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Financial and environmental performances in the banking industry: A non-linear approach

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The present paper investigates the impact of corporate financial performance (CFP) on corporate environmental performance (CEP) in the banking industry. Based on the data of French banks from 2008 to 2011, our study reveals that the relationship between CFP and CEP is non-monotonic, thus suggesting that bank CEP increases significantly only after a certain threshold of financial resources is reached. Our study provides unique insights into the CFP-CEP relationship in the banking industry and reveals that adequate financial resources needs to be available in order to foster environmental investment and meet the expectations of a range of stakeholders.

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1. Introduction

Over the last four decades, the relationship between corporate financial performance (CFP) and corporate environmental performance (CEP) has been among the most discussed phenomena in CSR research (Endrikat et al., 2014). As companies become increasingly aware of environmental pressures, several studies have sought to identify the relationship between financial and environmental performances. Although some scholars have suggested a positive relationship (e.g., Clarkson et al., 2011), others have provided support for a negative relationship (e.g., Hassel et al., 2005) or presented insignificant results (e.g., Graves and Waddock, 1999). Furthermore, while the majority of studies has focused on whether it pays to be green and the relationship from CEP to CFP, some studies have highlighted that the direction can be reversed, from CFP to CEP (Misani and Pogutz, 2015).

According to the slack resources hypothesis (Waddock and Graves, 1997), a positive relationship can be expected between CFP and CEP. Indeed, as high levels of CFP produce available (slack) resources, companies attribute more resources dedicated to improving CEP (Schreck, 2011). Slack resources are "a cushion of actual or potential resources which allows an organization to adapt successfully to internal pressures for adjustment or to external pressures for change" (Bourgeois, 1981, p. 30). In practice, slack resources allow companies to invest in capabilities that will not immediately pay off but will ultimately improve their adaptation to external environments.

In contrast, according to the managerial opportunism hypothesis (Preston and O'Bannon, 1997), as managers pursue their own objectives, they may find that these objectives conflict with those of shareholders and other stakeholders. Accordingly, when CFP is high, managers will reduce environmental practices to increase short-term profits. On the other hand, when CFP is insufficient, pursuing CEP can be seen as managerial opportunism as managers tend to justify themselves by investing more in environmental practices.

Finally, the relationship between CFP and CEP can be insignificant. Here, high CEP depends more on pressure from stakeholders, regulations or managers' motivations than on CFP (Darnall et al., 2010).

From a contingency perspective, Barnett and Salomon (2012) developed the notion of stakeholder influence capacity (SIC), arguing that stakeholders consider some companies more credible than others and react to their CSR practices accordingly. SIC is defined as "the ability of a firm to identify, act on, and profit from opportunities to improve stakeholder relationships through corporate social responsibility" (Barnett, 2007). Companies with different levels of CFP will invest differently in CEP. Indeed, firms with low CFP are less able to transform CEP into SIC and are thus hampered in their capacity to build strong ties with stakeholders. However, when firms attain a sufficient level of CFP, they have the opportunity to improve their relationships with stakeholders through investing in environmental performance and thus enhancing their credibility. From this perspective, the relationship between CFP and CEP might be expected to be U-shaped.

The firms in some industries are obliged to pay more attention to CSR than in others due to the nature of their business activities. Banks are not spared from dealing with environmental issues as they have a crucial impact on economic and sustainable development. Indeed, they act as financial intermediaries, value financial assets, monitor borrowers, manage financial risk and organize payment systems (Tobe, 2017). Furthermore, as they use considerable social resources, they need to provide feedback to the community more often than other industries.

Moreover, as the reputations of financial institutions rely on their CSR programs, they have to manage their environmental practices in order to keep stakeholders' support.

Although the relationship between CFP and CEP has been tested and supported empirically (Earnhart and Lizal, 2006), little is known about the CFP–CEP link in the banking industry, and no study to our knowledge has yet investigated the possibility of a curvilinear CFP–CEP relationship. Therefore, this study addresses the following question: *How does corporate financial performance (CFP) influence corporate environmental performance (CEP) in the banking industry?* We investigate this question using data from French banks from 2008 to 2011. Our findings show that, when a bank has low CFP, an increase in this performance has no impact on its CEP. However, when CFP reaches a certain threshold, a further increase leads to a significant increase in CEP.

