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Government regulation, business leaders' motivations and environmental performance of SMEs

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This paper investigates whether government regulation crowds out intrinsic motivation to improve environmental performance of small- and medium-sized enterprises (SMEs). Motivation crowding is the phenomenon by which external pressures reduce intrinsic motivation. Literature on motivation crowding effects of environmental regulations exhibits two gaps. First, previous studies have focused on households while neglecting business organizations, even though businesses account for a major part of industrial pollution worldwide. Second, previous literature neither measured intrinsic motivation nor tested how government regulation affects this motivation. Empirical evidence of motivation crowding by environmental regulations is therefore still lacking. This paper fills both research gaps. Using a dataset of 2,373 SMEs from 12 European countries, we show that government regulation enhances environmental performance directly but harms it indirectly by crowding out intrinsic and extrinsic motivations of business leaders. It only stimulates environmental performance for companies exhibiting low motivation.

Keywords: motivation crowding theory; environmental performance; government regulation; intrinsic motivation; small- and medium-sized enterprises

1. Introduction

The literature on motivation crowding has theorized that incentives-based policies designed to recruit self-interest might harm the intrinsic motivation to supply public goods (Boyer, Dwenger, and Rincke 2016). Also, in the environmental domain, studies have shown that price incentives can crowd out intrinsic motivations (Pellerano *et al.* 2017). These effects also pertain to other types of external interventions, such as government regulation. In an influential paper, Cardenas, Stranlund, and Willis (2000) showed that the introduction of modestly enforced government-imposed regulations in three rural villages in Colombia increased resource extraction. They suggested that one of the interpretations of this finding is that regulation crowds out other-regarding behavior. Also, Volland (2008) found that imposing external penalties through outside regulations tends to worsen the situation, whereas employing enabling rewards does not. Recent research by Abatayo and Lynham (2016), however, did not confirm this finding. They found no differences between externally imposed regulations and

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self-governing regulations and between weak externally imposed regulation and no regulation. They concluded that externally imposed regulations do not crowd out intrinsic motivation. In contrast, Choi (2015) found that a mandatory carbon price reduces the willingness to pay for voluntary carbon offsets, whereas Han *et al.* (2018) found that an increase in garbage fees crowds out households' pre-existing motivations for sorting waste, again supporting the crowding-out mechanism.¹

The literature on motivation crowding in the environmental domain has focused only on the behavior of individuals or households. How government intervention impacts on the intrinsic motives of firms has neither been theorized nor empirically tested, even though business organizations are a major source of environmental damage. This paper takes a first step to fill this research gap by focusing on the motivations of top managers of small- and medium-sized enterprises (SMEs) to adopt corporate social and environmental responsibility (CSR). Compared to their larger counterparts, the behavior of small firms is disproportionately driven by the values and motives of the managers (Wickert, Scherer, and Spence 2016). Therefore, crowding-out effects are more likely to occur for SMEs than for large companies.

A second shortcoming of previous studies on crowding effects of government regulation of environmental behavior is that they researched the relationship between various types of regulations and environmental outcomes without measuring intrinsic motivation and testing how intrinsic motivation affects this relationship between regulation and environmental performance. In a literature overview of 18 studies on the impact of economic incentives on conservation policy, Rode, Gómez-Bagethun, and Krause (2015) found that only four studies measure intrinsic motivation (of which, none investigated the effects of government regulation). They argue that explicit information about intrinsic motivation is essential to develop an understanding of the specific conditions under which crowding effects occur, as "observing behaviour does not make it possible to isolate economic from intrinsic motivations" (Rode, Gómez-Bagethun, and Krause 2015, 280). If government regulation is found to improve environmental performance, the literature interprets this finding as evidence that crowding out of intrinsic motivation does not occur. However, it cannot be ruled out that other factors affect this relationship. Empirical evidence on whether government regulation crowds out intrinsic motivation is therefore still lacking. Our research fills this second research gap by measuring intrinsic motivation and testing how government regulation impacts this motivation. Our results show that a positive relationship between government regulation and environmental performance actually goes together with crowding out of intrinsic motivation. We thus correct the standard interpretation in the literature that a positive relationship between government regulation and environmental performance implies that crowding out of intrinsic motivation is absent.

Our research question is therefore twofold. First, to what extent does government regulation crowd out intrinsic motivation toward environmental performance in SMEs? Second, how do indirect effects caused by crowding out of intrinsic motivation compare with the direct effects of government regulation on environmental performance? The paper thus contributes to the previous literature on motivation crowding in environmental economics in two important ways. First, instead of analyzing individual or household behavior, we research to what extent government regulation crowds out intrinsic motivation toward the environmental performance of SMEs. This is important because small businesses collectively account for up to 70% of industrial pollution worldwide (Hillary 2000). Second, by separating the effect of government regulation

on intrinsic motivation from its direct effect on environmental performance, our study is the first to empirically identify crowding out of intrinsic motivation by government regulation. Our approach allows us to disentangle the effects of government regulation on environmental performance caused by crowding out of intrinsic motivation from other effects of government regulation on environmental performance.

Below, we first develop a conceptual framework for exploring how government regulation influences voluntary initiatives to protect the environment through the intermediation of motivations of top managers of SMEs. Next, we discuss the methodology for our research, which is based on a survey of 2,373 SMEs from 12 European countries. Then, we report the results of the data analysis, which includes tests on common source bias, non-response bias and endogeneity bias. Section four presents the estimation results and various types of robustness analyses. The last section summarizes and discusses the findings.

2. Conceptual framework

This section first discusses how the motivation of business leaders affects voluntary initiatives to improve the environmental performance of SMEs (Hypotheses 1 and 2). Voluntary initiatives are activities that companies perform on a voluntary basis. These initiatives are, thus, not the consequence of government regulations spelling out the type of activities the business should undertake or environmental performance standards with which the company should comply. Environmental performance in this study encompasses environmentally responsible business practices (Post, Rahman, and McQuillen 2015). Next, we describe the tenets of motivation crowding theory and provide reasons why government regulation may crowd out intrinsic and extrinsic motivations of business leaders (Hypotheses 3 and 4). This part concerns the main contribution of this paper. Finally, we present the overall conceptual framework.

