring on voluntary operational risk disclosure quality.

Overall, we conclude there to be a substitution effect between national culture and bank-specific contextual factors on voluntary operational risk disclosure quality. Untabulated results using the secrecy compound variable confirms the results.

Thus, just like the level of globalization of banks affects the quality of voluntary operational risk disclosures by counterbalancing the impact of national culture, so do the specific contextual factors of the banking sector. However, globalization seems to be a stronger force.

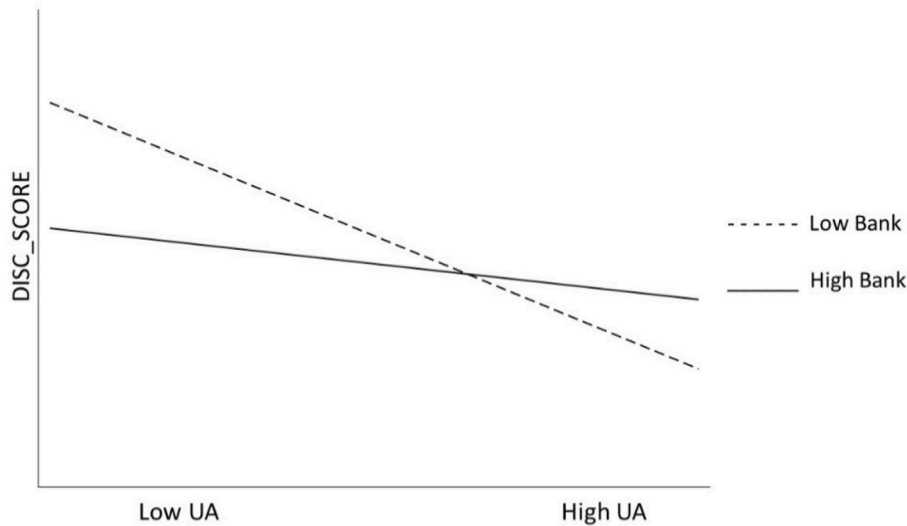


Fig. 2. Substitution effect of UA and Bank on DISC_SCORE.

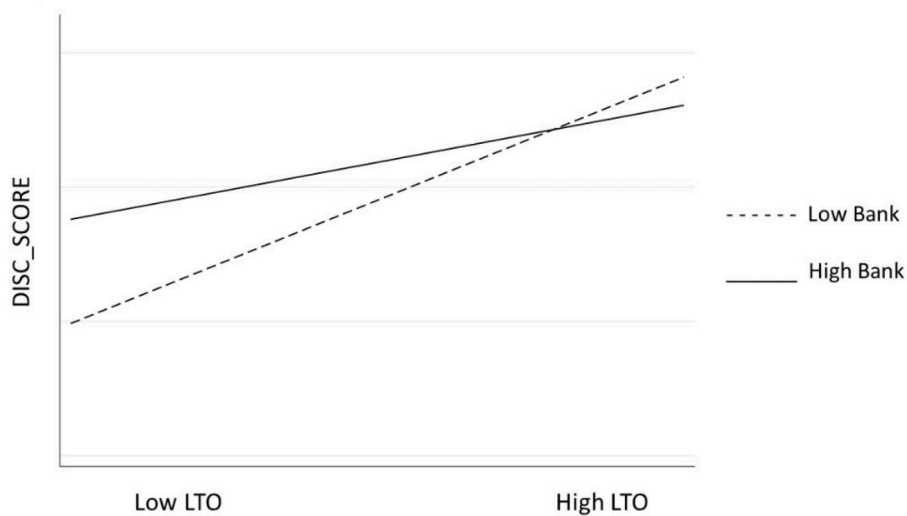


Fig. 3. Substitution effect of LTO and Bank on DISC_SCORE.

7. Conclusion

We provide new evidence on the association between national culture and voluntary operational risk disclosure in the EU banking industry. Complementarily, we assess whether this association differs between global banks and banks with low levels of internationalization. We also investigate the extent to which the existing formal institutional environment affects the relationship between national culture and voluntary operational risk disclosure.

