Empirical Analysis of Risk Culture in Financial Institutions: Interim Report

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Abstract:

An exciting multi-disciplinary research project brings together expertise in financial risk management and organisational psychology. Using the Macquarie University Risk Culture Scale™ we have examined risk culture in 113 business units across three major banks. While the research is ongoing, the analysis to date provides evidence that favourable risk culture, when combined with robust risk processes and structures, is associated with more desirable risk related behaviour and less undesirable risk related behaviour. Risk culture "exists" in 95% of the business units we examined i.e. staff within the business unit have a common perception of risk culture, whether favourable or unfavourable. Within each of the banks, there is variance in risk culture scores between business units, even within the same business line. This suggests that risk culture is a quality of local business units. The paper also investigates the relationship between risk culture and risk structures (effective training, framework, remuneration, risk managers) finding that they are distinct but correlated constructs that together lead to enhanced behavioural outcomes.

Executive Summary

The Macquarie University Risk Culture Scale was used to assess the culture in 113 business units across three large banks, two headquartered in Australia and one in North America. The main findings were as follows:

- Strong risk culture (higher scores for Valued, Proactive, Manager and low scores for Avoidance) was generally associated with more desirable risk-related behaviour (e.g. speaking up) and less undesirable behaviour (e.g. manipulating controls). This finding provides further validation of the importance of risk culture generally, and of the Macquarie University Risk Culture Scale as a means of assessing risk culture.
- Personal characteristics were also important. Staff with longer tenure, those who are less risk tolerant and those with positive attitudes to risk management were more likely to display desirable risk-related behaviour. Those with high personal risk tolerance were more likely to display undesirable risk related behaviour.
- Good risk structures (policies, controls, IT systems, training, remuneration systems) appeared to support strong culture and ultimately less undesirable risk behaviour. Good risk structures do not by themselves guarantee good behaviour. Early results suggest that structures such as remuneration are interpreted through the lens of culture.
- Senior staff tend to have a significantly more favourable perception of culture than junior staff. This highlights the importance of anonymous and independent risk culture assessments where staff feel safe to reveal their true beliefs.
- There are statistically significant differences between the risk cultures of the three large banks we have analysed. That is, we can rank them meaningfully in terms of the average risk culture scores. This average comparison may be misleading, however, because variations exist within each of the three banks.
- The majority of business units we have assessed (more than 95% of 113) have an internally consistent perception of culture. That is, there is a strong or obvious culture in the unit (i.e. not just the perception of an individual but a quality of the group). However, it should be noted that there might be agreement that culture is good OR that it is poor.
- Most variation in risk culture scores occurs at the business unit level and seems to be driven by the local team environment. This is consistent with the hypothesis that culture is a local construct and very much dependent on interactions with close colleagues and the immediate manager.

1. The What and Why of Culture

Regulators and industry participants alike acknowledge the importance of organisational culture in financial intermediaries (FIs) as a crucial factor in preventing scandal, unexpected losses and even insolvency. In particular, 'Risk Culture' has been identified as being a key driver of employee behaviour and causal factor related to undesirable outcomes in FIs. Yet confusion surrounds the nature of risk culture and how it relates to the structures of risk governance.

We define risk culture as **the shared perceptions among employees of the relative priority given to risk management, including perceptions of the practices and behaviours that are expected, valued and supported**. Risk culture is only one aspect of broader organisational culture; other aspects that have been investigated across industries include Innovation Culture (Dobni, 2008), Customer Service Culture (Schneider, 1980), and Safety Culture (Guldenmund, 2000)[1]. However, in the context of FIs, especially those considered 'too big to fail', the relative priority given to risk management is relevant to a range of stakeholders and is of particular interest to prudential supervisors. Cases such as NAB (APRA, 2004), HBOS (Parliamentary Commission on Banking Standards, 2013a), Barclays (Salz, 2013), JP Morgan Chase (Permanent Subcommittee on Investigations, 2013), Royal Bank of Scotland (FSA, 2011) and Lehman Brothers (US Bankruptcy Court, 2010) illustrate that undesirable risk behaviour flourishes and spreads when the organisational culture permits it or encourages it. In every one of the afore-mentioned cases, risk culture was identified as an underlying causal factor.

According to the global industry association, Institute of International Finance, '*It is critical for governance to embed a firm-wide focus on risk. The recent market turbulence has provided clear evidence that effective cultivation of a consistent "risk culture" throughout firms is the main enabling tool in risk management.*' (IIF, 2008; p. 11). Regulatory statements since the crisis of 2008 have repeatedly referred to risk culture as an area of focus in the post-crisis environment (see Basel Committee 2010; 2011). The most prominent of these regulatory documents is that produced by the Financial Stability Board (FSB) providing guidance on supervisory interaction with regard to risk culture (FSB, 2013). Here the FSB highlights both the requirement for supervisors to formally assess risk culture at financial institutions, and the difficulty of this undertaking.

We define risk as **the effect of uncertainty on objectives** (following ISO 31000[2]) and the focus of risk management is to maximize the chance that the organization will achieve its objectives. Contrary to the perceptions of some, risk management is not necessarily just a defensive activity and it is not only concerned with controls and rules. It includes a wide range of activities including risk assessment, identification, analysis, evaluation, treatment, monitoring and review, communication and consultation.

Therefore is should be clear that risk culture is distinct from risk appetite. A strong risk culture doesn't necessarily mean that risk is always minimised and that the appetite for risk is low. A strong risk culture implies, however, that staff throughout the organisation have a clear understanding of