2.1. Motivation and environmental performance of small businesses

Motivation refers to the reason upon which one acts. The literature distinguishes between intrinsic motives and extrinsic motives (Frey 1998; Weaver, Treviño, and Cochran 1999; Lindenberg 2001; Scopelliti 2018). Business leaders who feature intrinsic motives for improving environmental performance perceive good environmental performance as an end in itself, independent of other (mostly financial) benefits (Muller and Kolk 2010). An extrinsic motive encourages environmental performance because it has instrumental value for goals other than good environmental performance.

Various types of intrinsic motivation exist (Lindenberg 2001). First, in Deci, Koestner, and Ryan (1999), enjoyment or fun derived from the activity is at the heart of the conceptualization of intrinsic motivation. For example, business people may enjoy a ‘warm glow’ from contributing to a public good. However, as argued by Frey (1998) and Lindenberg (2001), intrinsic motivation may also involve moral obligations. This motivation stems from the feeling that one must follow a particular rule, norm or principle. The goal is to act appropriately. Business leaders feel that they are responsible for preventing negative impacts of their companies on the natural environment.

As regards extrinsic motivations, business leaders may pursue environmental policies for other reasons than a cleaner environment. An important reason is enhancing the company’s reputation among stakeholders and the (long-term) financial

performance of the company. As theorized by the resource-based theory and by instrumental stakeholder theory (Surroca, Tribo, and Waddock 2010), corporate environmental responsibility may enhance the company's market position by improving its reputation on the financial market, output market and the labor market (Jones, Willness, and Madey 2014).

Although it seems obvious that motives drive behavior, in the context of business organizations, the role of motives is more complex because motivation is basically an individual-level construct rather than a company-level construct (Katz and Kahn 1978). We bypass this theoretical concern by focusing our research on director-owners of SMEs. As regards the behavior of businesses, the upper echelon theory argues that organizational strategies reflect the values and beliefs of powerful actors in the organization (Hambrick and Mason 1984). Business leaders are shaping the strategic direction of their company. Their motives, therefore, affect the strategic initiatives of the firm, such as engaging in CSR to enhance environmental performance. The dominant influence of leaders in defining the interests of the company will be particularly strong for business leaders of SMEs. They are often directly involved in decisions on CSR and can change the CSR strategy of the firm substantially (Waldman, Siegel, and Javidan 2006). Their value-laden decisions are observed and interpreted by subordinates and will also influence the subordinates' values, beliefs and behavior (Kim *et al.* 2017). As the leader with high status and power, the business leader will, in fact, serve as a role model for the employees in the organization and foster their cooperation in the implementation of environmental policies. Lynch-Wood and Williamson (2014) found that in smaller firms the responsibility for environmental issues tends to reside with owners or directors, whereas in larger firms it is often delegated. The motives of business leaders of SMEs, therefore, have a decisive influence on the company's policies. These arguments yield the following hypothesis:

Hypothesis 1. The stronger the intrinsic CSR motivation of its business leader, the more voluntary initiatives an SME will undertake to improve its environmental performance.

Hypothesis 2. The stronger the extrinsic CSR motivation of its business leader, the more voluntary initiatives an SME will undertake to improve its environmental performance.

2.2. Government regulation and motivations

Motivation crowding theory has recognized that external pressures may crowd out intrinsic motivation (Frey and Jegen 2001). However, whether government regulation crowds out intrinsic motivation of business leaders of SMEs to improve environmental performance has not yet been researched. Motivation crowding theory provides various reasons for the crowding-out phenomenon (Deci, Koestner, and Ryan 1999; Frey and Jegen 2001; Bowles and Polania-Reyes 2012; Han *et al.* 2018). First, crowding out is observed if the external pressure is perceived to be coercive, thereby reducing self-determination and the freedom to act (Frey 1998). Compared to market incentives, government regulations are typically perceived as more restrictive to self-determination. Government interventions interfere directly with the business leader's realm of self-determination. This particularly applies to hard regulations with convincing threats of punishments for non-compliance. In that case, business leaders have no discretion regarding how they respond to this pressure and this will reduce their enjoyment from engaging in environmental actions.

As the second reason for impacting intrinsic motivation, government regulation may affect the salience of moral preferences by framing effects. In particular, the regulation may frame choice behavior of business leaders in terms of the self-interest of avoiding government intervention rather than the responsibility for the common good of protecting a public good. Ostman (1998) suggests that external control of common-pool resources increases an orientation on self-interest, as it shifts responsibility to the regulatory agency and thereby absolves individuals from other-regarding moral obligations. However, the framing argument can also explain crowding in (meaning that regulations enforce motivations), as government regulation may provide certain cues for appropriate moral behavior and trigger moral engagement (Bowles and Polania-Reyes 2012). Governments are, in fact, important institutional players with the ability to influence social norms, values and societal expectations on appropriate corporate behavior (Weaver, Treviño, and Cochran 1999). Government regulations may thus signal to the business leader that moral values are at stake in environmental performance, thereby enhancing his or her intrinsic motivation.

A third channel through which government regulation crowds out intrinsic motivation is that it conveys information about the motives of the regulator (Sliwka 2007). The implicit bad news of regulations is that they signal distrust in the business leader's motivation and willingness to protect the public good of the environment. Moreover, these regulations convey the desire of the regulator to control the behavior of the company. This makes the business leader feel that his or her competence and involvement are neither recognized nor appreciated by the regulator, which leads the business leader to reduce intrinsic motivation.² The conclusion is that impairing self-determination and signaling lack of trust and respect provide reasons for government regulations to crowd out the intrinsic motivation of business leaders of SMEs to improve environmental performance. Only the framing arguments are ambiguous.