Using a sample of 454 observations from 2008 to 2013, covering 87 banks in 15 EU countries, we find that several cultural dimensions are associated with banks’ voluntary disclosure. We hypothesize and find that in societies oriented towards the long term, banks voluntarily disclose a superior level of information on operational risks – a contribution because this more recent cultural dimension was usually ignored in previous studies. These findings indicate that when analyzing banks’ risk disclosures, analysts, potential investors, and other stakeholders should consider cultural differences.

Furthermore, for global banks, we provide evidence that there is no association between voluntary operational risk disclosure quality and (i) secrecy, (ii) individualism, and (iii) long-term orientation. This is

consistent with the notion that global banks have board members interacting with individuals in other cultural settings and developing a global mindset, which leads to a loss of importance for the cultural values in the country where the bank is headquartered.

Finally, we find evidence that the contextual factors of banks’ regulatory, supervisory, and monitoring settings also affect the association between culture and voluntary operational risk disclosure. Although we find evidence of a substitution effect between culture and contextual factors, this substitution is only partial, as culture retains some of its influence. Thus, banks’ level of globalization has a stronger substitution effect than contextual factors when it comes to the relationship between culture and voluntary operational risk disclosure quality. Future studies may investigate whether these results persist after 2014, with the new directive and Single Supervisory Mechanism being implemented in the EU, and whether they generalize to areas other than Europe.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The authors do not have permission to share data.

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Appendix A. Operational risk disclosure quality index

This appendix presents a list of the items considered in the composition of the operational risk disclosure quality index. The original score for each item is zero. One point is given for each disclosure subitem. Adapted from [Barakat and Hussainey \(2013\)](#).

Disclosure item	Disclosure sub-items	References
1. Definition of operational risk	1.1 Definition	
2. Strategies and processes of operational risk management	2.1 Qualitative Information (mandatory)	European Parliament (2006) , annex xii, part 2, 1 (a)
	2.2 Quantitative Information	
	2.3 Forward-looking information	
	2.4 Graphical illustration or tabular presentation	
3. Structure and organization of the operational risk management function or other appropriate arrangements	3.1 Qualitative Information (mandatory)	European Parliament (2006) , annex xii, part 2, 1 (b)
	3.2 Quantitative Information	
	3.3 Forward-looking information	
	3.4 Graphical illustration or tabular presentation	
4. The scope and operational risk reporting and measurement systems	4.1 Qualitative Information (mandatory)	European Parliament (2006) , annex xii, part 2, 1 (c)
	4.2 Quantitative Information	
	4.3 Forward-looking information	
	4.4 Graphical illustration or tabular presentation	
5. The policies for hedging and mitigating operational risk and the processes for monitoring the continuing effectiveness of hedges and mitigants	5.1 Qualitative Information (mandatory)	European Parliament (2006) , annex xii, part 2, 1 (d)
	5.2 Quantitative Information	
	5.3 Forward-looking information	
	5.4 Graphical illustration or tabular presentation	
6. Amount of regulatory capital for operational risk	6.1 The amount of regulatory capital for operational risk (mandatory)	European Parliament (2006) , annex xii, part 2, point 4
	6.2 The categorization of regulatory capital for operational risk by division, business line, subsidiary, or country	
	6.3 The reasons for the change (or not) in regulatory capital for operational risk from previous years	
	6.4 Graphical illustration or tabular presentation	
7. Measurement approach to regulatory capital for operational risk	7.1 Definition and qualitative explanation of the measurement approach used to quantify the regulatory capital for operational risk (mandatory)	European Parliament (2006) , annex xii, part 2, point 4
	7.2 Quantitative explanation of the measurement approach	
	7.3 Prior or subsequent change in the measurement approach	
	7.4 Graphical illustration or tabular presentation	
8. Operational RWA's	8.1 The amount of RWA's for operational risk	
	8.2 The categorization of RWA's for operational risk by division, business line, subsidiary, or country	
	8.3 The reasons for the change (or not) in operational RWA's from previous years	
	8.4 Graphical illustration or tabular presentation	
9. Operational value-at-risk (VAR/economic capital/Pillar 2 Capital)	9.1 Qualitative Information	Ford et al. (2009)
	9.2 Quantitative Information	
	9.3 Forward-looking information	
	9.4 Graphical illustration or tabular presentation	
10. Internal control system	10.1 Qualitative Information	Helbok and Wagner (2006)
	10.2 Quantitative Information	
	10.3 Forward-looking information	
	10.4 Graphical illustration or tabular presentation	
11. Internal audit function	11.1 Qualitative Information	Helbok and Wagner (2006)
	11.2 Quantitative Information	
	11.3 Forward-looking information	
	11.4 Graphical illustration or tabular presentation	
12. Key risk indicators (KRIs) / Early warning systems (EWSs)	12.1 Qualitative Information	Ford et al. (2009)
	12.2 Quantitative Information	
	12.3 Forward-looking information	
	12.4 Graphical illustration or tabular presentation	
13. Self-assessment techniques	13.1 Qualitative Information	Ford et al. (2009)

