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MACRO-ECONOMIC CRISES AND CORPORATE SUSTAINABILITY

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Abstract

How does a macroeconomic crisis affect firms? strategic commitment towards sustainability and the quality of their sustainability performance? We tackle this question by studying the heterogeneous impact of a macro-economic crisis along those dimensions of sustainability that are of strategic relevance, arguing that firms' responses can diverge significantly, even among competitors, depending on two main factors: their strategic orientation and their motivational traits. We examine evidence on the evolution of the sustainability performance of a sample of 2,264 public companies between 2007 and 2011, and find that the variance in the sample increases for some of sustainability dimensions - namely those related to environmental innovation, product responsibility, and human rights in the supply chain - indicating the strategic nature of the response to the crisis through changes in sustainability commitment. We then examine the direct and interactive effects of strategic orientation and firm motives on sustainability performance variation during this period, focusing on those three dimensions. We find evidence that the interplay between strategy and

motives can influence firm's response to macro-economic crises by enhancing, rather than reducing, their commitment to corporate sustainability along the dimensions they perceive as strategic relevant.

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Introduction

Demands for sustainability in corporate behavior often go far beyond the objectives that organizations are configured to achieve (Sharma and Starik, 2002), and so require what may well be radical changes to their core organizational activities. Examples include the integration of social and environmental impact metrics into capital budgeting, managerial accounting, information systems, incentive and evaluation systems, internal auditing and reporting processes. Even more problematic is the fact that the returns to investments in such significant changes are highly uncertain - and, in fact, many practitioners perceive such investments as hazardous to firms' economic efficiency and profitability objectives.

In this context, the major economic and financial crisis spurred by the consequences of the sudden and unexpected bankruptcies of major US financial institutions in 2008 has sparked a major intellectual debate about the consequences of the crisis for extant theories on the role of businesses in society, and the positive and normative merits of different "theory of the firm" perspectives (Zollo and Freeman, 2010; Stout, 2013). However, the debate has stopped short of examining the empirical evidence about firms' behaviors, and especially of their outcomes along key sustainability dimensions. To the best of our knowledge, however, there have been virtually no empirical inquiries published to date in leading management journals on the consequences of the crisis on corporate behavior and related performance outcomes. So we currently lack an empirically founded theory about the impacts of macro-economic crises on the adoption and diffusion of corporate sustainability practices, on their integration into firms' strategic thinking and operational conduct, and on the related performance consequences along environmental, social and long-term economic sustainability dimensions.

What kind of influence could macroeconomic conditions have on how firms make sense of, and respond to, the increasing and widely varying stakeholder expectations? More specifically, do macroeconomic conditions increase or reduce firms' efforts to invest in adapting their internal processes and business models to stakeholders' expectations? For instance, do macro-economic crises influence firms' willingness to change their internal capital budgeting, monitoring, performance evaluation and incentive systems to explicitly include or rather exclude objectives and metrics that cover the environmental and social impacts of both their own operations and products, and those of their suppliers?

Despite the fact that these questions intuitively seem salient, they have largely escaped either conceptual analyses or empirical inquiry to date. For instance, Kemper and Martin (2010) contributed a conceptual argument framing the economic crisis as a test of the validity of different theories of the firm to the theoretical debate on corporate sustainability. Slightly closer to our focus, Foss (2010) employs theoretical modeling tools to examine the impact of the economic crisis on the scope of the firm, as well as on the potential determinants of its boundaries. With regards to empirical work, only very few studies investigate the impact of a macro-economic shock on corporate sustainability behavior and performance. Karaibrahimoğlu (2010), examining the effects of the recent financial crisis on a sample of Fortune 500 companies, found evidence of significant reductions in the number and size of those companies' sustainability projects post-2008. More recent multiple case study research undertaken by Jacob (2012) has shown that initiatives targeted at workforces or local communities were negatively impacted, whereas wider corporate governance and environmental initiatives were further developed.

The contributions so far have been valuable in framing the general analysis of the consequence of macro-economic crises on firm behavior and performance related to sustainability, but have not addressed the empirical phenomenon in sufficient detail, neither in theory-building nor in theory-testing mode. A comprehensive theory about the nature and direction of how firms respond to sustainability demands during a macro-economic crisis, the antecedents of such behavior and its performance consequences is still lacking. In particular, we still know very little about the factors that might influence firms' sustainability-related choices after external environmental shocks (e.g. a major macroeconomic crisis).

We aim to contribute to fill this conceptual and empirical gaps in different ways. First, we develop theory on the influence of firms' strategic orientation and sustainability-related motives on sustainability performance during the macro-economic crisis period. We focus on these two factors because they represent two of the most relevant quasi-genetic traits of firms (Cohen *et al.* 1996), which in turn can influence organizational adaptation to environmental dynamics. In the context under consideration, we assume that firms differ in the way they cognitively frame and understand the sustainability challenge (Hart, 1995, 2005; Reidenbach and Robin, 1991; Zadek, 2004), which is likely to inform the adaptive response to a macro-economic crisis. This should help explain variations in firms' commitment to sustainability, and thus explain variation in sustainability performance.

Second, we aim to identify the dimensions of sustainability performance that are likely to be sensitive to strategic interaction among competing firms through variation in commitment

to, and investments in, sustainability. To do so, we apply a test of change in the sample variance during the crisis period, arguing that those sustainability dimensions in which we find significant change in the variance are those where firms strategize and differ with each other in deciding how to change their commitments to sustainability.

Third, we test our hypotheses regarding the impact of strategic orientation and sustainability-related motivations on firms' sustainability performance during the macro-economic crisis period, along the dimensions identified in the previous step as strategically relevant. We do so in a sample of 2,264 listed companies across industries and countries, covered by social rating agencies in their sustainability-related commitments, actions and performance outcomes.