Government regulations may not only harm intrinsic motivation, but also crowd out extrinsic motivation. The market failures that cause environmental degradation provide companies with market opportunities to realize strategic benefits (Dean and McMullen 2007). For example, companies that address environmental degradation may improve their reputation and profitability (Surroca, Tribo, and Waddock 2010). Regulatory policies addressing the negative externalities of environmental degradation reduce these payoffs (Hunt and Fund 2016). By forcing all companies to improve their environmental performance by meeting common standards that apply to all, government regulations reduce opportunities for companies to distinguish themselves from other companies.

Based on these considerations, we formulate the following hypotheses:

Hypothesis 3. Government regulation crowds out the intrinsic motivation of a business leader toward improving the environmental performance of the SME.

Hypothesis 4. Government regulation crowds out the extrinsic motivation of a business leader toward improving the environmental performance of the SME.

2.3. Conceptual framework

We complement Hypotheses 1–4 by two other relationships of the direct effects of voluntary initiatives by individual companies and government regulation on environmental

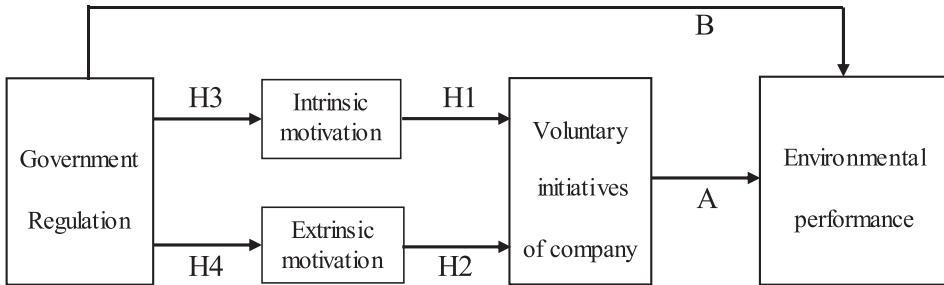


Figure 1. Conceptual framework.

performance (A and B in Figure 1), assuming that both channels are likely to improve a firm's environmental performance.

Figure 1 shows that our analysis extends the literature on motivation crowding effects in environmental economics by separating out the effects of government regulation on intrinsic and extrinsic motivations. In this way, we disentangle the regulatory impact on environmental performance caused by indirect effects due to crowding effects on intrinsic and extrinsic motivation from the direct effects of government regulation on environmental performance.

3. Methodology

3.1. Method of data collection

The data stem from a large survey targeted at SMEs, which was conducted in 2011. Before sending out the survey, we discussed the survey questions in two rounds with a research team of 14 CSR researchers from the 12 European countries where the survey would be sent (Denmark, Finland, Sweden, The Netherlands, Germany, France, Austria, Hungary, Poland, Italy, Spain and the UK). Second, we sought guidance from an SME consultant who specialized in advising SMEs on their environmental outcomes. Next, we pre-tested the survey by interviewing ten executives from companies. We used a convenience sample (Sekaran 2003) by selecting companies from the researchers' local environment. The companies were selected from both manufacturing and service sectors (food industry, construction, trade, ICT and insurance) as well as from different size classes to explore content validity in various different contexts. We explained the purpose and procedures to all participants of the pre-test. After receiving the survey question list by e-mail, all participants filled in the survey for their own company. They were asked to complete the survey before the interview was held. Then the researchers visited the company and discussed in depth the survey questions and the company's responses to each question. In order to check whether the respondent fully understood the survey questions and whether the questions suited the CSR of the company, the participants were asked to explain their response to the survey questions, how they gathered the information for their responses, which questions were unclear and why, which questions did not fit the situation of the company and why, and which questions were lacking and why. Based on the responses of the 10 respondents, the survey list was updated. The survey was translated by members of the research team from English into their own languages for the 12 countries in which the companies were located.

The 2011 survey was sent to 365,002 companies. The e-mail addresses of companies were obtained from KOMPASS (a French based international bureau that provides data on companies, see www.kompass.com). The survey was sent out by CenterData (<https://www.centerdata.nl/en>) which is specialized in doing online (multi-language) surveys. The response rate was 3.7% (13,637 companies). International mail surveys aiming at an industrial population have a history of very low response rates varying between 6% and 16% (Harzing 1997). Since our survey targeted small businesses and took substantial effort to fill out, the response rate is even lower and in line with ex ante expectations. From these responses, we selected the companies for which the business leader (director) had filled in the surveys. This resulted in 2,373 companies for which data for the variables used in this research are available. The average size of these companies is equal to 22 employees Full Time Equivalents (FTEs). Using Cochran's sample size formula, we find that this response is adequate for inferring reliable research findings for the total population of companies in the 12 countries.³

3.2. Measurement

The concept of CSR was introduced to the respondents as follows: "Corporate social responsibility of enterprises is the practice whereby enterprises integrate social and environmental concerns into their business operations on a voluntary basis, in order to contribute to public prosperity in the longer run." This definition of CSR, which has also been adopted by the European Commission (2001), stresses that CSR refers to voluntary actions.

We measured motivation by eliciting the reason for the company's engagement in CSR. We measured motivation by the following survey question: How important are the following motives for your enterprise to engage in CSR?⁴ The intrinsic motivation of the business leader was measured by the response to two statements reflecting on this survey question (see Table 1). The first statement inquired into the extent to which personal satisfaction is a motive to engage in environmental responsibility. The second statement measured the extent to which the company engages in CSR because the company feels responsible for the environment and society. Extrinsic motivation was measured by the responses to three statements on the financial and reputational benefits of environmental performance. The responses to all statements were measured by a seven-point Likert scale.

