

Risk culture of banks and cost of capital – European Insight

Abstract

This study examines the impact of risk culture on the cost of capital in European banks. A robust risk culture, marked by effective management and transparent disclosures, reduces information asymmetry and boosts investor confidence, leading to lower capital costs. The findings not only indicate the importance of aligning risk management practices with regulatory requirements and investor expectations, but also highlight the potential for significant cost savings for banks that can successfully implement such a risk culture. The study also identifies gaps for further research in understanding the mechanisms of this relationship, providing a roadmap for future studies in this area.

JEL Classification:

Keywords: Risk culture, cost of capital, textual analysis, European banks

1. Introduction

Despite the extensive body of research on risk culture and firm performance (Abeysekara et al., 2019; Arjoon, 2006; Fritz-Morgenthal et al., 2016; Sheedy & Griffin, 2018), a notable gap persists in the literature regarding the specific mechanisms through which risk culture influences the cost of capital in the banking sector (Xu et al., 2024). Prior studies predominantly focus on non-financial firms (NFF) (Fan et al., 2017; Teller & Kock, 2013). Palermo et al. (2017) and Sheedy & Griffin (2018) highlight the indirect effects of risk culture on the performance of NFF through improved decision-making and compliance. Other strand of studies also relies on survey data to capture various aspects of risk culture (Teller & Kock, 2013; Liu et al., 2018). Using other disclosure outlets, Bianchi et al. (2021) illustrate that a sound risk culture, assessed through textual analysis of annual reports, substantially improves risk management and operational efficiency. Nonetheless, the critical relationship between risk culture and the cost of capital within banks remains largely unexplored. This is particularly crucial given that risk management is integral to bank stability and influences capital costs, especially in the aftermath of the global financial crisis and the covid-19 pandemic which indicated weaknesses within the banking sector (Aebi et al., 2012; Fahlenbrach et al., 2012; Irresberger et al., 2015; Sheedy & Griffin, 2018).

This study bridges this gap by investigating how risk culture impacts the cost of capital for banks across Europe. Risk culture in banks comprises the values, beliefs, and behaviors related to risk management shared across the organization, significantly affecting how risks are identified, assessed, and managed. A robust risk culture can mitigate perceived risks, thereby lowering the cost of capital by enhancing transparency and bolstering investor confidence. This is particularly pertinent for European banks operating under stringent regulatory frameworks such as Basel III and the European Banking Authority's guidelines on internal governance (EBA, 2017). These regulations mandate comprehensive risk management and disclosure practices, shaping banks' risk culture and influencing their cost of capital.

Addressing this gap, our study employs a novel textual analysis approach to construct a comprehensive risk culture index for European banks¹. Based on 134 European banks from 2005 to 2022, we find that strong risk culture significantly reduces the cost of capital, as measured by the weighted average cost of capital (WACC), cost of equity, and cost of debt. Banks with effective risk management practices and transparent disclosures benefit from lower equity and debt costs

¹ We focus on European banks because European market over the past decade experienced both direct and indirect economic growth due to contribution to the derivative market. The market also was strongly hit by recent crisis (i.e., COVID-19 pandemic). In addition, from regulatory perspective, banks are much monitored because of the stringent regulation and are highly leveraged compared to NFF.

due to diminished information asymmetry and increased investor confidence, complementing prior research associating transparent risk reporting to reduced equity costs (Cuadrado-Ballesteros et al., 2016; Elshandidy & Acheampong, 2021). These results are robust across multiple sensitivity tests.

We contribute to the literature by first extending the understanding of risk culture's effects from NFF to the banking sector through a unique textual analysis methodology on annual reports, providing a more accurate reflection of banks' risk culture than traditional survey-based methods. Second, we demonstrate the significant influence of risk culture on the cost of capital by indicating the crucial role of transparent risk management and disclosure practices in maintaining financial stability. These findings align with agency theory, indicating how a strong bank risk culture can mitigate principal-agent problems (Acheampong & Elshandidy, 2024). The practical implications for policymakers highlight the need for regulatory frameworks to continue emphasizing the importance of risk culture in banks. Strengthening regulatory requirements for risk disclosures can enhance the overall risk management environment and reduce financing costs. The findings indicate the value of investing in a robust risk culture, suggesting that banks can achieve lower capital costs and improved financial performance by promoting an environment where risk management practices are effectively communicated and supported by senior management.