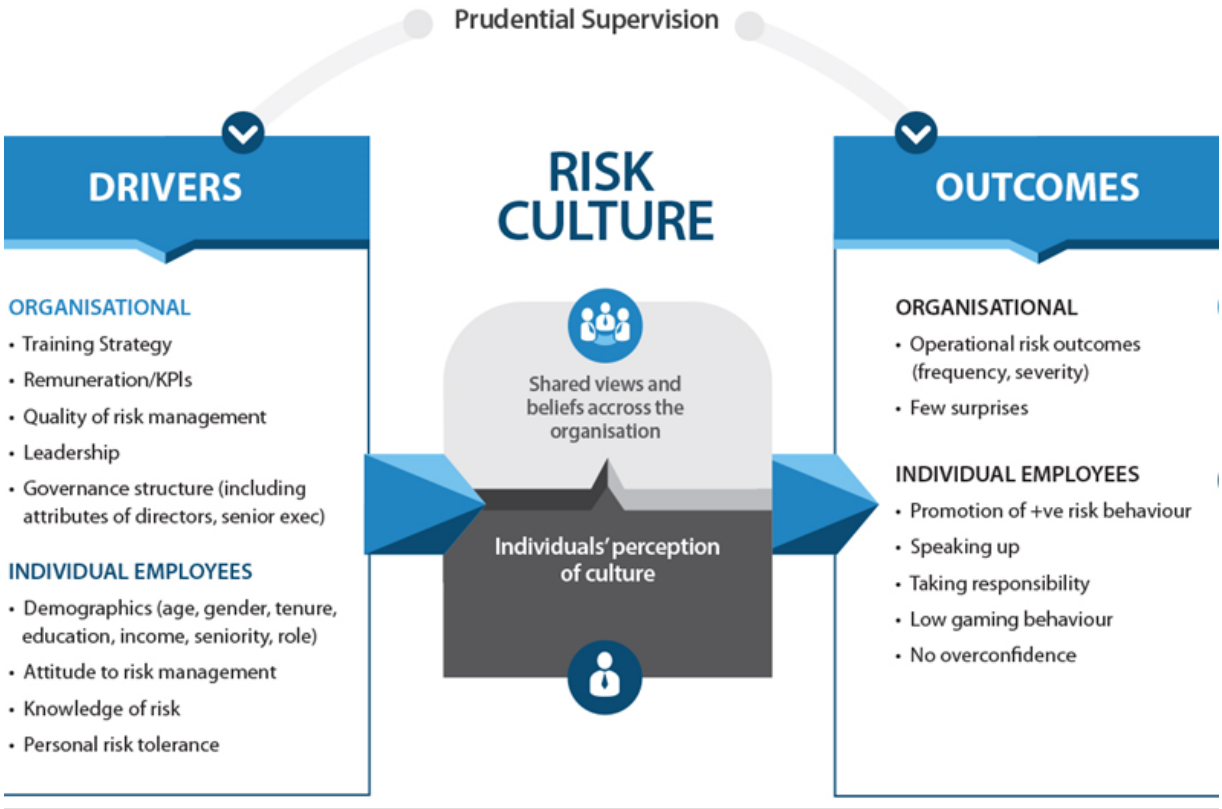
[1] We note that there is an ongoing debate about the distinction between "organizational culture" and "organisational climate" (Zohar & Hofman, 2012). Our definition of risk culture suggests it might be better conceived as a climate construct. Nevertheless, use of the term "risk *culture*" is ubiquitous within the financial sector and given the climate/culture difference is by no means settled, we refer henceforth to 'culture' and 'risk culture'.

[2] International Organisation for Standardisation is an independent NGO representing national standards bodies of 162 countries. See www.iso.org/iso/home/standards/iso31000.htm for risk management standards.

the boundaries of acceptable risk taking and are committed to ensuring that those boundaries are respected. As a result we hypothesise that robust risk culture helps organisations avoid **unexpected** shocks and gaming behaviour, but does not necessarily prevent losses from occurring. Risk appetite is a separate consideration to be determined by the stakeholders of the FI.

Culture matters to FIs because human behaviour is sensitive to context. As new members join a group such as a FI, they quickly learn cultural norms from existing members. This is typically achieved informally, by learning from the responses (both verbal and non-verbal) of respected others. Most of us learn how to behave by observing what others do rather than by reading procedure manuals.

Figure 1: Conceptual Model



1.1 Risk Culture vs Risk Governance

In our conceptual model, the governance and other structures supporting risk management are viewed as potential drivers of risk culture but are distinct from risk culture. Supportive structures, together with favourable risk culture, produce desirable risk behaviour e.g. speaking up, being accountable, not engaging in gaming behaviour.

Hypothesis 1: Governance and other structures supporting risk management are distinct from but correlated with risk culture.

The risk structures we explicitly include in the model are: training, remuneration/performance systems, risk managers and risk frameworks. We hypothesise, for example, that staff training programs that explain the importance of risk management and the role that each person plays in that process contribute to the prioritisation of desirable risk behaviour. Remuneration and performance measurement systems that are consistent with the firm's risk appetite are also likely to be crucial. The quality of the professional risk managers (Lines 2 and 3 in the three lines of defence model[3]) are considered, along with the IT systems, processes and risk frameworks. A further potential driver of risk culture is the effectiveness of risk governance at the most senior levels i.e. the Chief Risk Officer (CRO), the board Risk Committee and the Board of Directors generally.

It is important to note that these days almost all large FIs in major financial centres have implemented the risk governance structures mentioned above. The existence of a CRO and board Risk Committee can be more or less assumed (see Lingel and Sheedy, 2012; Magee, Schilling, and Sheedy, 2014). In this study we go further to assess the extent to which the CRO and the board Risk Committee provide constructive oversight and challenge.

The ultimate objective is for employees to display risk behaviour that supports the organisation's objectives. In our conceptual model (refer Figure 1), culture is distinct from but evidenced by behaviour. A strong risk culture, in combination with appropriate processes and structures, is arguably the best way of producing desirable risk behaviour. A structures, rules or compliance only based approach to risk management is fundamentally flawed; no set of rules is sufficiently comprehensive to cover every situation and devious, highly-motivated people can (as evidenced by the well-known cases referred to previously) circumvent rules. There is already evidence to suggest that governance structures by themselves have not been effective safeguards against scandal, unexpected losses and insolvency. For example, having a high status CRO did not prevent the failure of Lehman Brothers, the disastrous losses at RBS nor the LIBOR rigging scandals at Barclays and other banks.

Hypothesis 2: Supportive risk governance structures, combined with strong and favourable risk culture, are associated with desirable risk behaviour (and less undesirable risk behaviour).

Our definition of risk culture emphasises the *perceptions* of staff. These perceptions develop in the context of governance structures and rules as staff together evaluate and interpret their meaning. For example, if a firm implements the three lines of defence model of risk management for the first time, first line staff seek to make sense of this in their own context. Together with colleagues and immediate managers they explore the implications of the new framework for their own work processes, for reporting lines and for the way their performance is evaluated. If all staff now have risk management responsibility, how does this responsibility rate as a relative priority compared with other competing objectives? Here immediate managers can play an important role in signalling, through words and actions, whether the new initiative is a matter of genuine priority or perhaps just window-dressing for the benefit of prudential supervisors.

In summary, risk culture is not risk governance or structures per se, but rather the meaning and priority that is attached to those structures by staff. In the best case, the culture gives those

[3] In the three lines of defence model (see BCBS 2014 at paragraph 11), the business itself is the first line of defence, independent risk managers are the second line of defence and the third is internal audit or assurance.

structures their power but alternatively can render them ineffectual. When staff perceive that breaches of risk policy are not taken seriously then similar breaches will multiply as employees form the opinion that other objectives (such as high short-term profits) are the true priority. Ultimately culture determines how we behave when we are under pressure and have to act instinctively, when there is no opportunity to review the rule book. Culture also guides employees in how to balance competing objectives when there are multiple valid actions possible. For all these reasons a strong risk culture should be more effective than structures alone in ensuring that the organisation's objectives are reached.

According to Schein (2010), culture must be socially validated. For example, a leader may propose investing more resources into risk management. If this strategy is generally perceived to be successful over time, then resourcing of risk management becomes a shared value and, ultimately, a shared assumption. Notice the importance of social validation; the strategy has to be seen by the majority to work. This creates a problem for risk culture since the benefits of investing in risk management are not always obvious and may take some time to become evident. During periods of economic tranquillity, the benefits of risk management may not be evident at all and may be viewed as a hindrance.