Theoretical Development

From a strategy standpoint, corporate sustainability can be viewed as a specific form of resource allocation following a specific commitment made towards the integration of sustainability principles in firms' purpose and consequent behavior (Freeman et al. 2010). However, this view has been challenged on the premise that firms might perceive these commitments as simply symbolic signals to be produced for risk protection and/or legitimacy enhancement purposes (Weaver et al., 1999). Macro-economic crises might provide a particularly important condition to test the fundamental question of the degree to which corporate sustainability is indeed perceived by business managers as a strategically relevant set of decisions. The reason is that in a strong crisis situation firms are subject to heavy resource constraints, which can effectively reveal the "real" nature of the strategic commitment to the sustainability objectives. Those firms that invested in sustainability with a decoupling logic (Westphal and Zajac, 1994), divorcing the symbolic action from managerial practice, will most likely retrench and reduce what they consider as peripheral engagements, vis-à-vis the core business conduct. On the other hand, firms that integrated sustainability in the value proposition for customers and stakeholders might actually seize the opportunity to distinguish themselves from competitors that "decoupled", and decide to strengthen their commitment, and investments, in sustainability-related product and process innovation. For these companies, the worsening macroeconomic conditions could represent additional incentive to speed up their transition towards more sustainable operations and product portfolios.

The question of the strategic relevance of sustainability can therefore be tackled by examining two key explanatory factors, both linked to the cognitive framing of sustainability as either a reputational/risk management challenge or as a strategic opportunity. The first factor

has to do with the strategic orientation of the firm, i.e. a cost leadership or a differentiation approach (Porter, 1980). The second is connected to the motives that drive firms' engagement in sustainability.

The strategic relevance of corporate sustainability might therefore be a function of firm traits. However, there might be other sources of variation in the perception of strategic relevance, which then could drive firms' response to micro-economic crises. We argue that one such source of variation might actually be the specific dimensions of sustainability, which could be perceived by firms as more or less conducive of potential distinction from competitors.

The next section develops hypotheses on how strategic orientation and sustainability-related motives can potentially inform the adaptive response to a macro-economic crisis, i.e. variations in firms' commitment to sustainability, and eventually enhance post-crisis performance along those dimensions of sustainability that are perceived as strategically relevant.

Strategic Orientation

One way to study firms' strategic orientation relies on Porter's (1980) simplified distinction between cost leadership and differentiation logics. Whereas a cost-leadership oriented firm seeks to achieve scale-efficient production processes which allow it to compete on prices, a differentiator instead continuously invests in innovation and marketing capabilities to launch more novel products, which are often customer tailored and generally premium priced.

Within the overarching dominant firm level strategic orientation, firms face, however, the need of a cognitive framing on how they think about sustainability and how they can develop a sustainability strategy. Such a framing of the sustainability challenge is essential for them in responding to the demands of their stakeholder with regard to products, processes, corporate behavior and managerial decision making (e.g. Branzei, Vertinsky and Zietsma, 2000; Crilly, Zollo and Hansen, 2012). Based on an evolutionary logic, several stage models have been produced in the academic (e.g. Reidenbach and Robin, 1991; Stahl and Grigsby, 1997; Dunphy, Griffiths and Benn 2003; van Marrewijk and Were, 2003) and more practitioner oriented (e.g. Zadek, 2004; Hart, 2005; Mirvis and Googins, 2006) literature (for a complete review see, Maon, Lindgren and Swaen, 2010). Such approaches argue that the cognitive

framing of the sustainability challenge evolves over time.¹ Firms at an early stage of sustainability maturity follow a reputation risk logic, focusing their efforts on symbolic actions such as communication and donation (Crilly, Hansen and Zollo, 2012; Fiss and Zajac, 2006). Other firms at a more mature stages moved a step further and tend to frame the sustainability challenge as a potential source of cost efficiencies, aiming to reduce the costs of energy, raw materials, and waste disposal, (Hart, 1995, Russo and Fouts, 1997). Companies at such earlier mature stages that frame its sustainability strategy primarily driven by risk and cost-efficiency concerns tend to base their decisions about sustainability investments primarily on efficiency considerations. At even more mature stages, firms have undergone the risk and cost efficiency logic and took the challenge to reframe their understanding of sustainability in terms of innovating on sustainable products, processes or even business models, creating the potential for differentiation and revenue growth.

The way firms framed the challenges related to tackle sustainability issues is not necessarily identical to the competitive strategy approach at the firm level. In fact, anecdotal evidence from the received (evolutionary) research suggests that the vast majority of multinational firms' approaches to sustainability, no matter if they follow a cost efficient or differentiation strategy at the firm level, are identifiable in stage one (Smith and Lenssen, 2009), with a qualified minority having made the transition to the second stage. An excellent illustrative example of an evolved fit between firm level strategy and sustainability framing is the recent evolution of Nike's approach to managing sustainability related issues by focusing on new product innovation and supply chain management. Locke (2013) describes how Nike's framing of the issue, and the firm's related routines, changed from a logic of monitoring and selection to one of capacity development (active support and training) and institutional engagement with local government agencies and NGOs. This novel approach allowed leveraging significantly stronger support, trust and engagement from suppliers and local institutions, which could not only offer to the company reputational risk protection but, perhaps more importantly, process and product innovation advantages that enhanced at a first place the cost efficiency and later on product differentiation potential along the value chain. This example illustrates that conceptually there is a fundamental difference between the choice of a competitive strategy in Porter's sense and the evolution of the cognitive framing of a sustainability strategy. Whereas in Porter's logic a trade-off exists between cost efficiency and

¹ We are aware of the fact that in some cases entrepreneurial firms are founded precisely based on a strong cognitive framing of sustainability as the core of corporate activities. However, this is beyond the focus of our study as we concentrate on incumbent firms.

differentiation gains, firms in a more mature evolutionary stage of sustainability strategy framing are likely to take both. Relatively seen to early stage companies, they benefit due to the evolutionary process they have undergone in their sustainability framing from both, sustainability related cost reductions and revenue growth gains due to sustainability innovation and differentiation.