2. Literature Review

The Basel Committee on Banking Supervision (BCBS) defines the risk culture of banks as the norms, attitudes, and behaviours of banks related to risk awareness, risk-taking, and risk management, and the controls that influence risk decisions (BCBS, 2015). The impact of risk culture on firm performance predominantly focuses on NFF, particularly within supply chain settings. Fan et al. (2017) and Teller & Kock (2013) illustrate that a proactive risk culture in supply chain industry leads to improved risk-sharing mechanisms and operational performance. Liu et al. (2018) emphasize that robust risk management practices within supply chains enhance operational efficiency and risk mitigation. In contrast, research on the financial industry, particularly banks, is less extensive but equally significant. Fritz-Morgenthal et al. (2016) and Bianchi et al. (2021) utilize firms annual reports and text mining techniques to derive risk culture indicators, correlating these with market data to measure firm performance. These studies suggest that banks with strong risk cultures tend to be better capitalized and exhibit lower total risk exposure than their total assets.

Methodologically, the literature frequently employs cross-sectional surveys where risk culture and performance measures are self-reported. Abeysekara et al. (2019) use survey method to measure firm performance and find that high market share growth is associated with a strong

risk culture. Sheedy & Griffin (2018) provide evidence that effective risk management practices, which are integral to a robust risk culture, are associated with long-term sustainability and enhanced risk-adjusted performance.

The theoretical literature further supports the empirical findings by indicating the long-term benefits of a strong risk culture. Effective risk management practices lead to fewer surprises and enhanced performance over time (Sheedy & Griffin, 2018). Roeschmann (2014) argues that aligning formal risk structures with the organizational environment reduces uncertainty and communication efforts, thereby lowering costs and enhancing performance. This alignment ensures that risk management practices are consistently applied across the organization, fostering a culture of risk awareness and proactive risk mitigation.

Empirical evidence highlights several dimensions of risk culture that influence firm performance. Tone from the top, which includes leadership style and the value placed on risk management, has been shown to enhance policy compliance and risk management priority, thereby improving firm performance (Sinha & Arena, 2020). Accountability, with clear governance structures and formal risk management frameworks, is associated with improved operational and risk management performance (Sax & Torp, 2015). Communication and escalation, characterized by effective information exchange and psychological safety for speaking up, contribute to competitive advantage and operational resilience (Fan et al., 2017; Teller & Kock, 2013). Moreover, financial incentives and risk transparency significantly influence compliance rates and project portfolio success. Palermo et al. (2017) demonstrates that firms with transparent risk reporting practices enjoy better project outcomes and overall firm performance. Bianchi et al. (2021) provide empirical evidence that specific risk culture dimensions, significantly enhance firm performance metrics like return on assets and equity. Sheedy et al. (2019) further illustrate through a lab-in-the-field experiment that a risk-focused culture leads to higher compliance rates among finance professionals.

Regulatory bodies and consulting firms have also highlighted the importance of a strong risk culture in the financial industry. The European Banking Authority (EBA, 2017) emphasizes the need for internal governance frameworks that promote robust risk management practices. Deloitte (2019) indicate the role of effective risk culture in enhancing transparency, accountability, and overall financial performance thus advocating for integrating comprehensive risk management and disclosure practices to foster a healthy risk culture within banks.

In conclusion, the literature robustly supports the positive impact of a strong risk culture on firm performance. While most research has focused on non-financial industries, emerging evidence suggests these findings apply to the financial sector as well. Aligning risk culture with

formal structures and proactive management practices is essential for enhancing organizational performance and ensuring long-term sustainability. Future research should continue to explore the specific pathways through which risk culture influences different aspects of financial performance across various industries.

3. Research methodology

To investigate the impact of risk culture on the cost of capital in European banks, we employed a systematic approach in gathering data from Datastream Eikon. Our final sample consisted of 134 European banks from an initial sample of 214, from 2005 to 2022, resulting in 2412 bank-year observations. We employed three different measures for the cost of capital: *WACC*, *Cost_Equity* and *Cost_Debt*. These measures were employed to provide a comprehensive insight into the cost of capital from various perspectives. Following Elshandidy & Acheampong (2021) we measure WACC as:

$$WACC = Cost_Debt \times Leverage_{t,t} + (1 - Leverage) Cost_Equity \quad (1)$$

Where *Cost_Debt* is bank's cost of debt, *Leverage* is the bank's leverage, *t* is the firm tax rate, and *Cost_Equity* is the implied cost of equity capital. *Cost_Debt* was estimated using the interest rate, defined as the finance expense scaled by average short-term and long-term debt (Minnis, 2011). The interest rate was truncated at the 5th and 95th percentiles and further adjusted if it exceeds the prime interest rate by 1,000 basis points. One-year-ahead interest rate was used to reduce noise. *Cost_Equity* was empirically estimated using methods from Dhaliwal et al. (2016), averaging the models of Claus & Thomas (2001), Ohlson & Juettner-Nauroth (2005), Gebhardt et al. (2001), Easton (2004) to mitigate measurement errors. Detailed estimations are in Appendix A.