Our approach to understanding and assessing risk culture has been informed by the research into industrial accidents and safety. As explained in Johnson (2007), early investigation of accidents focused on technological or engineering solutions and human behaviour/compliance. A break-through came in the understanding of industrial safety when researchers recognised the weakness of this framework and turned to organisational climate/commitment as fundamental determinants of safety related outcomes. Research into 'Safety Climate' was pioneered by Zohar (1980) and flourished with infamous events such as the Chernobyl disaster of 1986. Safety Climate is defined by Zohar and Luria (2005) as 'employee perception of the priority an organisation (or direct supervisor) places on safety'. It has been assessed with the creation of validated quantitative questionnaires as explained in Johnson (2007), who is one of several authors to show that such survey instruments predict safety outcomes such as accident rates and accident severity. Safety Climate has now been assessed in many industries including health, construction, energy, emergency services and manufacturing (see Guldenmund, 2000; and Wiegmann et al. 2004 for review). This literature provides the theoretical basis for the present paper.

In contrast to the relatively large body of research on safety climate, academic study of risk culture in FIs is still emerging, with the recent work by Power, Ashby and Palermo (2013) and McConnell (2013) being some recent examples. Power et al. (2013) document the practice-literature that has emerged with contributions from industry bodies, consultants and regulators. They engage with fifteen FIs (both banks and insurance companies) to gain an understanding of how Risk Culture in FIs is evolving in the post-crisis period. They document trends including increased centralisation of risk management and the development (usually by consulting firms) of numerous questionnaires designed to assess culture and tool-kits or models for building Risk Culture. Research in support of these questionnaires, tool-kits and models appears lacking.

Power et al. (2013) characterise Risk Culture as the outcome of a series of risk management trade-offs across a number of dimensions. Too much emphasis on controls and risk-avoidance could become stifling of worthwhile innovation; undue questioning of strategies and escalation of issues

could result in organisational paralysis. Power et al. (2013) promote instead the need for balance in relation to these various trade-offs. They question the validity of survey instruments and models with an inherent assumption that more risk management is better.

The present authors suspect that the danger of excessive priority in risk management is unlikely to be a problem, except in the immediate aftermath of a systemic crisis such as was experienced in 2008-2010. The natural tendency in FIs is to reduce the priority given to risk management because shareholders, the dominant stakeholders in most firms, benefit from high risk, especially if it can be hidden from external stakeholders.[4] This is particularly true in systemically important firms where moral hazard is rife; FI leaders have learned through experience that profits are privatised and disastrous losses are socialised. If emphasis on risk management becomes inappropriate, firms would be in danger of losing good staff, losing market share, declining profits and acquisition. Nevertheless, we accept the need to explore the validity of the PAP hypothesis in this and future research into Risk Culture.

2. Assessing Risk Culture

Risk culture relates fundamentally to the perceptions of employees. The two main ways of gauging staff perceptions are to use interviews or surveys. Interviews can be very useful but in a large firm it is not practical to interview sufficient staff to create an adequate sample for analysis. In addition, interviews do not allow us to make objective comparisons over time or across businesses.

However, implementation of the survey methodology presupposes a valid survey instrument – typically a questionnaire. Without a rigorous validation process, it is not clear what a questionnaire is measuring, if anything. A reliable survey instrument will allow financial institutions to test the uniformity of culture throughout the firm, identify pockets of 'problematic' culture, demonstrate the effectiveness of the culture (if it is strong) to outsiders and track how culture changes over time.

The science of psychometrics is concerned with the construction and validation of assessment instruments for personality, intelligence, attitudes etc. By using the techniques of psychometrics one can create a survey instrument that is:

- valid (i.e. measures what it purports to measure),
- reliable (i.e. will produce consistent results if repeated),
- as short as possible to reduce survey fatigue, and
- less likely to be gamed.

In order to assess risk culture we used the Macquarie University Risk Culture Scale (see Griffin, Sheedy and Barbour, 2014). The process of validation for this scale identified several underlying dimensions or factors of risk culture. A factor is an aspect of the issue of concern (e.g. risk culture) indicated by a group of survey questions. Researchers examine the pattern of survey responses to

[4] The Merton model (Merton, 1974) characterises equity as a call on the assets of the firm since losses are limited to the initial investment while upside is unlimited. This asymmetric payoff creates an incentive to increase risk similar to a long call option.

find clusters of survey questions around a common theme. Statistical analysis of these correlations helps to identify what the factors are and which survey questions are relevant to each factor. Any survey questions that do not relate to the factors can be eliminated, thus reducing the number of questions. However, for each risk factor there needs to be several survey questions to ensure reliability. This is an important point because in a world of survey fatigue there is a natural desire in FIs to reduce survey length. In some cases firms have attempted to use a single survey item for each dimension of risk culture.

The Macquarie University Risk Culture Scale assesses four factors of risk culture as shown in Figure 2. it is possible to produce scores for business units, divisions and whole banks on each of the 4 factors of risk culture (subject to having a representative sample).

Figure 2: Four Components or Factors of Risk Culture

3. Method and Sample

The Macquarie University Risk Culture Scale was used to assess the culture in three large banks, two headquartered in Australia and one in North America. All three banks appear in the top 50 banks world-wide by market capitalisation and in the top 50 banks world-wide by assets. No bank in the study group had fewer than 30,000 employees. The surveys were performed between July and September 2014, each one remaining open for a period of two weeks. Anonymous survey responses were collected via a secure online survey platform and, from there, provided directly to the university researchers for analysis. To encourage candour, employees are advised that their employer will receive only aggregated analysis of responses.

In each case a stratified sample of employees, selected by the organization (with guidance from the researchers to maximise consistency), was sent an email inviting them to participate in a survey on risk culture. Each bank was asked to provide the researchers with access to at least 30 distinct business units to allow for the evaluation of culture at the local level. The selection of business units and employees was designed to broadly represent the demographics, geographical spread and business model of each bank. Staff from all levels of the organisation were invited to participate,

with some over-representation of middle and senior managers and risk professionals. All three banks had international operations so units were located in multiple countries.

Each bank was asked to provide access to multiple business units in each of five business lines defined as follows: Retail/Commercial banking; Corporate/International Banking (includes Capital Markets); Private Banking, Wealth Management and Insurance; Independent Risk and Internal Audit; and finally Other Group functions (includes HR, Finance, Technology if it is centralised, Marketing, Legal etc).