In order to measure legal enforcement of environmental performance, and voluntary initiatives by the enterprise itself, we asked respondents to indicate which cause contributed most to reductions in the company's energy consumption, waste disposal and water consumption during the period 2007–2010: legal requirements or voluntary initiatives by the own enterprise? Two dummies for each of the causes measure the two alternative options. For example, for legal enforcement, the dummy equals 1 if the respondent agreed that environmental performance was improved mainly because of legal requirements and equals 0 if the respondent did not agree. A substantial share of business leaders did not select either of these options and, instead, selected the option 'non-applicable'. Since the question inquired into the causes for the reduction in energy consumption, waste disposal and water consumption, the most likely reason for selecting the option 'non-applicable' is that the company did not reduce energy consumption, waste disposal and/or water consumption during the period 2007–2010.

We measured environmental performance by the use of two procedural measures: setting targets to improve environmental outcomes and reporting the realization of these targets. Target-setting is a proven management tool to improve environmental performance that is also feasible for SMEs (Palmer and Van der Vorst 1997). The establishment of voluntary targets is an essential first step. It requires the identification and specification of concrete, measurable, performance indicators and a commitment to management plans that specify how much they can be improved (Hummels and Karssing 2007). Internal reporting provides an instrument for analyzing how the outcomes realized relate to the targets (Mitchell and Hill 2009). Based on these reports, companies can plan for improvement and redefine their targets. The advantage of simple, specific and concise questions on the use of procedural measures to measure environmental performance is that they diminish social desirability bias (Podsakoff *et al.* 2003). In fact, Wakabayashi and Arimura (2016) also employ these self-reported data to measure environmental performance. As reported in Table 1, only 10–13% of the companies responded that they adopt these procedural measures. These low scores indicate that the responses to these survey questions are not biased by social desirability bias and thus provide reasonably reliable indicators.

3.3. Control variables

We controlled for various company characteristics and external influences from the business environment (for the measurement of the control variables, see the footnotes for Table 2). For internal company characteristics, we controlled for company size, time horizon, skill level, age structure and organizational culture. The number of FTEs measures the size of the company. Organizational culture was measured by the two dimensions distinguished by the Competing Value Framework: control versus flexibility orientation and internal versus external focus (Linnenluecke and Griffiths 2010). We also controlled for time horizon, educational level and age structure, since these have been shown to affect managerial beliefs, values and actions (Marginson and Mcaulay 2008).

As regards the external environment, we controlled for region, industry, position in the chain and intensity of competition. First, environmental performance and motivations are conditioned by the wider institutional and cultural environment of the company (Campbell 2007). We, therefore, controlled for five regional dummy variables. Also, the sector influences the relevance of environmental policies for companies. We distinguished eight sectors based on the Global Industry Classification Standard (GICS). Furthermore, CSR may depend on the enterprise's position in the chain. We also controlled for the intensity of price competition. The more competitive the market environment, the lower the profitability and the fewer resources a company has available for investing in social responsibility.

4. Data analysis

4.1. Factor analysis

In order to research the validity of the constructs of government regulation, voluntary own initiatives, intrinsic motivation, extrinsic motivation and environmental performance, we performed principal component analysis (with Oblimin rotation). Table 1 reports the results. The factor loadings for all individual variables exceed 0.50.

Table 1. Factor analysis of survey items.^a

Variables	Mean	SD	Factor loadings				
			Government regulation	Voluntary initiatives	Intrinsic motivation	Extrinsic motivation	Environmental performance
<i>Lower energy consumption due to:</i>							
- Legal requirements ^b	0.07	0.25	0.91	–	–	–	–
- Own voluntary initiatives ^b	0.50	0.50		0.88	–	–	–
<i>Lower waste due to:</i>							
- Legal requirements ^b	0.08	0.26	0.89		–	–	–
- Own voluntary initiatives ^b	0.40	0.49		0.85	–	–	–
<i>Lower water consumption due to:</i>							
- Legal requirements ^b	0.06	0.24	0.93		–	–	–
- Own voluntary initiatives ^b	0.45	0.50		0.90	–	–	–
<i>We engage in CSR because:</i>							
- My enterprise feels responsible for the planet and the society ^c	5.28	1.47	–	–	0.88	–	–
- It creates personal satisfaction for the people in my enterprise ^c	5.15	1.41	–	–	0.89	–	–
- It serves long-term financial interests of shareholders and/or owner ^c	3.72	1.89	–	–	–	0.76	–
- It limits reputational risks ^c	4.50	1.63	–	–	–	0.75	–
- Large customers ask for it ^c	3.77	1.89	–	–	–	0.73	–
<i>Environmental performance</i>							
- Energy consumption ^d	0.11	0.23	–	–	–	–	0.87
- Waste disposal ^d	0.13	0.24	–	–	–	–	0.86
- Water consumption ^d	0.10	0.21	–	–	–	–	0.86
Eigenvalue	–	–	2.56	3.53	1.75	1.00	1.08

(Continued)

Table 1. (Continued).

Variables	Mean	SD	Factor loadings				
			Government regulation	Voluntary initiatives	Intrinsic motivation	Extrinsic motivation	Environmental performance
Variance explained	—	—	15.06%	20.79%	10.34%	5.90%	6.36%
Cronbach's alpha	—	—	0.89	0.85	0.70	0.62	0.87
Construct reliability	—	—	0.94	0.91	0.83	0.79	0.90
Average variance extracted	—	—	0.83	0.77	0.72	0.56	0.75

Notes: ^aExtraction Method: Principal Component Analysis; Rotation Method: Oblimin with Kaiser Normalization.

^bMeasured on a binary scale ranging from: 'no' (0); 'yes' (1).

^cMeasured on a 7-point scale ranging from: 'not at all'(1) to 'very much'(7).

^dMeasured on a 3-point scale: 'no use of targets, no reporting' (0.0), 'use of targets, no reporting' (0.5); 'no use of targets, reporting' (0.5); 'use of targets and reporting' (1.0).