Given the challenge of low response rates and measurement biases associated with traditional surveys (Sheedy & Griffin, 2018), Agarwal et al. (2019) proposed using unstructured news data to assess risk culture in firms. We therefore employed a textual analysis approach to construct risk culture. This approach aligns with the risk culture characteristics outlined by the Financial Stability Board (FSB) and supported by Bianchi et al. (2021). We focused on four key risk culture characteristics: Tone from the top (*T_TONE*), incentives (*INCEN*), accountability (*A_BLTY*) and effective communication and challenge (*COM_CH*).² We extracted each of these

² *T_TONE* reflects senior managements and the board's commitment to risk management. *INCEN* pertains to the reward systems that encourage prudent risk management. *A_BLTY* measures how effectively individuals and teams are held accountable for their risk-related decisions. *COM_CH* captures how risk-related information is communicated and challenged within the banks.

characteristics from the annual reports using a phrase table developed by Bianchi et al. (2021).³ This table is based on the FSB's risk culture characteristics and allows for a systematic and standardized extraction of relevant text from the reports. We calculated the scores for each characteristic as the total number of identified sentences within the word vector related to each characteristic scaled by the total phrases in each annual report. The risk culture variable is then constructed by summing the scores of the four individual characteristics we label *Risk_Culture*. We present the process in Figure 1.

$$\mathbf{Risk_Culture} = \mathbf{T_TONE} + \mathbf{A_BLTY} + \mathbf{COM_CH} + \mathbf{INCEN} \quad (2)$$

Following Acheampong et al. (2024) and Acheampong & Elshandidy (2024) we employed several bank-level and country-level controls in our analysis to account for other factors that might influence the cost of capital. These controls include Bank size, profitability, tobin_q, leverage, net margin, financial distress, corruption, financial openness, and OECD membership. A Full description of all the variables is provided in Table 1. We employed a two-way fixed effect analysis to investigate the impact of risk culture on bank cost of capital. This econometric approach allows us to control unobserved heterogeneity across banks and over time, ensuring robust and reliable results.

$$COC_{it} = \beta_0 + \beta_1 Risk_Culture_{it} + \sum_{N=1}^{Nr} \beta_m Xb_{lit} + \sum_{N=1}^{Nc} \beta_{cn} Xc_{lit} + \varepsilon_{it} \quad (3)$$

Where COC represents the cost of capital measures (i.e., *WACC*, *Cost_Equity*, *Cost_Debt*). *Risk_Culture* is the risk culture for bank *i* in year *t*. β_m represent the effect of bank control Xb_{lit} and β_{cn} represent the effect of country controls Xc_{lit} on COC. The error term is ε_{it}

4. Findings

The results, as reported in Table 3 indicates that risk culture is negative and significantly associated with all cost of capital measures a p-value of 0.036, 0.051 and 0.092 respectively for *WACC*, *Cost_Equity* and *Cost_Debt*. This indicates that banks with a robust risk culture tend to have lower cost of capital because of their improved disclosure and governance practices which reduce information asymmetry (Acheampong & Elshandidy, 2024, Dhaliwal et al., 2016). The economic

³ We focus on annual reports because it remains the most widely used firm disclosure by investors and other stakeholders (Elshandidy & Acheampong, 2021).

significance of this findings indicates that a one percent standard deviation increase in *Risk_culture* results in 0.089, 0.938 and 0.010 decrease in *WACC*, *Cost_Equity* and *Cost_Debt* respectively. . The reduction is profound for *Cost_Equity* which complements prior studies (Bertomeu et al., 2011; Cormier et al., 2011). Enhanced transparency and disclosure practice reduces the cost of capital and thus boost investor confidence by reducing perceived risks (Cuadrado-Ballesteros et al., 2016). The negative significance of profitability indicates that more profitable banks exhibit lower capital. Bank size also indicates that large banks enjoy the benefits of low capital costs. Leverage, however, shows no statistical significance.