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Disclosure item	Disclosure sub-items	References
14. Scorecard models/scenario analyses / stress tests	13.2 Quantitative Information	Ford et al. (2009)
	13.3 Forward-looking information	
	13.4 Graphical illustration or tabular presentation	
	14.1 Qualitative Information	
15. Operational risk event databases (internal/external)	14.2 Quantitative Information	Helbok and Wagner (2006); Ford et al. (2009)
	14.3 Forward-looking information	
	14.4 Graphical illustration or tabular presentation	
	15.1 Qualitative Information	
16. Legal Risks	15.2 Quantitative Information	Helbok and Wagner (2006)
	15.3 Forward-looking information	
	15.4 Graphical illustration or tabular presentation	
	16.1 Qualitative Information	
17. Additional information on operational risk exposure and management (e.g. corrective actions subsequent to specific operational risk events)	16.2 Quantitative Information	
	16.3 Forward-looking information	
	16.4 Graphical illustration or tabular presentation	
	17.1 Qualitative Information	
	17.2 Quantitative Information	
	17.3 Forward-looking information	
	17.4 Graphical illustration or tabular presentation	

Appendix B. Variable definitions

Variable	Definition	Source
Dependent variable		
DISC_SCORE	The voluntary operational risk disclosure quality score determined using the index presented in Appendix A. Mandatory items are excluded from the calculation of this index.	Annual reports, Risk reports
National Culture variables		
IND	A higher score indicates a higher (lower) degree of individualism (collectivism).	Hofstede (2001)
UA	A higher score indicates a higher degree of uncertainty avoidance.	Hofstede (2001)
PD	A higher score indicates a higher degree of power distance.	Hofstede (2001)
MAS	A higher score indicates a higher (lower) degree of masculinity (femininity).	Hofstede (2001)
LTO	A higher score indicates a higher (lower) degree of long-term orientation (short-term orientation).	Hofstede et al. (2010)
Secrecy	The sum of UA, PD and MAS minus the sum of IND and LTO A higher value indicates a more secretive culture.	
IGC	A higher score indicates a higher degree of in-group collectivism. We use the practices scores.	GLOBE, House et al. (2004)
UA_G	A higher score indicates a higher degree of uncertainty avoidance. We use the practices scores.	GLOBE, House et al. (2004)
PD_G	A higher score indicates a higher degree of power distance. We use the practices scores.	GLOBE, House et al. (2004)
AST	A higher score indicates a higher degree of assertiveness. We use the practices scores.	GLOBE, House et al. (2004)
Bank-level controls		
GLOBAL	Dummy variable coded 1 if bank is considered global by being present in 3 or more continents; 0 otherwise.	Annual reports
Bank_subs	Dummy variable coded 1 if bank is a subsidiary of another bank; 0 otherwise.	Bankscope
Racar	Natural logarithm of risk adjusted capital-assets ratio measured as capital-assets ratio divided by the standard deviation of return on assets for the sample period.	Bankscope
Size	Natural logarithm of total assets (in millions EUR).	Bankscope
Cross_list	Dummy variable coded 1 if the company is registered and reporting with the SEC; 0 otherwise.	SEC filings
Ama	Dummy variable coded 1 if the bank uses the advanced measurement approach for Operational Risk; 0 otherwise.	Annual reports, Risk reports
Gov_BoD	Dummy variable coded 1 if the bank has, at least, one member of the board appointed by the national Government; 0 otherwise.	Annual reports
Nonexec_BoD	The proportion of non-executive members of the BoD. In a two-tier system the percentage of non-executive members of the Supervisory Board (employee representatives are considered executive members).	Annual reports, corporate governance reports