Our paper contributes to the literature in several ways. First, our study, which responds to the recent calls in the literature for more research into the ways CFP influences CEP (Endrikat, 2014), provides empirical evidence that the CFP–CEP relationship in the banking industry is non-monotonic. Second, the study is of value to both bankers and investors seeking to understand the conditions under which CFP can be used to foster CEP and meet stakeholders' expectations. Last, the study provides evidence in support of the slack resources hypothesis and suggests that a contingency approach is worth pursuing.

2. Data and model specification

For our sample, we drew on the Vigeo database for French banks and used the 2008–2011 financial period as it was the most recent and complete. Vigeo is the leading European agency in the evaluation of firms' environmental, social and governance (ESG) practices and performances. The agency rates the extent to which firms and public organizations take into consideration ESG issues. Thus, CEP, which is the dependent variable in this study, was approximated using the Vigeo database where each of the criteria used to assess environmental performance is ranked from 0 for less environmentally responsible firms to 100 for more environmentally responsible firms. These criteria are explained in Appendix A. Furthermore, we used the Diane financial database to obtain performance and firm-level operational data. Our final sample comprised 191 observations covering 68 banks.

We tested for the effects of CFP on CEP. Thus, following prior research (Nollet et al., 2016; Lioui and Sharma, 2012), and to ensure the robustness of our analysis, we measured bank financial performance using various proxies: return on assets (ROA), which is defined as net income divided by total assets; return on equity (ROE), which is measured as net income divided by total shareholder equity; and earnings before interest, taxes, depreciation, and amortization ratio (EBITDA), which is defined as earnings before interest, taxes, depreciation, and amortization divided by total sales.

We included several control variables from the CSR literature (Chen and Gavious, 2015) in our analysis to test for other effects. The control variables were bank size (SIZE) measured as the natural log of total assets, leverage (LEV) measured as long-term debt divided by total assets, intangibles (INTANG) defined as intangible expenditures divided by total assets, and capital intensity (CINT) measured as net property, plant and equipment divided by total assets. The data for control variables were collected from the DIANE financial database.

To examine the influence of CFP on CEP in the banking industry, we estimated a panel regression model with the following baseline structure:

$$CEP_{it} = \alpha_0 + \beta_1 CFP_{it-n} + \beta_2 X_{it} + \varepsilon_{it} \quad (1)$$

for i = 1, 2,…, K and n = 0, 1, …. N

where, CEP_{it} is corporate environmental performance and CFP_{it-n} is corporate financial performance which, depending on the specification, is either the ROA, ROE, or EBITDA, in both contemporaneous and lagged terms. X_{it} is a vector that encompasses the control variables. α_0 represents the constant term. The ε_{it} term includes the idiosyncratic error terms μ_{it} as well as c_i, which check for the unobserved firm and time effects, such that $\varepsilon_{it} = \mu_{it} + c_i$. We used panel data methodology in the estimation of the models. Specifically, we used time and firm random effects to deal with endogeneity issues and estimated the models by the generalized least squares method to control heteroscedasticity. We performed the Hausman test and found no systematic differences between the fixed-effects models and the random-effects models. These results allowed us to justify our choice for the random-effects models. Consequently, Eq. (1) takes the following form:

$$CEP_{it} = \alpha_0 + \beta_1 \mathrm{CFP}_{it-n} + \beta_2 X_{it} + \mu_{it} + c_i \quad (2)$$

for i = 1, 2,…, K and n = 0, 1, …. N. $E(\mu_{it}|CFP_i, X_i, c_i) = 0$. $Var(\mu_{it}|CFP_i, X_i, c_i) = \sigma^2_{\mu,it}$ for all t = 1; 2;…; T. $Cov(\mu_{it}, \mu_{is}|CFP_i, X_i, c_i) = 0 \; \forall s \neq t$

In this paper, we extend the linear relationship between CEP and CFP of Eq. (1) in order to incorporate the hypothesized curvilinear relationship. Thus, Eq. (1) takes the following form:

$$CEP_{it} = \alpha_0 + \beta_1 \mathrm{CFP}_{it-n} + \beta_2 \mathrm{CFP}^2{}_{it-n} + \beta_3 X_{it} + e_{it} \quad (3)$$

for i = 1, 2,…, K and n = 0, 1, …. N.