In a further analysis we employ alternative measures for the cost of capital and risk culture. Following Elshandidy & Acheampong (2021), we substitute the cost of debt in the *WACC* estimation using S&P ratings. This helps to take into account the time dimension thus ensuring that *WACC* fully captures the relevant COC when complying with disclosure standards. For cost of equity, Botosan & Plumlee (2005) conclude that Ohlson and Juettner-Nauroth (2005) and Easton (2004) models are the best measures because they both have the benefit of being parsimonious. In addition, Hail & Leuz (2006) indicate that Ohlson is highly associated with Claus measure with a coefficient of 0.945. Therefore, we employed the average of these two measures as an alternative COE measure. Both measures can be noisy therefore averaging them is with the idea that as the noise represents random errors, this should mitigate a fraction of that noise.

We report the results in Table 4. We find that risk culture is negative and significantly associated with all alternative measures of cost of capital. Most of the controls exhibit plausible coefficient signs as expected. This highly confirms our main findings (Table 3). Turning to alternative measures for risk culture, we first took the natural logarithm of *Risk_Culture* scaled by the standard deviation over the last three years for each of the risk culture proxy (paper). We also use the individual proxies (i.e., *T_TONE*, *A_BLTY*, *COM_CH*, and *INCEN*) as alternative measures for risk culture. The results, shown in Table 5 (Panel A and Panel B), indicate that effective risk culture portrayed in the narratives of annual reports reduces the financing cost of banks. Most importantly, all individual proxies are negatively associated with the cost of capital measures, confirming the significance of specific aspects of risk culture. To address potential endogeneity and reverse causality concerns we employ GMM estimation and Lag regression. We report the findings in Table 6, which indicate consistent results with our primary analysis, reinforcing the robustness of our conclusions.

5. Conclusion

The analysis of risk culture in European banks and its impact on the cost of equity capital reveals significant insights. A strong risk culture, characterized by effective risk management practices and transparent risk disclosures, reduces information asymmetry, and increases investor confidence. This, in turn, lowers the cost of equity capital, emphasizing the importance of fostering a robust risk culture. The study identifies gaps in understanding the specific mechanisms through which risk culture influences equity costs, particularly within the unique regulatory frameworks of European banks. Addressing these gaps can help banks align risk management strategies with investor expectations and regulatory requirements, ultimately promoting financial stability. Policymakers can also benefit from these insights by designing regulations that enhance risk culture. Future research should focus on these nuanced interactions to better understand the relationship between risk culture and financial performance, enabling more informed decision-making for banks and investors alike.

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Table 1 – Variable Description

Variable	Ex. Sg.	Definition
Dependent variables: Cost of capital measures		
Risk_Culture		Text-based risk culture which is measured as the sum of four different risk culture characteristics (i.e., tone from top, accountability, communication and challenge and incentives). $Risk_Culture = T_TONE + A_BLTY + COM_CH + INCEN$
WACC	(-)	$Cost_Debt \times Leverage_{t-1} + (1 - Leverage) Cost_Debt$
Cost_Equity	(-)	The average implied cost of equity from the models of Easton (2004), Gebhardt et al. (2001), Ohlson & Juettner-Nauroth (2005), and Claus & Thomas (2001)
Cost_Debt	(-)	Average interest rate on debt in year $t+1$. Interest rate is measured as interest expense in year $t+1$ scaled by average debt in year $t+1$ ($Debt_{t+1} + Debt_t/2$); Debt is measured as (short-term debt + total long-term liabilities). Because of the likelihood of estimation problems due to significant changes in <i>Debt</i> , we recode <i>Debt</i> to missing for any observation where <i>Debt</i> is more than doubles or reduces by half.
B_Size	(?)	Natural log of bank's total assets at the end of the fiscal year in which annual report was prepared
Profitability	(-)	Profit before tax ((if available, otherwise profit after tax)/worth) x 100
Tobin_Q	(+)	The ratio of a company's market value to net assets
Leverage	(+)	Calculated as total debt scaled by total assets, representing change in financial leverage
N_Margin	(-)	Net Interest Margin - total interest income less total interest expenses, scaled by total assets
F_Distress	(+)	Country level index of financial stress
Corruption	(+)	The original score of TI index indicates the perceived level of prevailing corruption on a scale of 0-10. With higher score suggesting a higher economic and political integrity. We use 10 minus this TI index, rendering CI with a higher score indicating more rampant corruption
F_Openness	(-)	Financial Openness captured by Chinn & Ito's (2008) measure of financial openness.
OECD	(-)	Organisation for Economic Co-operation and Development – a dichotomous variable = 1 if bank is OECD member, and zero if otherwise