Table 1: Sample Construction

	Bank A	Bank B	Bank C
Number of Responses	1,884	4,584	4,262
Response Rate (% of invitations)	21%	40%	41%
Number of Business Units Assessed	42	28	42

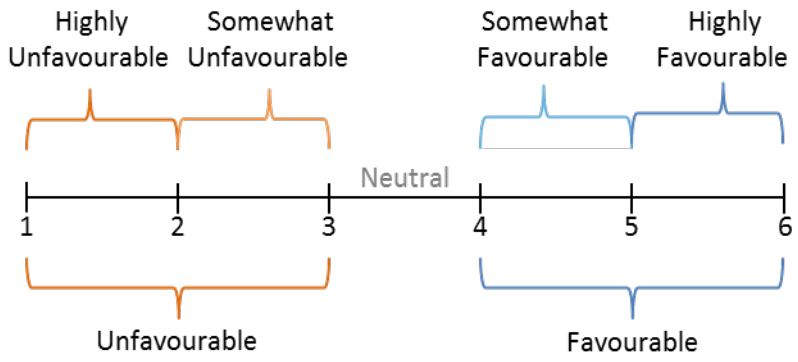
In addition to the 22 questions on risk culture, employees were asked to answer:

- approximately 10 demographic questions,
- 3 questions on their personal attitudes to risk management (e.g. risk management is an enabler for doing business vs. an unnecessary impediment),
- 3 questions on personal risk tolerance drawn from the [refs],
- 14 questions on their perceptions of the bank's risk structures as explained below,
- 15 questions on their perceptions of risk-related behaviour as explained below,

Staff who self-identified as professional risk managers (i.e. independent risk or internal audit) were asked an additional 18 questions relating to the effectiveness of the bank's risk structures.

For each survey item answers were given on a six-point scale from 1 (Strongly Disagree) to 6 (Strongly Agree). Composite scores (for each risk factor) were computed by taking an average of the relevant survey items then recoded where ≤ 3 = Unfavourable (1-2 "Highly Unfavourable" + 2-3 "Somewhat Unfavourable"), 3-4 = Neutral, ≥ 4 = Favourable (4-5 "Somewhat Favourable + 5-6 "Highly Favourable") and negative worded scales recoded in the reverse direction.

Figure 3: Creating Composite Scores



Risk Structure Factors

We developed a set of survey questions to assess staff perceptions surrounding the quality of structures used for risk management. We initially analysed the risk management scandals of the past decade, the risk management and safety culture literature and regulatory documents (see Appendix). We also conducted a series of interviews with subject-matter experts including professional risk managers, supervisors and consultants. As a result we formed hypotheses regarding the key structures of risk management and produced a set of potential survey questions or items. These items were pilot tested in a medium-sized bank before applying them in the current study. Factor analysis was used to identify the following components of risk structures:

- *Risk Frameworks* effectiveness (covers policies, procedures, systems)
- *Risk Manager* quality (e.g. Lines 2/3 add value to business unit performance)
- *Risk Training* quality
- *Remuneration and KPIs* (consistent with values and risk appetite)

Risk Behaviour Factors

Similar methods were applied to develop a set of survey questions to assess risk related behaviour of staff (both their own behaviour and their observations of colleagues):

- *Desirable Risk Behaviour*. This is a set of survey items where respondents rate their own behaviour that supports risk management objectives e.g. speaking up, promoting risk management, knowing how to report a risk event.
- *Undesirable Risk Behaviour*. As above but for undesirable behaviour e.g. lack of priority for risk management, needing to 'bend' the rules to get the job done.
- *Observed Negative Risk Behaviour*. Respondents' observations of the behaviour of colleagues within the business unit e.g. manipulating controls, not taking risk management seriously.
- *Observed Overconfidence*. As above but relating to overconfidence e.g. unjustified confidence in the organisation's ability to withstand threats, sense of immunity to risk.

4. Results

We first analysed the relationship between risk culture, risk-related behaviour and risk structures in a correlation analysis. For this analysis we use pooled data from all three large banks resulting in 10,730 observations.

Table 2: Correlation Analysis

	1	2	3	4	5	6	7	8	9	10	11	12
1. Culture: Valued	1											
2. Culture: Avoidance	-.44	1										
3. Culture: Proactive	.47	-.51	1									
4. Culture: Manager	.31	-.44	.56	1								
5. Behaviour: Positive	.24	-.26	.45	.35	1							
6. Behaviour: Negative	-.28	.54	-.46	-.45	-.40	1						
7. Behaviour: Neg. Obs.	-.24	.48	-.34	-.33	-.21	.47	1					
8. Behaviour: Overconfidence	-.33	.55	-.42	-.38	-.24	.46	.60	1				
9. Structures: Training	.22	-.24	.33	.29	.28	-.27	-.18	-.21	1			
10. Structures: Framework	.44	-.50	.50	.42	.30	-.40	-.33	-.39	.40	1		
11. Structures: Remuneration	.24	-.41	.22	.16	.12	-.30	-.31	-.34	-.01	.17	1	
12. Structures: Risk Managers	.31	-.33	.47	.37	.36	-.35	-.22	-.26	.31	.46	.13	1

All correlation coefficients are significant with 99% confidence (two-tailed) with the exception of one highlighted in red type-face.

The correlations are all in the expected direction. We note, for example that the three desirable risk culture factors (Valued, Proactive and Manager) are all positively associated with positive risk behaviour and negatively associated with negative risk behaviour. The structures that support risk management (Training, Framework, Remuneration, Risk Managers) are all positively associated with the desirable culture factors, suggesting that appropriate risk structures may help strengthen risk culture (although the direction of causality could run both ways). The fact that correlation between the factors of risk culture and risk structures is always less than |0.50| is significant. This result suggests that the two constructs – culture and structures - are distinct from one another.[5]

[5] This has also been confirmed in factor analysis i.e. survey items relating to governance loaded onto the relevant governance factors, survey items relating to culture loaded onto the relevant culture factors.

The regression analysis in Tables 3 and 4 is also created from pooled data across all three large banks. Standardised regression coefficients have been used.

Table 3 provides analysis of self-reported risk-related behaviour, both positive and negative. For each measure of risk-related behaviour we conducted step-wise regressions to investigate the explanatory power of demographics, followed by risk structures and lastly risk culture. The first step showed that positive behaviour is significantly more likely to be reported by staff with longer tenure, those who are part of the independent risk and audit functions, those who are less senior, those who are less risk tolerant and those with positive attitudes to risk management. Together these personal attributes explained 10% of the variation in positive risk behaviour among individuals.

The second step added four elements of risk structures to the equation. Positive perceptions relating to the quality of risk training, remuneration/KPIs, risk frameworks and risk managers were all significantly related to positive risk behaviour. Together these risk structures explained a further 13% of the variation in positive behaviour.

The third step added the four risk culture factors to the equation. Positive risk behaviour was significantly more likely to be observed when scores for Proactive and Manager were high, that is where staff perceive that risk issues and events are proactively identified and addressed and where the immediate manager is an effective role model for desirable risk behaviour. Risk culture explained a further 6 % of the variation in positive risk behaviour taking the total to 28%.

Turning to the analysis of negative (self-reported) risk behaviour, we observed more or less the reverse with some notable exceptions. All four of the risk culture factors were significantly associated with negative risk behaviour, with three of the four coefficients having the expected sign[6]. We observed in particular large coefficients for both Avoidance and Manager. That is, negative risk behaviour was more likely to be reported by staff who perceive that risk issues and policy breaches are ignored, downplayed or excused and less likely to be reported by staff who perceive that their immediate manager is an effective role model for desirable risk behaviour. Together the risk culture factors explained 13% of the variation in negative risk behaviour and the total variance explained was 42%.