3. Results

Table 1 presents the summary statistics, whereas Table 2 provides the Pearson correlation results. We observe that the CEP score averages 47.685 with a standard deviation of 4.425. Furthermore, EBITDA shows the lowest average value among the three financial performance indicators, while ROE has the highest average value. We also observe that ROA exhibits the lowest volatility while ROE shows the highest.

Table 1. Descriptive statistics

variable	*mean*	*SD*	*min*	*p25*	*p50*	*p75*	*max*
CEP	47.68586	4.425495	41	44	48	51	60
ROA	.1115513	.2683267	-.4695	-.0187	.0277	.2145	.9846
ROE	.1726351	.9529925	-7.0746	-.0518	.0697	.6143	2.9975
EBITDA	.066922	.3715131	-.9827	-.063	.0488	.1969	.9828
LEVERAGE	.508377	.3039598	0	.28	.51	.77	1

SIZE	4.168168	1.042941	.46	3.55	4.21	4.84	6.56
CINT	.0503665	.1330586	0	0	0	.03	.8
INTANG	.073822	.1459436	0	0	0	.08	.74

SD, standard deviation.

Table 2 suggests only moderate levels of collinearity between the explanatory variables. The highest correlation is between ROA and EBITDA. We also tested for signs of multi-collinearity and calculated variance inflation factors (VIFs). We found that no VIFs exceed 5 for any of our explanatory variables so multi-collinearity is not problematic in our base regression model.

Table 2. Pearson pairwise correlations

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1. CEP	1.0000							
2 .ROA	0.2306**	1.0000						
3. ROE	0.0513	0.0741	1.0000					
4. EBITDA	0.1353*	0.6671***	0.0613	1.0000				
5. LEVERAGE	0.0407	-0.1445**	-0.0225	-0.0953	1.0000			
6. SIZE	0.1531**	-0.1852**	0.1115	-0.2505***	0.0898	1.0000		
7. CINT	-0.0791	-0.1374*	-0.2505	0.0791	0.0049	0.0709	1.0000	
8. INTANG	-0.0663	-0.2055***	0.0154	-0.0852	0.1475**	0.1893***	0.0586	1.0000
9. VIF		**2.08**	**1.03**	**2.00**	**1.05**	**1.18**	**1.09**	**1.10**

*Significance at the .10 level; ** Significance at the .05 level; *** Significance at the .01 level

Table 3 displays the panel regression results for the effects of CFP on CEP. Models (1)–(3) present the linear relationship between the three CFP indicators (ROA, ROE, and EBITDA) and CEP. Results reveal that in the linear models, ROA is significantly and positively associated with CEP, while the effects of ROE and EBITDA on CEP are positive but not significant. Also, the lagged coefficients of the three CFP indicators are not significant. In sum, these results provide support for the slack resources hypothesis, suggesting that high levels of CFP lead to available (slack) resources that in turn allow firms to invest in CEP. Moreover, the results of the control variables show that SIZE is positively and significantly associated with CEP. Thus, larger banks are likely to produce greater environmental efforts.