NB: This table presents the description of all the variables employed in this paper

Table 2 - Descriptive statistics

Variable	N	Mean	25th	75th	Std. Dev.
<i>Cost_Equity</i>	2412	0.3058	0.0721	0.1957	0.0688
<i>WACC</i>	2412	0.0420	0.0388	0.0727	0.0289
<i>Cost_debt</i>	2412	0.0680	0.0204	0.0529	0.0352
<i>Risk_Culture</i>	2412	0.3102	0.3845	0.5231	0.2861
<i>B_Size</i>	2412	10.515	7.0251	9.4520	2.5030
<i>Profitability</i>	2412	0.2695	0.0601	0.1870	0.1006
<i>Tobin_Q</i>	2412	1.0465	0.3387	0.6850	0.4578
<i>Leverage</i>	2412	0.2247	0.1738	0.2673	0.0841
<i>N_Margin</i>	2412	0.0117	0.0145	0.0320	0.0174
<i>F_Distress</i>	2412	0.1209	0.0832	0.1123	0.0705
<i>Corruption</i>	2412	0.5510	0.2209	0.7312	0.3263
<i>F_Openness</i>	2412	2.1001	2.3409	2.3409	0.5507
<i>OECD</i>	2412	0.9251	1.0000	1.0000	0.2012

NB: This table reports the descriptive statistics of the variables employed in this study

Table 3 - Impact of risk culture on cost of capital of EU banks

Variable	Cost of capital			
	Ex. Sg.	<i>WACC</i>	<i>Cost_Equity</i>	<i>Cost_Debt</i>
Risk_Culture	(-)	-0.310** (0.0364)	-0.328* (0.0512)	-0.025* (0.0923)
B_Size	(-)	0.032** (0.0414)	0.055** (0.0398)	0.010* (0.0610)
Profitability	(-)	-0.143* (0.0585)	-1.005** (0.0104)	-0.003* (0.0935)
Tobin_Q	(-)	-0.047 (0.5833)	-0.371* (0.0692)	0.062 (0.5480)
Leverage	(+)	0.237 (0.6895)	-0.628 (0.6605)	0.213 (0.7691)
N_Margin	(-)	0.479 (0.6879)	2.217 (0.4400)	-2.044 (0.1609)
F_Distress	(-)	-0.215 (0.6875)	0.191* (0.0881)	0.781** (0.0232)
Corruption	(+)	0.120** (0.0434)	0.104* (0.0776)	0.030* (0.0870)
F_Openness	(-)	0.100 (0.1317)	-0.196** (0.0222)	-0.139* (0.0883)
OECD	(-)	-0.130* (0.0627)	0.569 (0.3791)	0.506 (0.1234)
Intercept	(?)	3.642*** (0.0000)	9.609*** (0.0000)	6.337*** (0.0000)
Model-fit Stats				
Adjusted R ²		0.1236	0.0978	0.1135
Bank FE		Yes	Yes	Yes
Year FE		Yes	Yes	Yes
Obs.		2412	2412	2412

NB: This table reports the results for the impact of bank risk culture on cost of capital (i.e., WACC, Cost of equity and cost of debt). P-values are reported in parenthesis. *, **, *** represent significance level at 10%, 5% and 1% respectively. All variables are described in Table 1.

Table 4 - Further Analysis – Alternative measures of cost of capital

Variables	Cost of capital			
	Ex. Sg.	<i>WACC</i>	<i>Cost_Equity</i>	<i>Cost_Debt</i>
Risk_Culture	(-)	-0.187** (0.0395)	-0.333** (0.0299)	-0.069* (0.0798)
B_Size	(-)	0.025 (0.1312)	0.053 (0.1851)	0.014 (0.4861)
Profitability	(-)	-0.106 (0.6141)	-0.855* (0.0923)	0.341 (0.1871)
Tobin_Q	(-)	-0.010 (0.8979)	0.328* (0.0941)	0.067 (0.5007)