Loadings of 0.50 or greater are considered very significant (Hair, Anderson, and Black 1998). In addition, the Cronbach's alphas indicate the internal consistency of six factors, as all meet the accepted threshold of 0.60 (Hair, Anderson, and Black 1998). We tested the reliability of the factors further by confirmatory factor analysis using structural equation modeling. The global fit indices (CFA = 0.939; TLI = 0.923; SRMR = 0.025) indicate a good model fit. The construct reliability and convergent validity (measured by the average variance extracted) for all factors satisfied the accepted thresholds of 0.70 and 0.50, respectively. The predicted factor values identified by the measurement model are standardized to zero mean and unit standard deviation. We included these factors in our regression analysis.

4.2. Descriptive statistics and correlations

Table 2 reports the descriptive statistics and partial correlations of all variables. It shows that intrinsic and extrinsic motivations are both positively related to voluntary initiatives and environmental performance. Also, government regulation is positively related to environmental performance. Intrinsic motivation and government regulation are not significantly related.

4.3. Common method bias

Several precautionary remedies and ex-post tests recommended by Podsakoff *et al.* (2003) were used to address common method bias. First of all, in a cover letter to the respondents, we emphasized confidentiality. Respondents would thus have little motive to present a more favorable picture than they knew to be the case. As a second precautionary measure, the scales for measuring government regulation, intrinsic motivation and environmental impacts were all different. This reduces common method biases caused by commonalities in scale endpoints and anchoring effects. In order to avoid consistency artifacts between dependent and independent variables (Muller and

Table 2. Descriptive statistics.^a

		Mean	SD	1	2	3	4	5
1	Government regulation	0.00	1.00	1	—	—	—	—
2	Voluntary initiatives	0.00	1.00	-0.25	1	—	—	—
3	Intrinsic motivation	0.00	1.00	-0.03	0.15	1	—	—
4	Extrinsic motivation	0.00	1.00	0.05	0.08	0.30	1	—
5	Environmental performance	0.00	1.00	0.02	0.34	0.19	0.13	1
6	Company size (ln FTE)	3.08	1.68	-0.03	0.16	0.04	0.16	0.12
7	External orientation ^b	4.56	1.48	0.01	-0.03	0.14	0.08	0.05
8	Flexibility orientation	5.20	1.36	-0.06	0.06	0.27	0.08	0.03
9	Time horizon ^c	2.60	1.33	-0.04	0.07	0.06	0.07	0.07
10	% age 25-50	0.66	0.24	<i>0.04</i>	0.01	0.03	-0.02	0.07
11	% employees >50	0.23	0.23	0.02	0.08	<i>0.04</i>	<i>0.04</i>	0.05
12	% of medium skilled	0.42	0.31	0.03	-0.04	-0.02	0.02	0.01
13	% of high skilled	0.25	0.29	-0.02	-0.03	0.09	-0.03	-0.09
14	B2C ^d	1.97	1.04	0.01	<i>0.04</i>	0.02	-0.01	0.08
15	Intensity of price competition ^e	5.06	1.87	<i>0.05</i>	-0.07	-0.04	-0.03	0.01
16	UK ^f	0.04	0.19	-0.03	<i>0.05</i>	-0.07	0.06	0.02
17	Scandinavia ^f	0.16	0.37	-0.06	-0.01	0.03	0.11	-0.06
18	Continental ^f	0.31	0.46	-0.11	<i>0.06</i>	<i>0.06</i>	0.05	-0.06
19	Central ^f	0.11	0.32	-0.06	0.02	-0.00	-0.12	0.05
20	South ^f	0.38	0.48	0.20	-0.08	-0.05	-0.08	0.07
21	Material ^f	0.17	0.37	-0.01	<i>0.04</i>	0.00	0.00	0.07
22	Energy ^f	0.03	0.17	-0.01	<i>0.05</i>	0.01	0.02	0.03
23	Industrials ^f	0.19	0.39	<i>0.04</i>	-0.06	-0.03	0.00	-0.03
24	Consumer discretionair ^f	0.18	0.39	-0.03	-0.01	0.01	0.00	0.03
25	Consumer staples ^f	0.03	0.18	0.00	0.06	-0.01	-0.00	0.08
26	Financials ^f	0.03	0.16	-0.01	-0.02	-0.01	-0.01	-0.08
27	IT and Communications ^f	0.04	0.20	-0.02	-0.03	0.04	-0.01	-0.09
28	Other business ^f	0.33	0.47	0.01	0.01	0.01	0.00	-0.03

Notes: ^aPearson correlation coefficients; italics $p < 0.05$; bold $p < 0.01$.

^bResponse to the survey question: "Please characterize your enterprise on the following two scales. The first scale concerns the organizational focus. This scale ranges from, on the one hand, a strong internal focus on internal organizational efficiency, to, on the other hand, a strong external focus on adapting to the (changing) demands of the external environment. The second scale concerns the management style. This scale ranges from, on the one hand, giving employees clear guidelines, enforced by control mechanisms, to, on the other hand, providing them complete autonomy and participative decision making." The responses are measured by a 7-point Likert scale ranging from: 'not at all' (1) to 'very much'(7).

^cResponse to the survey question "What is the average time horizon of the financial targets of your enterprise?", measured in years.

^dResponse to the survey question "To whom do you sell your products and/or services?", measured by a 5-point scale ranging from: 'B2B'(1) to 'B2C'(5).

^eResponse to the survey question, "In the market for your main product or service, your enterprise is prone to price competition". The respondent could choose between seven options, ranging from 'not at all' to 'very much'.

^fDummy.

Kolk 2010), we placed the questions on motivation in the first part of the survey (questions 23–27), the questions on the causes of environmental improvements in the last part of the survey (questions 109–111, respectively), and the questions on environmental performance in between (questions 91–93). Fourth, we kept questions simple, specific and concise, avoiding ambiguous concepts (and testing them in the pilot interviews; see above). In addition, we applied an ex-post test for common method bias. For this, Podsakoff *et al.* (2003) recommend Harman's single-factor test through a

principal component analysis on all the variables included in the analysis. The basic assumption of this technique is that if a substantial amount of common method variance is present, either (a) a single factor will emerge from the factor analysis or (b) one general factor will account for the majority of the covariance among the measures. Our principal component analysis revealed five factors with eigenvalues greater than 1.0, which together accounted for 53% of the total variance. The largest factor did not account for a majority of the variance (20%). This indicates that respondents were not guided by an inherent bias resulting in homogenous scoring patterns.