What are the implications of these logics for our study of firms' responses to macro-economic crisis conditions? As a first step in answering this question we need to consider the inherent element of a firms' strategic orientation and its cognitive sustainability framing that is connected to inertia. We build on the notion of a *dominant logic*, which is defined as "the way in which managers conceptualize the business and make critical resource allocation decisions – be it in technologies, product development, distribution, advertising, or in human resource management" (Prahalad and Bettis, 1986: 490). A dominant logic manifests itself not only in tangible organizational structures and processes, but also in implicit theories about competition, the ways in which managers think and act, and how these cognitive representations relate to how they frame their strategic and managerial challenges. Understanding a firm's strategic competitive and sustainability approach as a dominant logic highlights the impact of cognitive inertia on its capacity to develop new views of value creation when environmental conditions change radically (Tripsas and Gavetti, 2000). In this sense, a firm's strategic orientation and sustainability framing provides in turbulent periods connected with macro-economic crises a stable behavioral pattern and guides both its standard competitive behavior and its sustainability related choices. Therefore, it is reasonable to assume that a significant external shock like a macro-economic crisis characterized by conditions of resource scarcity would enhance the probability of firms sticking to their dominant way of thinking, related to both, their way to compete and also about their way of thinking about sustainability (even if the latter is subject to evolution). For example, a company with a cost efficient strategy orientation will most probably look for ways to significantly improve on its cost drivers, when it comes to decide on how to deal with scarcer resources in a radically changed environment. If the sustainability framing corresponds to the strategic orientation, i.e. the company perceives sustainability to protect its margins and reputation, it follows that such companies will most likely only invest in sustainability technologies if they are considered to help minimizing major cost drivers, such as reducing its resource inputs and the waste and emissions from its operations. Sustainability investments that do not target cost reductions, but aim (for instance) at enhancing employees' or suppliers' well-being and personal development, or at improving local communities, will most likely be avoided, and they will rather not invest

in novel product design inspired by environmental and social issues that would cater for the preferences of sustainability sensitive customers.

On the other hand, companies that have been successful in employing differentiation strategies to address their markets might after the crisis simply decide to differentiate further. If it happens that this company is also at a more advanced maturity stage with regard to sustainability evolution and framed sustainability terms of innovation and differentiation might see the macro-economic crisis as an opportunity to differentiate its products even further from those of its competitors. Accordingly, its efforts will be more likely to focus on the further development of new products, or even new business models, to tackle environmental or social sustainability issues. If, on the other hand, cognitively sustainability is not perceived as a way to differentiate and raise revenues, concerns about retaining customer willingness to accept high prices for sustainable products after an economic crisis might deter companies from making costly investments in sustainability change initiatives. The crisis condition might lead to favor only marginal product innovations within their standard knowledge domains and adopt more careful price policies.²

Despite this potential constraint, we propose that all other things being equal, a firm competing at a firm level a differentiation strategy orientation will more likely report higher sustainability performance after a macro-economic crisis than a cost-efficient company, for the following reasons. First, as anticipated above, the evolutionary process companies usually undergo in their sustainability framing (e.g. Hart, 1995, 2005; Reidenbach and Robin, 1991; Zadek, 2004) allows them to generate both cost efficiency and differentiation gains due to sustainability investments, compared to companies at lower maturity stages. Second, if a company with a firm level differentiation strategy orientation has achieved an alignment of its firm level strategic dominant logic and its sustainability framing, it might now use the crisis indeed as a “litmus test” and go further in differentiating based on sustainability to achieve a differentiation advantage compared to its competitors. At this stage the firm can rely on and leverage firm-level well established processes, capabilities and mindsets connected to differentiation as such (e.g. Porac and Thomas, 1990), which allow a purposeful selection and implementation of the most promising sustainability related investments, given the challenging crisis conditions. Thus, it is more likely that performance gains from sustainability are relatively higher for differentiators compared to those a cost efficient company will earn from

² For example, Russo and Minto (2011) and Reinhardt (1998) have shown (in an environmental differentiation context) that such customer willingness is a prerequisite to securing such premiums.

such decisions, assuming it is at the same stage of cognitive framing of the sustainability challenge. Third, tackling a novel set of issues – such as those posed by environmental and social sustainability challenges - often associates thinking to prior experience (Gavetti, 2012). This might bring the tenets of a firm’s established strategic orientation unconsciously to bear on how managers make sense of, and respond to, sustainability issues. For this reason, even if the sustainability framing is subject to cognitive inertia, a company successfully competing at the firm level with a differentiation strategy and given its adaptive capacity described above it, is more likely to make the next step in the cognitive evolution towards sustainability and identifies sustainability differentiation as an effective mechanism to survive the crisis. Put differently:

Hypothesis 1: Ceteris paribus, following a macro-economic crisis, firms competing with differentiation strategies will record greater increases in sustainability performance along strategically relevant dimensions than firms competing on cost leadership.

Motivation for sustainability behavior

Why do companies do sustainability in the first place? As noted above, companies differ in their framing of the sustainability challenge, thus having developed different ways of justifying the nature of their relationship towards sustainability, broadly defined. Within this sense making perspective on corporate sustainability evolution (Basu & Palazzo, 2008), motives – an organization’s reason for doing sustainability – represent an important visible part of such (still latent) cognitive frames.

Overall, prior literature on motives has shown that, while the reasons why companies develop social and environmental sustainability agendas are numerous and complex, they can nonetheless be parsimoniously captured by three conceptually distinct motivational archetypes: (1) instrumental motives connected to economic competitiveness, (2) ethical motives or a general sense of socio-ecological responsibility (Aguilera *et al.* 2007; Bansal and Roth, 2000; Brønn and Vidaver-Cohen, 2008; Hahn and Scheermesser, 2006), and (3) reputational motives, connected to the quest for legitimacy in the eyes of stakeholders (Suchman, 1995).

The same literature offers several insights that are important for the purpose of this study. First, while motives tend to be mixed (i.e. the same sustainability program may serve simultaneously as a source of competitiveness, of legitimacy and of alignment with ethical values, albeit to different degrees), one of them will typically tend to predominate (Bansal and Roth, 2000). Second, motives originate through a complex sense making processes which lead