Leverage	(+)	0.215 (0.6996)	-1.245 (0.3539)	0.345 (0.6134)
N_Margin	(-)	0.017 (0.9770)	-0.479 (0.7366)	-0.169 (0.8156)
F_Distress	(-)	-0.211 (0.7115)	-0.047 (0.9726)	0.911 (0.1915)
Corruption	(+)	-0.024 (0.8651)	-0.282 (0.4149)	-0.000 (0.9992)
F_Openness	(-)	0.093 (0.1825)	-0.145 (0.3871)	-0.149* (0.0798)
OECD	(-)	-0.193 (0.4569)	0.644 (0.3037)	0.201 (0.5276)
Intercept	(?)	-0.504 (0.1580)	0.434 (0.6138)	0.348 (0.4255)
Model-fit Stats				
Adjusted R ²		0.0945	0.1038	0.0823
Bank FE		Yes	Yes	Yes
Year FE		Yes	Yes	Yes
Obs.		2412	2412	2412

NB: This table reports the results for the impact of bank risk culture on cost of capital using alternative measures of cost of capital. P-values are reported in parenthesis. *, **, *** represent significance level at 10%, 5% and 1% respectively. All variables are described in Table 1.

Table 5 - Further Analysis – Alternative measures for risk culture

	Ex. Sg.	Panel A			Panel B		
		<i>WACC</i>	<i>Cost_Equity</i>	<i>Cost_Debt</i>	<i>WACC</i>	<i>Cost_Equity</i>	<i>Cost_Debt</i>
<i>T_TONE</i>					-0.092 (0.1237)	-0.129** (0.0205)	-0.059* (0.0532)
<i>A_BLTY</i>					-0.229* (0.0609)	-0.297** (0.0124)	-0.012** (0.0410)
<i>COM_CH</i>					-0.209 (0.1347)	-0.328*** (0.0026)	-0.025* (0.0923)
<i>INCEN</i>					-0.345** (0.0138)	-0.299*** (0.0031)	-0.134* (0.0923)
Risk_Culture	(-)	-0.310** (0.0364)	-0.328* (0.0512)	-0.025* (0.0923)			
B_Size	(-)	0.032** (0.0414)	0.055** (0.0398)	0.010* (0.0610)	0.015** (0.0232)	0.055* (0.0698)	0.029* (0.0787)
Profitability	(-)	-0.143* (0.0585)	-1.005** (0.0104)	-0.003* (0.0935)	-0.094* (0.0734)	-0.955** (0.0311)	-0.009 (0.1608)
Tobin_Q	(-)	-0.047 (0.5833)	-0.371* (0.0692)	0.062 (0.5480)	-0.082 (0.1294)	-0.461* (0.0507)	0.045 (0.3480)
Leverage	(+)	0.237 (0.6895)	-0.628 (0.6605)	0.213 (0.7691)	0.1230 (0.4328)	-0.790* (0.0598)	0.410 (0.4697)
N_Margin	(-)	0.479 (0.6879)	2.217 (0.4400)	-2.044 (0.1609)	0.553 (0.6373)	3.675 (0.3605)	-2.975 (0.2098)

F_Distress	(-)	-0.215 (0.6875)	0.191* (0.0881)	0.781** (0.0232)	-0.508* (0.0532)	0.441* (0.0600)	0.623* (0.0512)
Corruption	(+)	0.120** (0.0434)	0.104* (0.0776)	0.030* (0.0870)	0.304* (0.0642)	0.374** (0.0459)	0.048* (0.0690)
F_Openness	(-)	0.100 (0.1317)	-0.196** (0.0222)	-0.139* (0.0883)	0.309 (0.3092)	-0.109 (0.1221)	-0.179* (0.0801)
OECD	(-)	-0.130* (0.0627)	0.569 (0.3791)	0.506 (0.1234)	-0.409 (0.0534)	0.474** (0.0479)	0.412* (0.0508)
Intercept	(?)	3.642*** (0.0000)	9.609*** (0.0000)	6.337*** (0.0000)	4.465*** (0.0000)	7.643*** (0.0000)	5.568*** (0.0000)
Model-fit Stats							
Adjusted R ²		0.1236	0.0978	0.1135	0.0890	0.0698	0.0811
Bank FE		Yes	Yes	Yes	Yes	Yes	Yes
Year FE		Yes	Yes	Yes	Yes	Yes	Yes
Obs.		2412	2412	2412	2412	2412	2412

NB: This table reports the results for the impact of bank risk culture on cost of capital (i.e., WACC, Cost of equity and cost of debt) using alternative measures for bank risk culture. P-values are reported in parenthesis. *, **, *** represent significance level at 10%, 5% and 1% respectively. All variables are described in Table 1.