[6] The positive association between Valued and negative risk behaviour (albeit small) is puzzling and we are further investigating this risk culture factor.

Table 3 Explaining Risk-related Behaviour

** Indicates significance at 95% confidence, * Indicates significance at 90% confidence

	Positive Behaviour				Negative Behaviour		
Predictors	Step 1	Step 2	Step 3		Step 1	Step 2	Step 3
Education	.01	.01	.01		-.01	-.01	-.01
Tenure	.08**	.07**	.07**		-.03**	-.02*	-.04**
Independent risk and audit	.06**	.05**	.03**		-.01	-.02*	-.02*
Seniority	-.18**	-.17**	-.15**		.09**	.06**	.04**
Individual risk tolerance	-.10**	-.05**	-.05**		.19**	.12**	.10**
Risk attitudes	.18**	.09**	.07**		-.14**	-.03**	-.02*
Training		.13**	.09**			-.11**	-.06**
Framework		.12**	.02			-.23**	-.06**
Remuneration/KPIs		.07**	.03**			-.22**	-.10**
Risk Managers		.21**	.13**			-.16**	-.07**
Valued			.02				.05**
Avoidance			.02				.33**
Proactive			.24**				-.08**
Manager			.10**				-.19**
ΔR^2	.10**	.13**	.06**		.07**	.21**	.13**
R^2	.10	.22	.28		.07	.28	.42

From this we cannot conclude that risk structures are more important than risk culture in explaining behaviour. In separate (unreported) regressions we reversed the ordering of the stepwise regressions. When culture factors are included first, they explain 16% of the positive behaviour and 33% of the negative behaviour. We note from the third regression equation in Table 3 that all four elements of risk structures (training, remuneration, framework and risk managers) become less significant or the coefficients decline in an absolute sense once the risk culture factors are added to the equation. This pattern is supportive of our hypothesis that risk structures have a partially mediated effect on behaviour through risk culture; the two constructs work together to drive behaviour.

Table 4 Explaining Observed Risk-related Behaviour

** Indicates significance at 95% confidence, * Indicates significance at 90% confidence

	Observed Negative Behaviour			Observed Overconfidence	
Predictors	Step 1	Step 2		Step 1	Step 2
Training	-.07**	-.03**		-.08**	-.03**
Framework	-.23**	-.09**		-.28**	-.08**
Remuneration	-.27**	-.16**		-.28**	-.14**
Risk Managers	-.05**	.01		-.07**	.02
Valued		.04**			-.02
Avoidance		.30**			.35**
Proactive		-.07**			-.11**
Manager		-.11**			-.10**
ΔR^2	.19**	.09**		.24**	.13**
R^2	.19	.27		.24	.36

Table 4 presents similar analysis for behaviour that staff observe in their business unit colleagues. In the case of observed negative behaviour (e.g. manipulating controls, not taking risk management seriously), all four risk structure were significantly associated with behaviour in the first regression and in the expected direction. Of the four, Remuneration was the strongest predictor of negative behaviour (judging by the size of the coefficient). After the risk culture factors were added, all four coefficients decreased in an absolute sense and one became insignificant. Avoidance had the highest coefficient, suggesting that a culture of avoidance is the strongest predictor of negative behaviour. Again we observed a positive relationship between the Valued dimension of culture and undesirable behaviour. This may be due to the fact that staff are more likely to notice and report on undesirable behaviour if they perceive that risk management is highly valued.

Very similar patterns of association are observed in the case of overconfident behaviour (e.g. sense of immunity to risk) except that in this case the Valued dimension of culture was found to be insignificant.

Variation in Risk Culture

We next analysed the variation in perceptions of risk culture by bank (see Table 4). Bank B had more favourable scores than either of Banks A or C for risk culture i.e. higher scores for Valued, Proactive and Manager and lower scores for Avoidance. Differences were significant with 95% confidence. In addition there were significant differences between Banks A and C at 95% confidence.

There was a general tendency for staff who work in the independent risk and audit functions to perceive that the bank places less value on risk management and to perceive higher levels of avoidance, but to perceive that their own risk/audit colleagues are more proactive and their managers are better models of desirable behaviour. This was particularly noticeable in Banks A and C. We attribute this finding to the fact that those in the second and third lines of defence (according to the three lines of defence model) tend to be more highly attuned to risk problems and more likely to prioritise good risk practices.

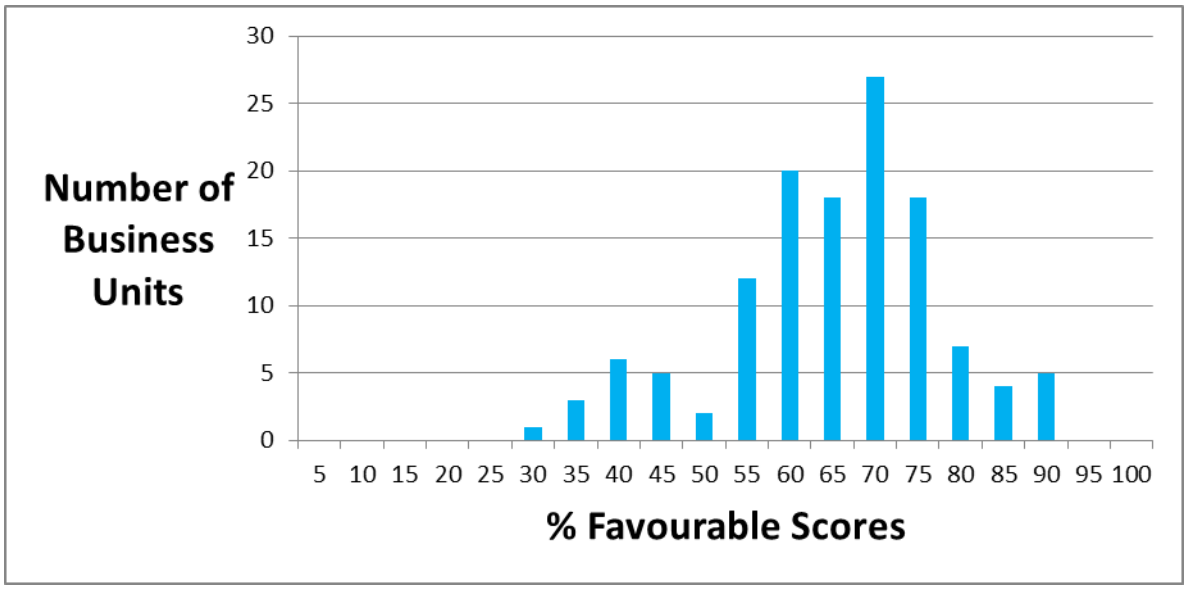
Table 5: Risk Culture By Bank: 1 (Strongly Disagree) – 6 (Strongly Agree) Scale
High scores are desirable for Valued, Proactive and Manager. Low scores desirable for Avoidance.