managers to develop mental models and linguistic schema that underlies how they think of, discuss and ultimately understand the nature of their responsibilities toward their stakeholders, the environment and the society at large (Basu and Palazzo, 2008). While this organizationally embedded process is ongoing, over time motives evolve into quasi-stable organizational traits – as do identity orientations (e.g. see Brickson, 2007) or organizational beliefs, norms and values (Trice and Beyer, 1993) - which tend to be enduring and difficult to change. However, although being stable, organizational motives are not completely fixed, but depend on managers' cognitive framings which themselves is evolutionary. Third, while the extent to which motives for sustainability can be taken as predictors of corporate social and environmental performance remains an open question (Margolis and Walsh, 2003, Basu and Palazzo, 2008), there is some evidence that different motives tend to be associated with distinct modes of corporate behavior, and may thus help to demonstrate the extent to which the motives lens could be useful in illustrating why different companies respond differently to similar contingencies. For example, Bansal and Roth (2000) found that companies which subscribe competitive logics (i.e. instrumental motivations) “choose the options that they believed secure the highest returns, independent of their ecological consequences” (p.724). They noted that managers in such companies care mainly about serving shareholder interests, and treat sustainability as a means of achieving that goal: they focus on financial performance and actively that their processes and procedures to enhance their market positions. In contrast, companies who seek legitimacy (a conceptually different motivational force) tend to focus on compliance with societal norms or legal regulations and adopt isomorphic, imitative strategic postures. This stance differs from companies whose motivations are predominantly competitiveness oriented, which tend to focus on making more proactive efforts to innovate against competition (Sharma and Vredenburg, 1998), as well as from those that take predominantly ethical positions, and are more likely to adopt what Bansal and Roth (2000) have referred to as ‘independent strategic postures’, i.e. strategic positions which are by no means imitative but are rather inspired by firms' core values. Similarly, Berman *et al.* (1999) argue that firms with (what they call) intrinsic commitment models have a “normative (moral) commitment to treating stakeholders in a positive way” compared to those with instrumental motivations (which follow what they term a “strategic management model”) where “the nature and extent of managerial concern for a stakeholder group is viewed as determined solely by the perceived ability of such concern to improve firm financial performance” (p. 488). These findings suggest that companies with different predominant motivations are likely to respond differently to similar contingencies in their external environments.

We start our hypotheses development with the case of instrumental motivation. Prior literature has shown that firms motivated by instrumental logics - i.e. by economic principles - base their selection of sustainability initiatives primarily on economic criteria, independent of social and environmental performance. This suggests that such firms are likely to reduce their commitment to sustainability when changes in external conditions make their prior stances unprofitable or otherwise less attractive. If resource-constrained environments reduce customer willingness to pay for environmentally-friendly products (e.g., Reinhardt, 1998), firms with predominantly economic motivations may consider reducing or diverting their sustainability efforts to distinguish themselves along environmental dimensions in favor of more readily profitable sustainability initiatives (e.g. by limiting their efforts to those initiatives with the potential to reduce their waste production or energy consumption). The same logic would also suggest that such firms would enhance their commitment to sustainability if they expect such a shift to generate short-term economic benefits.

However, we argue that this simple argument, albeit insightful, portrays a form of causality – between competitiveness related motivation and corporate responses to a macro economic crisis – which is too simplistic. Building on our prior discussion on strategic orientation we suggest that depending on how firms strive to be competitive, their sustainability responses to a macro-economic recession may differ considerably. As noted above, a strategic posture based on differentiation could generate a response that leverages the opportunity presented by the recession to distinguish its product portfolio along environmental and social lines from competitors (who will retrench to efficiency-driven, or even legitimacy-driven, approaches). The classic example here is General Electric's Ecomagination initiative, or IBM Smarter Planet initiative which are inspiring both organizations towards innovation efforts which take a sustainability approach to create value for customers and their stakeholders.

In contrast to the differentiation approach, a strategic posture based on cost leadership is mainly characterized by a focus on (often short term) efficiency gains, perhaps complemented by a focus on risk mitigation, which represents another form of cost reduction, albeit hypothetical rather than deterministic (Reinhardt, 1998). Independent of the nature of the sources of cost containment, a strategic orientation based on cost leadership will guide firms to select sustainability initiatives that can contribute to achieving their strategic goals of containing costs. Several studies have provided empirical evidence that companies develop social portfolios driven by the desire to improve their economic performances, and that a principal driver of this approach is the potential of initiatives to reduce costs in the short term (Brønn & Vidaver-Cohen, 2008; Campbell, Moore, & Metzger, 2002; Graafland & van de Ven,

2006; Hahn & Scheermesser, 2006; Pelozo, 2006). The strategic importance of initiatives with short term results may be increased by the consequences of a macroeconomic crises. In summary, the above arguments suggest articulating the nature of the relationship between competitiveness related motives and firms sustainability performances during a macro economic crisis in contingent terms, promoting the idea that the direction of response, and, as a consequence, the direction of change in sustainability performances, depends on whether competitiveness motives are coupled with a strategic posture emphasizing cost leadership or differentiation.

Hypothesis 2: Ceteris paribus, following a macro-economic crisis, firms with instrumental motivations towards sustainability and which compete via differentiation strategies will record greater increases in sustainability performance along strategically relevant dimensions than firms with instrumental motivations towards sustainability but which compete on cost leadership.

Contrary to instrumental motives, ethical motives are associated with the belief that a firm has a direct responsibility toward sustainability and its stakeholders. Such ethical or moral motives inspire companies to engage in socially responsible initiatives out of a sense of duty and responsibility toward others, including society as a whole (Bucholz, 1991; L'Etang, 1995). In this case sustainability is not a means to an end, as with instrumental motives, but an end in itself. Managers in such companies develop sustainability agendas because it "is the right thing to do" (Lampe, Ellis and Drummond, 1991), driven by a desire to "make the world a better place" (Graafland and van de Ven, 2006), and select and implement initiatives relying on moral criteria and principles, rather than on instrumental calculations of the practical benefits these activities might generate for the firm (e.g. see Bertoin Antal, 1992; Hahn and Schermesser, 2002; Bansal and Roth, 2002, Steurer *et al.*, 2005). Sustainability criteria are not just part of a company's strategy - they tend to be part of what drives it (Berman *et al.* 1999). Decision-making tends to be based on the organization's values, or those of powerful individuals within it. These arguments suggest that these firms' commitments to sustainability are likely to be only influenced minimally by the extent to which a macroeconomic crisis threatens to alter the profit potential of its initiatives with social and environmental connotations. While a financial crises might eventually enhance the tradeoffs between the need for profitability on the one hand and a genuine commitment to sustainability on the other in such firms, by making profiting from the latter less straightforward, their moral obligations and ethics-inspired values for

sustainability would still guide their decision making and ensure they maintained their adherence to sustainability principles. Strictly speaking, ethically motivated firms should generally strive to maintain their sustainability commitment during macro-economic crises. Which is, we theorize that because ethically motivated firms, differently from other types of firms, have already developed comprehensive sustainability programs, their change in sustainability performance will be less significant than the changes we expect for economically motivated and legitimacy motivated firms. We also suggest that this phenomenon will not only interest the sustainability dimensions that are strategically relevant to the firm. However, as we focus in our paper on strategic decision making, we keep the focus on the strategically relevant dimensions. Such considerations lead to the following proposition:

Hypothesis 3: Ceteris paribus, following a macro-economic crisis, firms that show an ethical motivation towards sustainability will show a greater increase in their sustainability performance along strategically relevant dimensions than other firms.