4.4. Non-response bias

In order to evaluate the non-response bias, we employed the Heckman two-step estimation procedure (Puhani 2000). Heckman showed that non-response bias is a kind of omitted variable bias. The omitted variable can be measured by the so-called inverse Mill's ratio that captures the influence from unobserved characteristics of the enterprise on the response to the survey. The inverse Mill's ratio can be calculated from the first step of Heckman's procedure that estimates a probit model for the response (0 for non-response; 1 for response) in 2011. In the second step, the ultimate model of interest is estimated. The estimation of the response rate in the first stage should include at least one variable that does not affect the estimation in the second stage. As exclusion restriction, we used the degree of feeling European as measured by the Eurobarometer because the invitation letter that requested companies to respond to the survey was signed by a representative of the European Union. It is expected that respondents who feel more European are more inclined to cooperate with the survey, independent of their interest in CSR. The estimation results of the probit model supported this proposition and showed a highly significant positive effect of feeling European on the response rate ($p < 0.001$), controlling for sector, company size and the starting year of the company. From the regression result, we calculated the inverse Mill's ratio.⁵ We found that the inverse Mill's ratio is significantly related only to intrinsic motivation. Based on these results, we concluded that the response for intrinsic motivation is likely to be susceptible to non-response bias. By including the inverse Mill's ratio as an extra control variable in the regression analysis, we removed the selection bias part from the error terms.

4.5. Test on endogeneity of government regulation

A possible complication for our empirical research is that companies with strongly motivated business leaders are more likely to go beyond external requirements and thus are less likely to report that government regulations were the most important cause for improved environmental performance during the period 2007–2010. The reverse causality from motivation to the stated impact of government regulation may bias its estimated impact on intrinsic and extrinsic motivations.

In order to test for reverse causality, we employed the proportion of women managers as instrumental variable for intrinsic motivation. According to the gender socialization theory, women demonstrate more concern for others, are more emphatic, and show more altruistic attitudes (Williams and Polman 2015). Hence, we expect a positive influence by the proportion of women managers on intrinsic motivation. Multiple regression analysis (controlling for all other control variables) indeed showed a

significantly positive effect (t -value = 4.93). For extrinsic motivation, we adopt as an instrument the intensity of monitoring of the company's social and environmental performance by NGOs and the media; in a transparent environment, environmental performance yields greater strategic market value (Campbell 2007). Multiple regression analysis (again controlling for all other control variables) showed a significantly positive effect (t -value = 12.79). When using IV analysis, we found that neither intrinsic nor extrinsic motivation reversely affect government regulation (p values vary from 0.299 to 0.827). Hence, motivation does not reversely impact on government regulation.

5. Results

This section reports the estimation results for intrinsic motivation, extrinsic motivation, voluntary initiatives and environmental performance.

We employed the conditional mixed process (CMP) estimator in order to control for correlation between the residuals for intrinsic and extrinsic motivation, voluntary initiatives and environmental performance. The CMP modeling framework is essentially that of seemingly unrelated regressions, but is more general. In particular, the individual equations need not be classical regressions with a continuous dependent variable. The dependent variables may also be binary, ordered and categorical or based on interval measures. CMP can also estimate parameters in mixed-process simultaneous systems that are recursive, meaning that endogenous variables may appear on the right-hand side as observed variables in other equations, as in our model. Conditional means that the individual model equations can vary by observation.

This last feature of CMP allows us to use different samples for which the crowding effects may differ. Hungerman (2009) showed that crowding-out effects are stronger if intrinsic motivation is high. Indeed, only if companies are intrinsically motivated to start with, can government regulation crowd out intrinsic motivation. We, therefore, distinguished two samples. In the first sample, the reference option to which we compare government regulation are those companies for which business leaders had selected 'voluntary initiatives' in the survey question as the main cause of environmental improvements by the company. In this sample, companies for which the business leader had selected 'not applicable' for this survey question are not included. In the second sample, we employed companies for which the business leader had selected 'not applicable' as reference option for government regulation. In this sample, companies for which the business leader had selected 'voluntary initiatives' are excluded. Correlation analysis showed that intrinsic and extrinsic motivation of business leaders who had selected 'not applicable' is significantly lower than for business leaders who had selected 'voluntary initiatives.' Accordingly, crowding-out effects from government regulation are less likely. For the other equations for voluntary initiatives and environmental performance, we used a sample consisting of all respondents. In these equations, companies whose business leader had selected the 'non-applicable' option are the reference category.

Table 3 presents the estimation results. The estimation results in column (1) of Table 3 support Hypotheses 1 and 2 that intrinsic and extrinsic motivations stimulate voluntary initiatives to enhance environmental performance. Columns (2a) and (3a) report the estimation results explaining motivations for the first sample in which companies that selected 'voluntary initiatives' are the reference option. The results show that government regulation crowds out intrinsic and extrinsic motivation of business leaders. These results support Hypotheses 3 and 4. Columns (2 b) and (3 b) report the