	Valued	Avoidance	Proactive	Manager
A. All Staff Average (standard deviation)				
Bank A	4.36 (.91)	2.79 (.92)	4.65 (.73)	4.97 (.90)
Bank B	4.49 (.91)	2.67 (.94)	4.74 (.75)	5.05 (.92)
Bank C	4.28 (.95)	2.97 (.97)	4.63 (.75)	4.93 (.93)
B. All Staff Excluding Risk and Audit Average (standard deviation)				
Bank A	4.37 (.91)	2.78 (.92)	4.64 (.73)	4.95 (.91)
Bank B	4.51 (.90)	2.66 (.95)	4.71 (.74)	5.03 (.92)
Bank C	4.26 (.95)	2.94 (.96)	4.65 (.75)	4.97 (.92)
C. Risk and Audit Average (standard deviation)				
Bank A	4.13 (.96)	2.93 (.89)	4.84 (.69)	5.38 (.64)
Bank B	4.38 (.95)	2.72 (.87)	4.92 (.73)	5.17 (.90)
Bank C	4.32 (.92)	3.06 (1.02)	4.57 (.74)	4.83 (.90)

Finally we analysed risk culture by business unit within the three large banks. We hypothesised that risk culture is typically a 'local' construct. This hypothesis rests on the idea that attitudes and values will primarily be shaped by colleagues that we work closely with and by immediate managers.

In each of the large banks we have assessed so far, we have discovered individual business units that have risk culture scores significantly better or worse than the average for the bank. Most variation in risk culture occurs at the business unit level and seems to be driven by the local team environment. Figure 4 below illustrates this point with regard to Avoidance. The frequency histogram for all the 113 business units analysed to date shows a wide range of % Favourable scores. Scores across the three banks range between 28% and 90%, with a median of 65%.

Figure 4: Frequency of % Favourable Scores – Avoidance (All Banks)



Bank B had the narrowest range of scores across business units with % Favourable scores for Avoidance ranging between 56% and 90%. Bank A had the widest range of % Favourable scores for Avoidance ranging between 33% and 89%. Such wide dispersion of business unit scores suggests

that it is not possible to talk about a uniform 'bank-wide culture' for any of the banks analysed to date.

Is Everyone In Agreement?

Researchers of organisational climate/culture examine not only the % Favourable scores (or average scores) in a business unit as illustrated in the previous section. In addition they consider the strength of the culture or the extent to which staff in individual business units have a consistent perception of culture. Some have found that culture is only a useful concept for determining behaviour if staff have a high level of agreement regarding priorities, although lack of agreement may mean that changes to culture will be easier to achieve.[7] That is, culture must be both strong and favourable for desirable behaviour to reliably emerge.

An "agreement index"[8] or r_{wg} was calculated to assess the extent that respondents within the business unit groupings were consistent in their ratings of risk culture (see LeBreton and Senter, 2008). Following common practice, an agreement index greater than 0.70 was taken as evidence that employees in a particular unit rate culture consistently with one another. That is, there is a strong or obvious culture in the unit (i.e. not just the perception of an individual but a quality of the group). However, it should be noted that there might be agreement that culture is good OR that it is poor.

Figure 5 Panel A provides an illustration (not using real data) of low business unit agreement for one culture factor. Here we see that across the survey items that comprise this factor, there is a very wide dispersion of opinion among employees. In contrast Panel B illustrates the case of high agreement where the range of staff opinion is much narrower.

In the banks analysed to date we observed that agreement is evident in the majority of business units. We have 452 unit culture scores (i.e. 113 teams with four risk factors each). There are only 24 cases (5% of the total) where there is no common perception regarding the risk culture of the team for a particular culture factor. The implication of this is that risk culture "exists" within the large majority of surveyed business units. Risk culture is "strong" enough that staff within a business unit agree about the relative priority given to risk management. If agreement exists and culture scores are favourable, the "good" aspects of risk culture are being clearly communicated to and acknowledged by staff. Conversely if agreement exists and culture scores are unfavourable, the "bad" aspects of risk culture are likely to be "infectious" – poor practice spreads among individuals within a business unit till they become commonly accepted as "the way things are done around here".

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[7] See survey of the available literature in Chapter 3 of Ehrhart, Schneider and Macey (2014) under the heading 'Climate Strength'.

[8] In the case of a single item, $r_{wg} = 1 - \frac{s_X^2}{\sigma_E^2}$ where S_X^2 is the observed variance in scores across staff in the unit while σ_E^2 is the expected variance in scores across staff in the unit if there was a complete lack of agreement i.e. a uniform distribution of factor scores. So r_{wg} is a measure of dispersion of scores that must lie in the range between zero and unity. For a multi-item factor, agreement is calculated by assessing the average variance across all the items in the factor as explained in LeBreton and Senter (2008).