Turning to the third motivation, legitimacy-oriented companies tend to adopt a more imitative and defensive approach. For these firms, the development of social agendas represents an insurance against social costs, including social sanctions or regulation. Competitive advantage is gained elsewhere, far from sustainability-related concerns. In a nutshell, sustainability strategies are decoupled from firms' strategies (Meyer and Rowan, 1977; Westphal and Zajac, 1994; 2001; Fiss and Zajac, 2006; Yoshikawa, Tsui-Auch and McGuire, 2007; Crilly, Zollo and Hansen, 2012). Decoupling describes the gap between firms' statements or espoused commitments and the actual changes they are willing or able to carry out in their organizational processes and structures to fulfill those commitments (Meyer and Rowan, 1977). Examples of decoupling include commitment to socially desirable policies without implementing the necessary structures and practices (Westphal and Zajac, 2001; Fiss and Zajac, 2006) or seeking legitimacy via symbolic rather than concrete actions (Ravasi and Schultz, 2006; Boiral, 2007; Stevens *et al.*, 2005). Typical explanations for this behavior range from lack of competence or the impossibility of facing multiple conflicting stakeholder demands (Meyer and Rowan, 1977), to managers' deliberate efforts to exploit information asymmetry between a firm and its stakeholders (Westphal and Zajac, 1994).

These arguments suggest that, *ceteris paribus*, legitimacy-oriented firms could be expected to display higher tendencies to withdraw from their current sustainability agendas in the short term in favor of, for example, relying on less expensive symbolic actions (e.g. Berrone

et al. 2013). Likewise, given their limited level of prior commitments, and the marginality of their sustainability agendas to their corporate strategies, dropping them altogether represents a viable alternative that would be less costly than it would be for firms who have invested significant resources in developing – and aligning their strategies to – sustainability agendas. Thus, we suggest the following:

Hypothesis 4: Ceteris paribus, following a macro-economic crisis, firms that show legitimacy motivations towards sustainability will record greater decreases in their sustainability performance along strategically relevant dimensions than other firms.

Empirical analysis

Data

We used three data sources to conduct this study: i) the Bureau Van Dijk database (Orbis and Zephyr) to capture accounting and corporate development data, ii) the Compustat database to obtain financial data and iii) the Thomson Reuters Asset4 database for measures on sustainability performance, strategic orientation and motives. The data used span from 2005 to 2011.

As with other databases that are used frequently in empirical research on corporate sustainability, such as KLD or DJSI (e.g. Bansal and Clelland, 2004; Hillman and Keim, 2001; McWilliams and Siegel, 2000; Waddock and Graves, 1997), Asset4 provides data on the sustainability performances of publicly listed firms, covering more than 3,500 listed firms worldwide since 2002. Its main advantage lies in the depth of its assessments in each of the sustainability domains: it includes more than 900 raw items per firm, obtained from different, publically available sources such as stock exchange filings, annual reports, sustainability reports, and NGO and news agency web-sites. These 900 raw items are then aggregated into 18 macro-variables³ which form the foundations for the estimation of four performance indicators which are used to assess the sustainability performance of a firm. The four indicators include the typical performance dimensions of corporate sustainability (Elkington, 1997; Bansal, 2005) namely *environmental* (three items), *social* (seven items), *economic* (three items) as well as *corporate governance* dimensions (five items).

³ The 18 macro variables are: Emission Reduction, Resource Reduction, Environmental Product Innovation, Customer /Product Responsibility, Society /Community, Society /Human Rights, Workforce /Employment Quality; Workforce /Health & Safety, Workforce /Diversity and Opportunity, Workforce /Training and Development, Integration/Vision and Strategy, Board of Directors/Board Functions, Board of Directors/Board Structure, Profitability/Shareholder Loyalty, Revenue/Client Loyalty, Margins/Performance.

Measures

Our measures can be classified into four groups. The first group includes measures for *sustainability performance*: our estimate was obtained from two performance indicators provided by Asset4 - environmental and social performance indicators. We gathered data for the period 2007-2011 so as to analyze not only more immediate consequences but also the nature of outputs that might be manifested in the longer run.

The 10 macro-items, represented sustainability performance across the two - environmental and social - dimensions as measured in each year from 2007-2011. The environmental sustainability dimension, comprised three categories: ‘emission reduction’, ‘resource reduction’ and ‘product innovation’, and the social sustainability dimension seven categories: ‘product responsibility’, ‘community’, ‘human rights’, ‘employment quality’, ‘health & safety’, ‘diversity and opportunity’ and ‘training & development’. Asset4 constructs a 0-100 score per year for each dimension based on numerous key performance metrics that measure firms’ activities and performances, e.g. use of specific policies, adoption of particular certifications, awards gained, controversies faced, etc. (Appendix 1 provides a detailed description of such key performance metrics and their grouping into higher order indicators.)

The second group of measures reflects the firm’s *strategic orientation*, and includes proxies for differentiation and cost leadership strategies. We captured *differentiation strategies* from Asset4 indicators by averaging relevant items over the 2005/2007 period. More precisely, we used the Economic Client Loyalty (ECL) indicator, which is composed of a total of 46 items and measures a company's management commitment and effectiveness towards generating sustainable and long-term revenue growth and reflects a company's capacity to grow, while maintaining a loyal client base through satisfaction programs and avoiding anti-competitive behaviors and price fixing.⁴ Importantly, this variable goes over and above a ‘standard’ definition of differentiation (typically represented in items such as customer satisfaction, brand value, marketing expenditures, revenue growth etc., Balakrishnan, 2009; Berman *et al.* 1999; Pelham, 1997; Rayport and Sviolka, 1994), but which includes items which can be classified as sustainability differentiation, such as anti-competitive behavior and avoidance of price fixing (Baumgartner and Ebner, 2010; Berman *et al.*, 1999).