Table 3. Estimation results.^a

	1 Voluntary initiatives	2a ^b	2b ^c	3a ^b	3b ^c	4 Environmental performance
		Intrinsic motivation	Extrinsic motivation			
Government regulation		-0.28***	-0.05**	-0.15***	0.07**	0.10***
Voluntary initiatives						0.43***
Intrinsic motivation	0.75***					
Extrinsic motivation	0.41**					
Company size (ln FTE)	0.02	0.02	-0.07***	0.11***	0.00	0.06
External orientation	-0.09***	0.05**	0.06**	0.08**	0.08***	0.02
Flexibility orientation	-0.11***	0.19***	0.12***	0.03	0.03	-0.04**
Time horizon	-0.01	0.01	-0.01	0.00	0.04	0.04*
% age 25–50	-0.06	-0.20	-0.13	0.20	-0.11	0.09
% employees >50	0.04	-0.54**	-0.32	0.15	-0.25	0.03
% of medium skilled	-0.19	0.10	0.20	0.11	0.22	-0.02
% of high skilled	-0.35**	0.31**	0.50***	0.16	0.12	-0.11
Scandinavia	-0.53***	0.51***	0.54**	-0.11	0.42*	0.15
Continental	-0.43**	0.63***	0.50**	-0.32*	0.30	0.34**
Central	0.09	0.52***	0.24	-0.74***	-0.40	0.26*
South	-0.37*	0.51***	0.49**	-0.41**	0.01	0.31**
Material	-0.01	0.12	0.14	-0.06	0.04	0.08
Energy	0.06	0.04	0.12	0.01	-0.11	0.06
Industrials	-0.09	0.04	0.09	0.02	-0.05	0.08
Consumer discretionair	-0.07	0.07	0.07	-0.05	0.06	0.09
Consumer staples	0.17	0.03	-0.08	-0.07	-0.03	0.07
Financials	-0.02	0.06	0.10	0.06	0.08	0.10
IT & Communications	-0.16	0.09	0.09	-0.04	-0.05	0.07
B2C	0.01	0.02	-0.01	-0.01	-0.09**	0.02
Price competition	-0.03	-0.00	0.01	0.00	0.01	-0.01
Inverse Mill's ratio	-0.10	0.24**	0.07	-0.00	-0.03	0.16*
R ²	0.07	0.12	0.11	0.10	0.09	0.13
F	7.59***	9.61***	5.50***	7.88***	4.37***	13.99***
N	2,373	1,648	1,046	1,648	1,046	2,373

Notes: ^a* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

^bReference: companies that filled in ‘voluntary initiatives’ in the survey question on the main cause of the improvement in environmental performance.

^cReference: companies that filled in ‘non-applicable’ in the survey question on the main cause of the improvement of environmental performance.

estimation results explaining motivations for the second sample in which companies for which business leaders had selected ‘non applicable’ are the reference option. Once again, the results indicate crowding out of intrinsic motivation by government regulation, but the magnitude of the crowding effect appears to be much smaller. For extrinsic motivation, the crowding-out effects turn into crowding-in effects.

Column (4) shows that government regulation and voluntary initiatives significantly enhance environmental performance. Voluntary initiatives are substantially more effective in stimulating environmental performance than is government regulation.

6. Discussion

6.1. Summary of findings and comparison with previous literature

This paper sets out to research to what extent government regulation crowds out intrinsic motivation toward environmental performance in SMEs and how the indirect effects caused by crowding out of intrinsic motivation compare with the direct effects of government regulation on environmental performance. **Table 4** summarizes the main results for these research objectives. The first column of **Table 4** shows the (positive) direct effects of government regulation on environmental performance from column (4) of **Table 3**. The second column reports the indirect effects of government regulation on environmental performance through crowding effects on intrinsic and extrinsic motivations. The total effects are equal to the sum of the direct and the indirect effects of government regulation.

For the first sample, **Table 4** shows that the negative indirect effect of government regulation through crowding out intrinsic and extrinsic motivations offsets the direct positive effect of government regulation. Bowles (2016) calls this 'strong crowding out.' These empirical results confirm the crowding-out mechanism: government regulation significantly harms intrinsic and extrinsic motivations of business leaders, thereby reducing voluntary initiatives by SMEs to protect the environment. Crowding-out effects are almost absent in the second sample. Accordingly, the total effect of government regulation is substantially positive. This implies that only if intrinsic motivation is already low to begin with, does government regulation contribute to the environmental performance of SMEs.

An unexpected outcome of our research is that for companies in the second sample, government regulation increases rather than reduces extrinsic motivation, which is opposite to Hypothesis 4. The reason may be that government regulations teach business leaders of companies with low environmental performance that improvements required by government regulations yield financial and other benefits, thereby boosting extrinsic motivation to enhance environmental performance. Another explanation is that environmental improvements mandated by government regulations are relatively costly and that the regulations make business leaders realize that voluntary pro-active measures might be more cost-efficient.

Our results are in line with previous research concluding that government regulation generates motivation crowding effects on the environmental behavior of rural households (Cardenas, Stranlund, and Willis 2000; Choi 2015; Han *et al.* 2018) and farmers (Vollan 2008), but diverge from the results of Abatayo and Lynham (2016). They found that government regulation improves environmental performance and interpreted this finding as evidence that crowding out of intrinsic motivation does not occur, although they did not test this explicitly. Our results show that a positive relationship between government regulation and environmental performance actually can go together with crowding out of intrinsic motivation. These findings suggest that Abatayo and Lynham (2016) may have misinterpreted their results as evidence against crowding out of intrinsic motivation.

Table 4. Direct, indirect and total effects of regulation on environmental performance.^a

	Direct effect	Indirect effect			Total	Total effect
		Through intrinsic motivation	Through extrinsic motivation	Total		
Government regulation	0.10***	Reference: voluntary initiatives -0.09***	-0.03**	-0.12***	-0.02	
Government regulation	0.10***	Reference: no voluntary initiatives -0.01**	0.01**	-0.01		0.09***

Note: ^a ** $p < 0.01$; *** $p < 0.001$.