Figure 5 Panel A: Low Agreement Exemplar

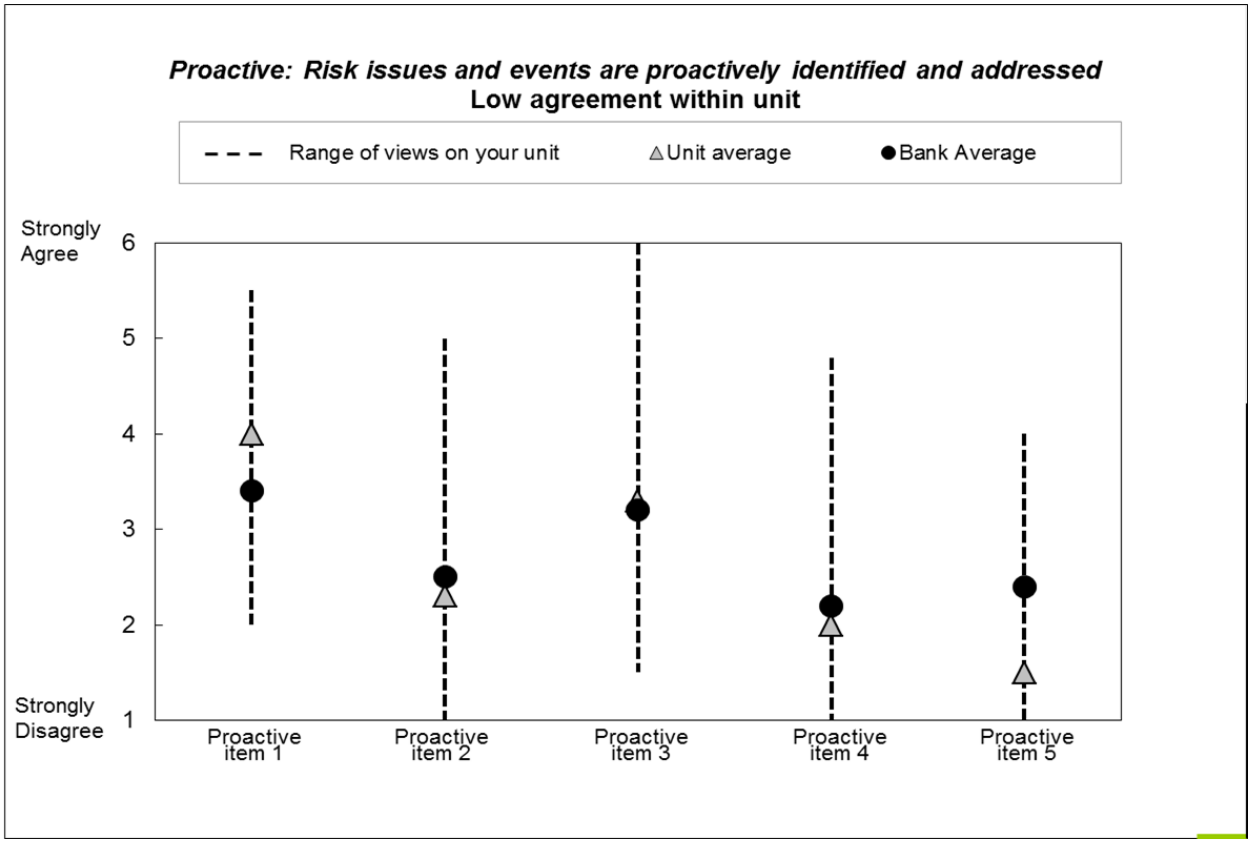
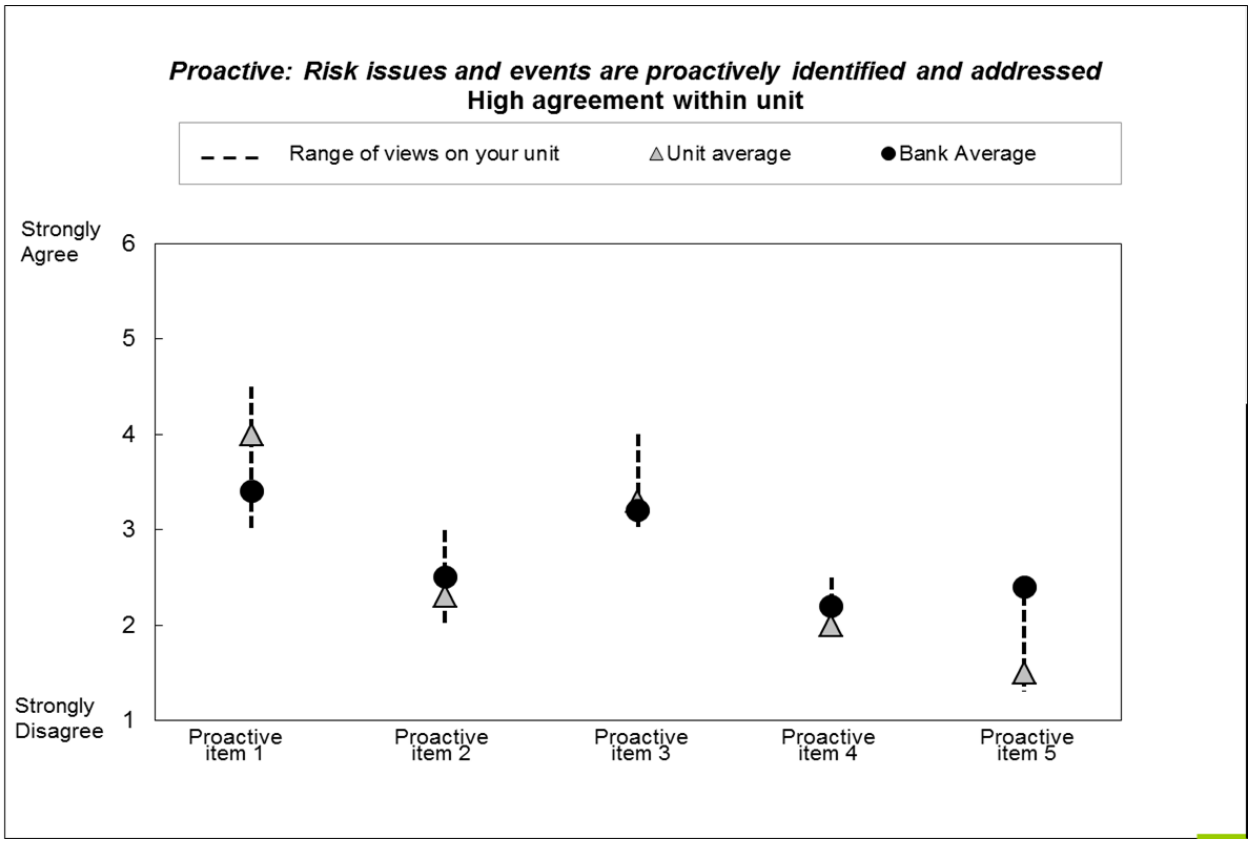


Figure 5 Panel B: High Agreement Exemplar



In the relatively small number of cases where agreement was not evident, possible explanations based on organisational climate research[9] include:

- Large business unit,
- Lack of cohesion in the business unit,
- Lack of social interaction within the business unit,
- Low average tenure,
- Lack of consistency in the behaviour of leaders, and
- Failure of leadership to provide adequate guidance.

Interestingly we found that in a number of business units that we examined, agreement did exist despite being large in size, split across multiple locations and sometimes more than one country. This is interesting as development of social interaction and cohesion in such teams could be problematic.

Culture by Level

We observed that senior staff tend to have a significantly more favourable perception of culture than junior staff. The most likely explanation for this is that 'bad news' is sometimes hidden from senior people. People with an unfavourable assessment of the culture may be disinclined to make those assessments public in fora where senior managers are present. This highlights the importance of anonymous and independent risk culture assessments where staff feel able to reveal their true perceptions.

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[9] See Table 3.4 of Ehrhart, Schneider and Macey (2014) and supporting text.

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Appendix: Assessment of Cases and Practice Literature.

Cases illustrating risk management failures in FIs are abundant, and along with them, a range of documents analysing them and drawing lessons for improved practices. While not exhaustive, the table below summarises the findings in relation to the more notable documents available to us.