To capture *cost leadership strategies*, we preferred to follow an accounting based operationalization. Previous studies have often used accounting indicators or self-reported

⁴ The full description of these variables is available upon request at <http://im.thomsonreuters.com/solutions/content/asset4-esg/> or by requesting to the authors.

assessments of cost efficiency or margins stability to measure cost-efficiency strategies (e.g. Hambrick, 1983). We measured *cost-efficiency* by assessing the inverse of the ratio between the 'cost of goods sold' and the total sales, normalized by industry average. This operationalization provides an indication of the extent to which the firm is willing (and able) to reduce the costs associated to the products/services it delivers against the willingness (and the ability) of other firms operating in the same market (Berman *et al.* 1999).

The third group of measures refers to firm's *motivations* in pursuing sustainability behaviors. Building on the received literature, and consistent with our discussion on the nature of firms' motives for adopting sustainability strategies, we differentiated between i) instrumental motives ii) legitimacy motives and iii) ethical motives.

We measured *instrumental motivation* via a calculation based on Asset4's profitability/shareholders loyalty item. Each firm is assigned a 0-100 score based on 67 sub-items assessing e.g. accounting compliance, auditor independence, liquidity, dealing controversies, accounting controversies, shareholder protections, and profitability.

In order to capture the existence of *legitimacy motivation*, we build on the insight that this motivation is often manifested in symbolic management – i.e., where firms adopt policies and actions for symbolic purposes - as a tactic to respond to social pressure and to improve their legitimacy (e.g., Edelman, 1992; Meyer and Rowan, 1977; Westphal and Zajac, 1994, 2001). We assessed the extent to which firms adopt sustainability policies which are not followed by actions that indicate substantive implementation efforts. Our measure of legitimacy-seeking is thus consistent with findings from corporate sustainability research (e.g. Bansal and Roth, 2000; Weaver, Treviño and Cochran, 1999). Oliver (1991), among others, suggests that appearance of an action not followed by a concrete action (such as the mere adoption of a policy) is often sufficient for a firm to achieve legitimacy. Following this logic, we operationalized *legitimacy motivation* by assessing the behavior of the firm in terms of the extent to which adoption of policies is followed, or not, by substantive actions. We considered three types of specific actions as indications of substantive behavior:

- efforts to monitor the performance of a focal policy,
- efforts aimed at setting specific targets and objectives for that policy and,
- efforts associated with displaying information about its implementation.

The more of these actions are undertaken by a firm following the adoption of the policy, the more substantive his behavior will be and, consequently, the less legitimacy-motivated it will be.

We used Asset4 data to identify the presence or the absence of substantive efforts related to specific policies. The database provides dichotomous (yes-1 or no-0) measures for company sustainability policies along 4 dimensions - ‘policy’ (whether the company has a specific policy); ‘monitoring’ (whether it is monitoring the performances of the policy); ‘implementation’ (whether it provides indications of its effective implementation); and ‘improvements’ (whether it sets specific objectives for the policy in order to assess its improvements). 14 categories of policies are listed (environmental product innovation, emission reduction, resource reduction, client loyalty, shareholder rights, vision and strategy, margins/performance, product responsibility, community, human rights, diversity and opportunity, employment quality, health & safety, and training & development). While we acknowledge that this is a limited set (companies may have policies falling outside these predetermined categories) it nonetheless has the advantage of creating a common ground for comparing companies, as well representing some of the most widely adopted sustainability policies. We used these data to calculate, for each firm i and over each of the j possible policies, a *legitimacy motive* (LM) score as shown below.

$$LM_i = 1 - \sum_{j=1}^{14} \frac{Policy_j + Monitoring_j + Implementation_j + Improvements_j}{98} \quad (1)$$

In Equation 1 the term ‘Policy’ can take dichotomous values (either 0 or 1), depending on whether the firm i has (has not) formally introduced each of the j policies. The terms ‘monitoring’, ‘implementation’ and ‘improvements’ are similarly dichotomous, but were assigned twice (i.e., either 0 or 2) the score that was assigned to the simple presence of a policy. In this way we avoid assigning the same total score for legitimacy to a company with several policies but no indications of substantive actions as to one which had introduced fewer policies, but had followed them up with substantive actions⁵. The second term of the equation 1 is a ratio between the score assigned to companies as a function of their implementation efforts and the maximum score that would be achieved if each policy were followed by efforts to monitor, implement and improve it (i.e., 7 points x 14 categories of policy). Thus the second term equals one when a company’s efforts in these three areas are at a maximum, and asymptotically approaches 14/98 when each policy is not followed by efforts that are substantive in nature.

We captured *ethical motivation* by assessing the extent to which a firm has integrated sustainability related goals and criteria into its vision and strategy (e.g., see Bansal, 2005).

⁵ As an example, the score employed avoids scoring as equivalents instances where a company has 12 policies but no substantive actions (i.e., 12*1=12), and one which has only 3 policies, but all of which are followed up by substantive actions (which would lead to 3*4=12).

While such integration into a firm's strategy is not by itself a guarantee of ethics (in principle, it could do the same for competitiveness related reasons), their integration in a firm's vision signals a form of commitment that goes beyond instrumental reasons, in particular for stock listed firms which are characterized by a dispersed ownership, typically looking for short term results (Aguilera *et al.*, 2007). Following a logic similar to that employed to assess legitimacy seeking, we calculated a score that aggregated Asset4's items related to the Integration/Vision and Strategy (IVS) sub-groups. Asset4, provides dichotomous measures (yes or no) for sustainability integration along five dimensions: 'policy' (whether the firm has a policy aimed at maintaining an overarching vision and strategy that integrates financial and extra-financial aspects into the business); 'commitment' (whether the firm publicly commits to and describes the implementation of an integrated strategy); 'challenges' (if the firm reports challenges or opportunities linked to the integration of financial and extra-financial issues); 'integrated strategy' (whether the firm integrates financial and extra-financial factors in the management discussion and analysis sections of its annual report); and 'stakeholder engagement' (whether the company explains how it engages with its stakeholders). For each of the firms *i* we measured the strength of its ethics motives as the distance between the performance of the firm on the IVS dimension (obtained by simply summing the scores on these five dichotomous items) and the maximum possible score (i.e. five). We calculated an average of over the years 2005, 2006 and 2007 for both strategic orientation and sustainability motives measures.