6.2. Research implications

6.2.1. Theoretical implications

Over the last quarter century, much research has been performed on motives of CSR, distinguishing between extrinsic and intrinsic motives (Muller and Kolk 2010). Previous research did not, however, consider that intrinsic motives can depend on external pressures that drive extrinsic motivations. This study develops a more nuanced understanding of how external pressures and intrinsic motives relate by advancing the hypothesis that government regulation impacts on intrinsic motivation. Insight into motivation crowding effects is important, because disregarding motivation crowding out leads to overestimation of the influence of government regulations on environmental performance. This study, therefore, adds to the literature that has studied the effects of government regulation on environmental innovation by companies (Hunt and Fund 2016), but did not explore the impact of public policy on intrinsic and extrinsic motivations. Our study shows that the effectiveness of government regulation in stimulating environmental performance of SMEs is contingent on the intrinsic motivation of its business leaders.

Another important implication of our research is that motivation crowding out may occur, even if government regulation improves environmental performance. Previous studies' assumptions that a positive correlation between government regulation and environmental performance indicates no crowding out of intrinsic motivation is unwarranted. Our study provides a more refined theoretical analysis of the crowding mechanism by separating it from the direct effects of government regulation on environmental performance. It provides empirical evidence that a positive relationship between government regulation and environmental performance does not exclude crowding out of intrinsic motivation. The reason is that the negative effects of motivation crowding out on environmental performance can be offset by the positive direct effects of government regulation on environmental quality.

Third, our research indicates that future theoretical research should distinguish between situations with high and low intrinsic motivation. Furthermore, empirical research should test for non-linearity to check whether crowding out effects increase with the level of intrinsic motivation. More generally, it is important to increase our understanding of the specific conditions in which motivation crowding out is more likely to occur. For example, the signal sent by government regulations can vary

considerably depending on the meaning they convey. This meaning may depend, among other things, on the cultural context.

6.2.2. Policy implications

As alternatives for legal requirements, several alternative governance instruments may respect the intrinsic motivation to protect public goods. Campbell (2007), for example, advocates regulations based on consensus-building among companies, government and other relevant stakeholders. This is in line with previous experimental studies that showed that crowding effects decline if regulation respects the self-determination of participants (Vollan 2008) and facilitates communication (Abatayo and Lynham 2016). From a motivation crowding perspective, it indeed seems crucial to seek cooperation with the stakeholders by respecting their legitimate concerns, engaging their moral preferences, and allowing businesses discretion on how to enhance the public good.

A second policy implication of our results is that it is important to estimate the importance of intrinsic motivation, before any government regulation is implemented. If only a few business leaders are intrinsically motivated to begin with, government regulation cannot crowd out intrinsic motivation. But if intrinsic motivation is strong, government regulation should be handled with care. This further underlines the importance of measuring intrinsic motivation, not only for research objectives, but also for policy objectives.

A related implication of our research is that government regulation may want to focus on setting minimum requirements for environmental performance. In this way, it will enhance the environmental performance of companies that have not taken voluntary initiatives because of low intrinsic or extrinsic motivation. In our sample, almost 50% of all companies belong to this group.⁶ Our estimation results indicate that crowding-out effects from government regulation are largely absent in this group. It should be noted that government regulation often involves setting minimum requirements. This explains why, in our sample, the proportion of companies that identified government regulation as the main reason for their improvements in environmental performance varies between only 6% for water consumption and 8% for waste disposal (see Table 1). For countries with little or no environmental regulation, our policy advice is for the government to introduce minimum requirements to compel companies that lag behind to improve their environmental performance. This allows companies that are frontrunners in reducing environmental harm to retain the scope to distinguish themselves from other companies by expressing their commitment to social responsibility through voluntary initiatives.

6.3. Limitations and future research directions

Our study suffers from several limitations. First of all, our research is limited to business leaders of SMEs. The scope of crowding theory would be extended further if it could be shown to be applicable to large companies as well. More theoretical and empirical research is needed to study motivations in large organizations.

Another limitation of our research is the use of cross-company survey data. Although our dataset is unique (no other such large, multi-country, dataset of CSR for SMEs exists to date), experimental research that explicitly measures intrinsic motivation would be a useful complement for testing motivation crowding effects.

Moreover, the use of survey data rather than data on actual environmental performance may be problematic. The results should thus be interpreted with some caution, even though self-reported data are common in the literature (Arimura, Hibiki, and Katayama 2008). Moreover, we adopted several precautionary remedies and ex-post tests in order to address common method and non-response bias.

A final limitation is that the results of this study are based on European data. Our findings should ideally also be tested in other parts of the world.

Notes

1. Demirel, Iatridis, and Kesidou (2018) found that effective environmental protection entails collaboration between government regulation and voluntary environmental measures. Coercive legislation does not leave much room for flexibility and voluntary choices by managers and frequently pushes the manager to adopt environmental measures without considering effectiveness (Daddi, Testa, and Frey 2016). Both Daddi, Testa, and Frey (2016) and Demirel, Iatridis, and Kesidou (2018) did not, however, analyze effects of government regulation on intrinsic motivations.
2. However, Rode, Gómez-Baggethun, and Krause (2015) provide several arguments that government regulation can also crowd-in intrinsic motivation. One of the arguments is that it is easier for intrinsically motivated companies to act upon their motivation if the government regulation creates a level playing field by compelling companies that are not intrinsically motivated to invest in environmental improvements.
3. The total number of companies in the 12 countries equals 16,091,476 (Source: EU, http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/index_en.htm#h2-1).
4. If the survey question had been phrased as “How important are the following motives for your enterprise to engage in environmental performance?”, the survey questions would also pick up that, with regulation, the weight of intrinsic motivation in overall motivation would decline. Our survey question, however, refers to CSR only, which is limited to the voluntary part of the environmental performance. As a result, the survey question measures a decline in intrinsic motivation itself, rather than a reduction in the weight of intrinsic motivation.
5. We used the transformation proposed by Lee (1983) to transform probabilities into pseudo-probit scores for calculating the inverse Mill's ratio.
6. This information can be derived from Table 1. The complement of the sum of the shares of companies that filled in either ‘enforced by legal requirements,’ or ‘due to own voluntary initiatives’ equals 40% for energy consumption, 49% for waste disposal and 46% for water consumption.

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