Table 3. CFP–CEP relationship in linear and quadratic models

	Model 1	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 6*
	CEP	*CEP*	*CEP*	*CEP*	*CEP*	*CEP*
ROA_t	3.864219**			.8922015		
	(1.911273)			(3.199402)		
ROA_t^2				5.030954		
				(4.12333)		
ROE_t		.1860697			.7474342	
		(.5230059)			(.5968289)	
ROE_t^2					.1897915*	
					(.1080089)	

$EBITDA_t$			1.910779			1.929526*
			(1.238083)			(1.081339)
$EBITDA_t^2$						.0003383**
						(.0001651)
$LEVERAGE_t$	-.5730136	-.8793974	-.9642198	-.2025701	-1.084235	-.0440727
	(1.214061)	(1.323341)	(1.266571)	(1.320143)	(-1.084235)	(1.431231)
$SIZE_t$	.9179897**	.7732487*	.898293*	.8908225**	.737858*	.8697962**
	(.4631973)	(.4397983)	(.4795726)	(.4294905)	(.4418263)	(.4422039)
$CINT_t$	-1.117903	-1.738279	-2.439698	-.8909963	-1.958223	-2.09629
	(2.121073)	(2.291277)	(2.518615)	(2.087915)	(2.379272)	(2.357967)
$INTANG_t$	-.7688955	-1.898987	-1.917034	-.8705297	-2.366069	-.6487384
	(2.776532)	(2.422192)	(2.564532)	(2.587013)	(2.483064)	(2.523725)
CEP_{t-1}	.0578837	.0560134	.0402134	.0432124	.0412055	.0286056
	(.0998442)	(.0966782)	(.1040913	(.1014653)	(.108065)	(.1048456)
ROA_{t-1}	-.1777563					
	(1.820204)					
ROE_{t-1}		-.4504707				
		(.9670216)				
$EBITDA_{t-1}$			.7078698			
			(1.221743)			
Constant	41.0236***	42.39116***	42.5398***	41.46261***	42.99176***	42.20853***
	(4.615703)	(4.644419)	(4.647648)	(4.634069)	(4.948785)	(4.765663)
R-squared	0.0974	0.0489	0.0732	0.1141	0.0691	0.0962
Observations	115	115	115	115	115	115

Robust standard errors are in parentheses. * Statistical significance at 10% level; ** Statistical significance at 5% level; *** Statistical significance at 1% level.

Table 3 also shows the CFP–CEP relationship in the quadratic models (models (4)–(6)), and reveals interesting results. We find that for both ROE and EBITDA, there is a significant curvilinear CFP–CEP relationship. Indeed, the bank CEP increases significantly only after a certain threshold of financial returns is reached. Thus, it appears that fostering CEP is a costly policy that requires the availability of adequate financial resources. Our findings provide support for the contingency perspective suggesting that a non-monotonic relationship exists between CFP and CEP.

4. Conclusion

In this study, we investigate how corporate financial performance influences corporate environmental performance in the banking industry. Based on the data of French banks from 2008 to 2011, we find that the relationship between CFP and CEP is non-monotonic. Specifically, when a bank has low CFP, an increase has little impact on its CEP. However, when CFP reaches a certain threshold, a further increase leads to a significant increase in CEP. The findings provide support to the slack resources hypothesis and suggest that when banks reach high levels of CFP, they can ensure available (slack) resources to invest in CEP.

Furthermore, the study extends the notion of stakeholder influence capacity (SIC) by suggesting that an eventual upturn in the CFP–CEP relationship will determine the level of banks' SIC. Indeed, when banks attain a sufficient level of CFP, they are more able to invest in environmental performance, thereby strengthening their credibility as well as their relationship with stakeholders.

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Appendix A

The Vigeo ratings are established following criteria and fields of social responsibility based on a reference framework. This framework comprises the *best practices* recommended by international organizations such as the UN, ILO and OECD. More precisely, Vigeo rates six domains for social responsibility: *"Human Resources*", "*Environment*", "*Corporate Governance*", *"Community Involvement*", *"Business Behavior*", and "*Human Rights.*" Specific details are available on the Vigeo website: http://www.vigeo.com/csr-rating-agency/en.

Concerning the "*Environment,*" Vigeo rates the following criteria:

Category	***Criteria***
Environment	Environmental strategy
	Accidental pollution prevention and control
	Development of green products and services
	Protection of biodiversity
	Management of water resources
	Management of environmental impacts from energy use
	Management of atmospheric emissions
	Waste management
	Management of local pollution
	Management of environmental impacts from transportations
	Management of environmental impacts from the use and disposal of products/services