The last group of measures includes control variables that are relevant in the study's context.

First, we control for *firm size*, using the average of *total assets* (logarithm) across the years 2005, 2006 and 2007 as a proxy (Wan and Yiu, 2009; Bansal and Clelland, 2004).

Second, we include the firm's *external growth activities* as a control. The argument here is that acquisitions, alliances and joint ventures can influence firm's sustainability performance independently from their motives or strategic orientation arguments. We measured *external growth activities* by calculating the numbers of firms' joint ventures and acquisitions since 2000.

Third, we control for the firm's available *resource slack* (Cyert and March, 1963), which offers it funds that can be redirected toward projects with uncertain outcomes (Nelson and Winter, 1982), thus fostering an innovative environment (Bromley, 1991; Greve, 2003). We build on Bourgeois (1981) and calculated resource slack as the ratio between current assets and current liabilities. For the purpose of our study we calculated the average of firms' current ratios over the years 2005, 2006 and 2007.

Fourth, we control for the effect of *path dependency* on the organizational capabilities related to sustainability, measured via the pre-crisis sustainability performance over the years 2005, 2006 and 2007. The degree of the integration of sustainability dimensions in a company's organizational traits depends also on the capabilities and competences related to sustainability practices it has previously developed.

We also controlled for firm's *pre-crisis profitability*. The causal relationship between the firms' profitability and their ability to increase sustainability performances has been widely debated in the literature (Eccles et al, 2013). It has been measured as the average of the firm's Return on assets (ROA) over the years 2005, 2006 and 2007, calculated as the ratio between the firm's net income and its total assets.

For similar reasons we controlled for the difference in firm's profitability across the macro economic crisis, which allowed us to disentangle any spurious negative effects the crisis could have brought on the firm's financial ability to undertake sustainability initiatives. We measured *increase in profitability during crisis* as the difference in Return on Assets (ROA) between 2007 and 2011.

Finally, consistent with previous research (Graves and Waddock, 1994), we included a range of *sector* and *regional* dummies as control variables. We included 11 dummy variables to identify firms' sectors as reported in Asset4 (finance, personal goods and services, transportation, mechanics and engineering, materials, banking and insurances, food, healthcare, retail, ICT, and utilities) and six dummy variables for their regions of origin (Africa, Europe, North America, South America, Australia and Asia).

Two step analysis

We constructed our analysis in two consecutive steps. Step 1 was aimed at identifying those dimensions of sustainability that firms interpret as strategic relevant, and therefore as dimensions where they strategize their commitment. To identify these dimensions, we analyzed the evolution of heterogeneity in performance across our environmental and social sustainability dimensions by looking at the changes in their variance before and after the crisis that started in 2008. The logic of this examination is relatively straightforward. A significant increase in the variance in the sustainability performance of population firms along a particular dimension would indicate that some of them reacted to the crisis by increasing their sustainability investments along that specific dimension and had thus distanced themselves (in terms of performance) from other companies which had not chosen to pursue that strategy in that sustainability dimension. Conversely, a reduction in variance for the same population of

firms in a particular dimension would indicate that the response to that specific sustainability challenge had become increasingly homogeneous, rather than more differentiated. Such lower variance in sustainability performance would mean that fewer firms were pursuing ‘break-away’ strategies, seeking to distinguish themselves by their sustainability efforts and thus gain distinctive advantages, and that the strategic value of those dimensions were perceived, at best, as ‘hygiene’ factors - worth investing in at the same level as competitors (on average) to avoid reputational risks, but with no perceived advantage from doing more. The outcome of the first step is the identification of the difference between those sustainability dimensions that represent *strategically relevant dimensions*, and those which are, instead, perceived as not having the potential to lead to competitive advantage.

Step 2 of the analysis is aimed to investigate the antecedents of firms’ decisions to invest in those dimensions of sustainability identified as strategically relevant in the first step. In this sense, the second step is aimed at testing the hypothesized effects of firms’ strategic orientations and sustainability motives on the increase in strategically relevant dimensions of sustainability, as postulated in the hypothesis presented earlier.

Step 1

We examine the evolution of the variance in sustainability performances (i.e. in the 10 macro-variables representing environmental and social performance) across the global sample of 2,264 listed companies, which includes all firms rated by the Asset4 database over the period 2007-2011. We used 2007 as the baseline year, and test for the change in variance in the sustainability performance indicators previously defined of the sample firms between then and 2011 to determine whether (and why) their performance heterogeneity increases or decrease along a range of environmental, social and governance dimensions following the economic and financial crisis that began in 2008. Since the Kolmogorov-Smirnov test revealed the firms’ sustainability performance scores being significantly not normally distributed, and as being characterized by leptokurtic distributions, we performed Levene’s test for difference in variance across years (Levene, 1960), without normality assumption. To check the robustness of results, we performed the same analysis using the two statistics proposed by Brown and Forsythe (1974) that replace the mean in Levene's formula with the 10% trimmed mean – but obtained similar results to the initial Levene’s test.

Table 1 reports on the statistical test for the significance of the change in sample variance between 2011 and the baseline (pre-crisis) year (2007).

INSERT TABLE 1 ABOUT HERE

The results of this first analysis step can be interpreted as implying that there seems to be no uniform answer to the general question about the variance in environmental and social performance in the sample firm population between 2007 and 2011:

- a significant increase in variance for the variables *environmental product innovation* (+30.24, $p < 0.01$), *human rights* (+112.32, $p < 0.001$) and *product responsibility* (+8.00, $p < 0.01$);
- a significant decrease in variance for the *employment quality* variable (-43.65, $p < 0.01$).
- non-significant changes in variance for *emission reduction*, *resource reduction*, *community*, *diversity and opportunity*, *health and safety*, and *training and development*.