Exec_own	Proportion of voting rights held by bank executives.	Annual reports, corporate governance reports
Largest_own	Proportion of voting rights held by the largest non-management, non-governmental shareholder.	Annual reports, Bankscope
Gov_own	Dummy variable coded 1 if the domestic government holds at least 5% of the voting rights; 0 otherwise.	Annual reports, Bankscope
Ac_size	Number of members on the Audit Committee. When there is no Audit Committee the number of members is 0. When there is no disclosure then it was considered missing.	Annual reports, corporate governance reports
Risk_com	Dummy variable coded 1 if a Risk Committee is set up separate from the Audit Committee; 0 otherwise.	Annual reports, corporate governance reports
Bank stability	Standard deviation of observations of RI from January 1 through December 31 of each year.	Datastream
Country-level controls		
Concentration	Total assets of the five largest banks divided by the/ total assets of the national banking sector. It is measured annually at the country level.	European Central Bank
GDP_capita	The natural logarithm of GDP per capita. Data are in current local currency. It is measured annually at the country level.	World Bank's World Development Indicators Database
Bank	Principal component of: supervisor power and independence indices (Supervisor), activity restrictions index (Restrict) and private monitoring index (Monitor). The supervisor power and independence indices measure the degree to which the supervisor has the authority to take specific actions to prevent and correct problems and the independence of the supervisor from the government and legally protected from the banking industry. It ranges from 0 to 17. Higher values indicate more powerful and independent banking supervision authorities. The	Barth et al. (2013), World Bank

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Variable	Definition	Source
	activity restrictions index measures the regulatory impediments to banks engaging in securities market, insurance, and real estate activities. It ranges from 3 to 12. Higher values indicate more restrictive scope of activities. The private monitoring index measures the extent of monitoring by outsiders such as international rating agencies. It ranges from 0 to 12. Higher values indicate more private monitoring. It is measured at the country level. We used data from the 3rd survey (2006) for the period 2008–2010 and data from the 4th survey (2011) for the period 2011–2013.	
H_Bank	Dummy variable coded 1 if Bank variable is equal or above median value; 0 otherwise.	
Legal	Dummy variable coded 1 if the legal system is civil code law; 0 otherwise (common law).	La Porta et al. (1998)
Invp	Corrected anti-director rights index. It is measured at the country level.	Spamann (2010)
Language	Principal component of: Pronoun_drop, Politeness and Strong_ftr. Pronoun_drop is the share of a country's population that speaks a language that allows first-person singular pronoun drop in an independent clause. Politeness is the share of a country's population that uses multiple politeness distinctions in second-person pronouns or avoids pronouns for politeness. Strong_ftr is a dummy variable that equals 1 if strong-FTR ("future time reference"); 0 otherwise (weak-FTR).	Davis and Abdurazokzoda (2016), Chen (2013)
Specialization	Dummy variable coded 1, 2, 3, 4, 5 if a bank is a bank holding company, a commercial bank, a cooperative bank, an investment bank, or a savings bank, respectively.	

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