Summary of Cases and Literature

Case or Document, (Source) In date order	**Risk Management, Behaviour, Governance and Culture Issues**
HIH Insurance (Martin, 2003)	• High risk strategy with inadequate pricing of risk, reinsurance and reserving for future losses; • Inadequate attention to risk by senior management and insufficient challenge by Directors; • Dubious accounting practices that reduced transparency to the market; and • Failures by external advisors (including auditors) and regulators.
NAB Currency Options (APRA, 2004)	• Poor implementation of control framework (leading to fraud); • Warning signals ignored; • Failure to escalate risk issues; • Lack of priority to risk management; • Risk management function lacks independence; and • Incentives do not support prudence.
Risk Culture (IIF, 2009)	• Need for focus on Risk Culture by management; • Common issues include: disregard for risk, sweeping problems under the carpet, passivity, ignorance, failure to correct bad behaviour; and • Elements of an effective Risk Culture: committed leadership, horizontal information sharing, vertical escalation of fears or threats, continuous and constructive challenge of actions and perceptions, active learning from mistakes, incentives that reward thinking about the whole organisation and an effective governance structure.
Taking Control of Organisational Risk Culture (McKinsey,	• Strong risk culture must demonstrate: 'a clear and well-communicated risk strategy; high standards of analytical rigour and information sharing; rapid escalation of threats or concerns; visible and consistent

2010)	role-modelling of desired behaviours and standards by senior managers; incentives which encourage people to 'do the right thing' and think about the overall health of the organisation; and continuous and constructive challenging of actions and preconceptions at all levels of the organisation.'; • Ten key risk culture factors can be grouped into four groups: Acknowledgement of Risk (overconfidence, no challenge), Responsiveness of Risk (indifference, slow to respond), Transparency of Risk (communication, level of insight) and Respect for Risk (gaming, beat the system).
Lehman Brothers Insolvency (US Bankruptcy Court, 2010)	• Deliberately high risk strategy, but insufficient attention to tail risks and liquidity implications; • Management chose to disregard or over-rule risk controls regularly; • Reward systems based on revenue with minimal regard for risk factors; • Risk controls failed adequately to adapt to changing business model; and • To maintain favourable ratings and investor confidence, management painted a misleading picture of financial condition especially leverage. (Used "repo 105" to temporarily remove assets from balance sheet.)
AIG Bailout (FCIC, 2011)	• Lack of understanding by senior group leaders of risks taken by affiliate companies; • Regulatory failures; and • Lack of insight into tail risks and liquidity implications.
Royal Bank of Scotland Bailout (FSA, 2011)	• Overconfidence with regard to the stability of the financial system; • Inadequate challenge (by the Board) of the firm's strategy and its inherent risks; • Failure to assess risks on an aggregate basis; • Board was too large and members lacked relevant banking experience; • Lack of Board review of risk appetite; • Deficiencies in risk assessment, reporting and controls; • Lack of status and authority for Group CRO and the risk management function more broadly; and • Supervisory failures.
Risk Culture in UK Insurance (Protiviti, 2012)	• Perception in many firms that risk function is primarily designed to meet regulatory requirements and to control; few perceive the risk function as value adding; • Need for non-executive directors to challenge risk management approach; and • Need for high-frequency and high-quality board discussion of risk management.
Cultivating a Risk Intelligent Culture (Deloitte, 2012)	• Key characteristics of 'risk intelligent' culture: commonality of purpose, values and ethics; universal adoption and application,; learning organisation; timely, transparent and honest communications; understanding the value of effective risk management; responsibility – individual and collective; expectation of challenge; • Deloitte assesses sixteen Risk Culture indicators aligned to four Risk Culture influencers: Risk Competence (knowledge, skills, learning, recruitment and induction), Organisation (strategy and objectives, values and ethics, policies, processes and procedures, risk governance), Relationships (Challenge, management, leadership and

	communication) and Motivation (performance management, risk orientation, incentives, accountability).
McConnell (2013)	Proposes a Risk Culture framework with six drivers (and indicators in parenthesis): • Leadership (core values, planning and execution, communication, people development, operational excellence); • Strategy (strategic perspective, risk perspective, resource, risk appetite, risk framework); • Decision-making (informed, competent, structured, empowered, open to challenge, recorded); • Controls (define and implement, reporting, review, risk delegation, risk limits, stress testing); • Recruitment, training and competence (recruitment, training, continuous development, feedback, managing performance, risk education); and • Reward (salary, bonus and profit share arrangements, recognition, risk aligned, risk-adjusted, risk independence).
HBOS failure and takeover (Parliamentary Commission on Banking Standards, 2013)	• Deliberate high risk strategy partly due to brash overconfidence of senior leaders; • Risk management resourcing did not keep pace with growth and evolving business model; • 'Federal' model gave excessive power to heads of businesses, lack of challenge from central executive, not open to challenge from Group Risk; • Group Risk function lacked status and authority, warnings ignored; • Senior risk executives lacked relevant experience or expertise; • Weaknesses in oversight structure were intentional, originating from CEO James Crosby and not corrected by his successor Andy Hornby; and • Regulatory failures.
JP Morgan Chase Whale Trades (Permanent Subcommittee on Investigations, 2013)	• Increased risk in special portfolio with inadequate oversight and controls; • Risks and losses were hidden from senior management and the broader market (by changing valuation protocols and risk models); • Risk limit breaches disregarded, risk metrics frequently criticised and downplayed, risk models gamed to produce lower capital requirements; • Failure to disclose increased risk to regulators; • Mis-characterising high risk trading as hedging; and • Regulatory failures.
Barclays: Mis-selling, LIBOR fixing (Salz, 2013)	• Despite having '5 Guiding Principles' from 2005, Barclays did not make these values a priority and they were not widely known by staff; • Failure to escalate and report bad behaviour; • Winning at all costs attitude in some parts (e.g. investment bank), combined with aggressive and arrogant attitude to regulation; • Arrogant attitude to customers (illustrated by large volume of complaints); • In both the retail bank and the investment bank, success was associated with strong personalities, successful sales and revenue producers, demonstrated cleverness and an ability to win;

	• Premium salaries were paid to attract 'the best people'; • Leadership team at Barclays Capital disliked bad news and were rarely challenged; • Program of cultural change has now begun; • Board did not adequately prioritise operational and reputational risks; • Performance measurement system was not linked to values; • Recruitment and induction did not focus on values;
Risk Culture in Financial Institutions (Power, Ashby and Palermo, 2013)	Risk Culture observed in six trade-offs: • Risk function: business partner or independent advisor; • Informal networks or formal processes (between risk function and business units); • Risk vs Control; • Internal change vs use of advisors; • Own Risk Culture or regulatory culture; • Levers on behaviour: ethics vs incentives.
Guidance on Supervisory Interaction with FIs on Risk Culture (FSB, 2013)	• Foundational elements of Risk Culture: risk governance, risk appetite, compensation; • Indicators of sound Risk Culture: tone from the top, accountability, effective challenge, incentives; • Tone from the top: leading by example, assessing espoused values, ensuring common understanding and awareness of risk, learning from Risk Culture failures; • Accountability: ownership of risk, escalation process, enforcement; • Effective Challenge: open to dissent, stature of risk management; and • Incentives: remuneration and performance, talent development and succession planning.

The table above highlights the fact that discussion of Risk Culture is often intermingled with and possibly confused with governance structures (e.g. remuneration systems, control structures, expertise/knowledge of both Directors and executives and behaviour) and behaviour (e.g. speaking up, challenging practices, gaming controls). Our definition of Risk Culture, focussing on employee perceptions within the FI, excludes both of these elements but they are clearly connected. In our model (see Figure 1), governance structures and demographic factors are distinct from but potential drivers of Risk Culture. It is possible that governance structures are also determined by Risk Culture creating a feedback loop. Issues of behaviour also fall outside our strict definition of Risk Culture but are likely to flow from it.

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