Table 6 - Endogeneity Checks

	Ex. Sg.	GMM Analysis			Lag Analysis		
		WACC	Cost_Equity	Cost_Debt	WACC	Cost_Equity	Cost_Debt
Risk_Culture	(-)	-0.310** (0.0345)	-0.298* (0.0522)	-0.027* (0.0911)	-0.309** (0.0350)	-0.305* (0.0530)	-0.030* (0.0905)
B_Size	(-)	0.029** (0.0452)	0.049** (0.0425)	0.015* (0.0580)	0.031** (0.0441)	0.051** (0.0415)	0.011* (0.0605)
Profitability	(-)	-0.135* (0.0623)	-0.978** (0.0118)	-0.007* (0.0892)	-0.140* (0.0601)	-0.991** (0.0109)	-0.004* (0.0901)
Tobin_Q	(-)	-0.043 (0.5932)	-0.389* (0.0669)	0.057 (0.5370)	-0.046 (0.5871)	-0.376* (0.0685)	0.060 (0.5422)
Leverage	(+)	0.221 (0.6823)	-0.638 (0.6624)	0.208 (0.7615)	0.229 (0.6851)	-0.625 (0.6612)	0.214 (0.7642)
N_Margin	(-)	0.467 (0.6890)	2.289 (0.4410)	-2.023 (0.1588)	0.472 (0.6881)	2.241 (0.4387)	-2.033 (0.1597)
F_Distress	(-)	-0.217 (0.6815)	0.187* (0.0901)	0.779** (0.0244)	-0.210 (0.6843)	0.189* (0.0889)	0.784** (0.0239)
Corruption	(+)	0.115** (0.0429)	0.108* (0.0742)	0.028* (0.0852)	0.117** (0.0431)	0.106* (0.0750)	0.029* (0.0861)
F_Openness	(-)	0.097 (0.1324)	-0.202** (0.0231)	-0.144* (0.0870)	0.098 (0.1335)	-0.198** (0.0227)	-0.141* (0.0878)
OECD	(-)	-0.127* (0.0612)	0.571 (0.3721)	0.511 (0.1228)	-0.129* (0.0621)	0.568 (0.3734)	0.509 (0.1235)

Intercept	(?)	3.624*** (0.0000)	9.587*** (0.0000)	6.325*** (0.0000)	3.640*** (0.0000)	9.598*** (0.0000)	6.331*** (0.0000)
Model-fit Stats							
Adjusted R ²		0.1252	0.0987	0.1154	0.0568	0.0609	0.0592
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.		2412	2412	2412	2412	2412	2412

NB: This table reports the results for the impact of bank risk culture on cost of capital (i.e., WACC, Cost of equity and cost of debt) using GMM and Lag regression. P-values are reported in parenthesis. *, **, *** represent significance level at 10%, 5% and 1% respectively. All variables are described in Table 1.

Appendix A - Implied cost of equity estimations

This section outlines the methodology used to estimate various measures of the implied cost of equity, as described by Dhaliwal et al. (2016). We first calculate four different measures of implied cost of equity and only use estimates within the range of 0 to 1. Each measure is winsorised at the 1% and 99% percentiles, and their average is used as our cost of equity measure. The procedures for these calculations closely follow those detailed by Dhaliwal et al. (2016). Below are the variables used in three of the four models:

P_t	Stock price of a bank at time <i>t</i> .
EPS_{t+1}	IBES median forecasted earnings per share or calculated EPS forecasts for the next year at time <i>t</i> .
BV_{t+i-1}	Book value per equity at time <i>t</i> .
POUT	Forecasted dividend payout ratio. This is measured using annual dividends and EPS. If EPS is negative, a return on assets of 6% is assumed. POUT is winsorised to be between 0 and 1.

A1 - Ohlson & Juettner-Nauroth (2005)

$$K_{OHS} = V + \sqrt{V^2 + \left[\frac{\varepsilon_t(EPSt+1)}{P_t} \right] * (g_2 - g_{lt})}$$

This model requires both EPS_{t+1} and EPS_{t+2} to be positive.

$$V = 0.5 + (g_{lt} + \frac{DPS_{t+1}}{P_t})$$

g₂ is the average of the forecasted long-term growth rate and EPSt+1 and EPSt+2. The long-term earnings growth rate g_{lt} is defined as the nominal risk-free rate (10-year Treasury yield minus 3%), following Claus & Thomas (2001), and Dhaliwal et al. (2016).

A2 - Gebhardt et al. (2001)

$$P_t = BV_t + \sum_{i=1}^{T-1} \frac{(FROE_{t+i} - K_{GEB}) * BV_{t+i-1}}{(1 + K_{GEB})^i} + \frac{(FROE_{t+T} - K_{GEB}) * BV_{t+T-1}}{K_{GEB} * (1 + K_{GEB})^{T-1}}$$

We use IBES analyst forecasts to capture expected earnings. FROE for the first three years is defined as FEPS_{t+j} divided by BV_{t+j-1}. After the third year, FROE is interpolated to the industry's median ROEs. DPS_{t+j} is the product of

FEPS_{t+j} and POUT. Future book value of equity is estimated assuming the clean surplus relation $BV_{t+1} = BV_t + EPS_{t+1} - DPS_{t+1}$. We assume $T = 12$ and use a numerical approximation in Excel to derive K_{GEB} .

A3 - Modified PEG ratio by Easton (2004)

$$P_t = \frac{FEPS_{t+2} - FEPS_{t+1} + K_{EST}DPS_{t+1}}{K_{EST}^2}$$

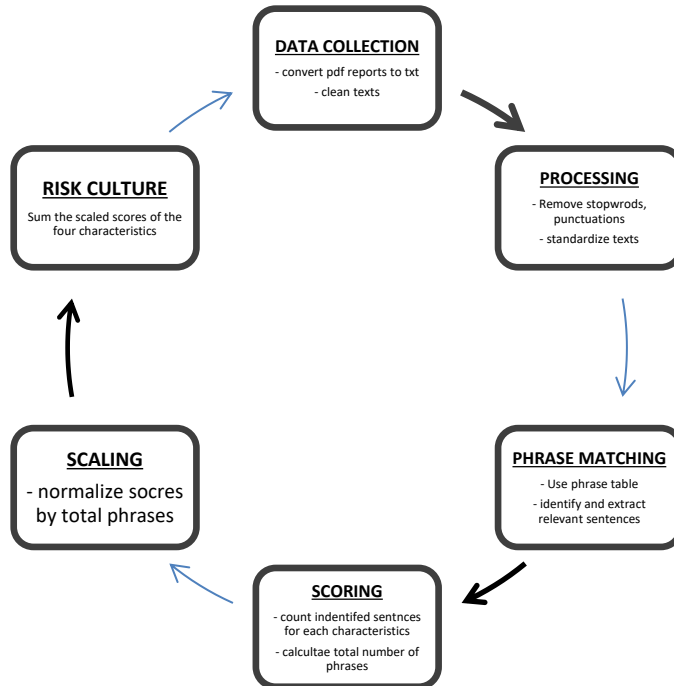
We use one-year ahead and two-year ahead earnings forecasts from IBES, following Easton (2004). DPS_{t+j} is defined as the product of $FEPS_{t+j}$ and POUT. A numerical approximation in Excel VBA is used to derive K_{EASTON} .

A4 - Claus & Thomas (2001)

$$P_t = BV_t + \sum_{i=1}^5 \frac{FEPS_{t+i} - (K_{CT} * BV_{t+i-1})}{(1 + K_{CT})^i} + \frac{[FEPS_{t+5} - (K_{CT} * BV_{t+4})] * (1 + g_{lt})}{(K_{CT} - g_{lt})(1 + K_{CT})^5}$$

Book value is estimated using the clean-surplus procedure. Future dividend is $DPS_{t+1} = EPS_{t+1} \times POUT$. Abnormal earnings for the next five years are estimated using IBES earnings forecasts, following Dhaliwal et al. (2016). For years $t + 4$ and $t + 5$, abnormal earnings are estimated from the $t + 3$ earnings forecast and long-term growth rate. If the long-term growth rate is missing, the implied earnings growth rate from EPS_{t+2} and EPS_{t+3} is used. The long-term growth rate g_{lt} is defined as the nominal risk-free rate (10-year Treasury yield minus 3%), following Claus & Thomas (2001) and Dhaliwal et al. (2016).

Figure 1: Risk culture construction



NB: This figure provides the steps taken to capture risk culture scores for each bank