Step 2

Step 2 of the analysis tests the hypotheses proposed above, and investigates the antecedents of firms' decisions to invest in those dimensions of sustainability performance identified as strategically relevant in Step 1, i.e. *environmental product innovation*, *human rights* and *product responsibility*. We measured the variation of these dependent variables as the difference between the scores assigned in 2007 and in 2011, since we wanted to capture the changes in firm performance in these sustainability performance dimensions before and after the crisis. The full model (Model 3) is specified as follows:

$$\begin{aligned} \text{Change in sustainability performance} = & \alpha + \beta_1 * \text{cost strategy} + \beta_2 * \\ & \text{differentiation strategy} + \beta_3 * \text{legitimacy motives} + \beta_3 * \text{ethical motives} + \\ & \beta_4 * \text{economic motives} + \beta_5 * \text{economic motives} * \text{cost strategy} + \beta_6 * \\ & \text{Economic motives} * \text{differentiation strategy} + \text{controls} + \varepsilon \end{aligned}$$

We tested the first hypothesis (H1) through inferences on β_1 and β_2 , H2 was tested through inferences on β_4 , H3 by looking at β_4 , and H4 by looking at β_3 . We performed the estimations using ordinary least square (OLS) with sector and year fixed-effects regression models.

Our statistical software automatically dropped the transportation sector dummy variable because of missing data. Other missing data meant we had to drop 842 firms, so our final sample consists of 1,422 firms: Table 2 shows the distribution across sectors and countries.

INSERT TABLE 2 ABOUT HERE

We tested our hypotheses using ordinary least square (OLS) with sector and geographical area fixed-effects regression models. Potential multicollinearity problems due to the use of interaction terms were addressed by standardizing the continuous independent variables, as suggested by Aiken and West (1991). Table 3 provides descriptive statistics and bivariate Pearson correlations coefficients. Overall, the correlations were moderate as expected. Some bivariate correlations between independent and control variables turned out to be statistically significant, which might indicate problems of multicollinearity. Some authors consider values below .90 acceptable in case of large numbers of observations ($N > 1000$) (Hair *et al.*, 1995), but others claim that no such thresholds can be relied upon (Wooldridge, 2005).

INSERT TABLE 3 ABOUT HERE

We therefore tested for multicollinearity problems by calculating the Variance Inflation Factor (VIF). Factors above 10 are considered as indicating potential multicollinearity problems (Chatterjee, 2000; Hair *et al.*, 1995): in our case, only sector and regional variables came near to this upper bound (VIF above 7), which is common for dummy variables that represent categorical variables with three or more categories (11 sectors and 6 regions). We therefore dropped one sector and one regional dummy variable, which left us with the VIF scores of all our independent variables ranging from 1.55 to 5.56. Altogether, the results of the multicollinearity test remained within the accepted range, indicating only weak multicollinearity issues, if any. We also tested for inverse causality and found no evidence that this was a problem in our study.

INSERT TABLE 4 ABOUT HERE

Table 4 presents the ordinary least squares (OLS) regression models used to test our hypotheses. All models are statistically significant ($p < 0.001$). We present three models (a, b, and c) for each of the three dependent variables (i.e. for *environmental product innovation*, *human rights* and *product responsibility*). Models 1a, 1b and 1c represent the three baseline models which include the control variables only. Models 2a, 2b and 2c add strategic orientation and sustainability motive variables. Models 3a, 3b and 3c include the interaction terms:

economic motives x differentiation strategy and *economic motives x cost strategy*. Sector and regional fixed effects are included in all models, but are not reported for the sake of brevity.

Hypothesis 1 postulates that firms following differentiation strategies should show a higher sustainability performance in dimensions of strategic relevance than those competing via cost-efficiency strategies, and our results partially confirm this argument. First, all direct effect models (2a, 2b and 2c) show consistently positive impacts of *differentiation strategy* on the three performance dimensions, but negative impacts of *cost-efficiency strategy*. However, only the positive effect of *differentiation strategy* on *product responsibility* is statistically significant (model 2c: 2.26, $p=0.02$) and the impact on *environmental product innovation* is only marginally significant (models 2a and 3a respectively). The negative effect of *cost-efficiency strategy* on *product responsibility* (model 2c: -3.14, $p=0.002$) is also statistically significant. This provides partial support for Hypothesis 1.

Hypotheses 3 and 4 deal with direct effects of firms' sustainability motivation on strategically relevant sustainability performance dimensions which are also reported in models 2a, 2b, and 2c. We found partial support for Hypothesis 3, as *ethical motives* were found to be positively and significantly associated with *product responsibility* (2.37, $p=0.065$). Consistent with Hypotheses 4, our results show that *legitimacy motives* negatively influenced two of the three sustainability performance dimensions - *environmental product innovation* (-3.32, $p=0.05$), and *human rights* (-4.37, $p=0.01$) - suggesting that firms motivated by legitimacy seeking reduced their sustainability efforts during the macro-economic crisis, which provides support for Hp4.

Turning to the combined effect of *instrumental (economic) motives* and strategic orientations (Hp2), Models 3a, 3b and 3c provide some interesting results. The interaction term between *instrumental (economic) motives* and *differentiation strategy* only shows a positive and significant coefficient (1.31, $p=0.081$ with regard to *environmental product innovation* (see Figure 1 for a graphical representation), whereas this combined effect remains non-significant for the other two dimensions (*human rights* and *product responsibility*). Meanwhile, the interaction effect between *instrumental (economic) motives* and *cost-efficient strategy* is non-significant for all dependent variables. The results provide moderate support for Hypothesis 2, emphasizing that firms committing to sustainability for instrumental motives and following differentiation strategies may have been able to (at least partially) improve their sustainability performance during the macro-economic crises.

Discussion

The main goal of this study is to offer an initial foray into the study of the theoretical explanations and empirical validations about the relationship(s) between competitive strategy and corporate sustainability.

The most immediate implication of our findings for management scholars is that sustainability should not be viewed as a homogeneous phenomenon, to be framed as having either a negative or positive relationship with long-term economic performance. More generally, the two classic dimensions of sustainability performance (other the economic dimension) – environmental and social - are not sufficient to explain the variance across the population of firms over the years. To study corporate sustainability from a strategic perspective, it seems necessary to move the locus of the analysis to a deeper level of categorizing the phenomenon, by specifying the specific sub-dimensions of the social and environmental sustainability considered.

Another contribution lies in the fact that the theoretical model developed to explain inter-firm variations of firms' sustainability performance on the basis of their competitive strategies, their sustainability motivations, and some of the interactions between the two factors, appears to be generally supported by the analysis of our data. Interestingly, our data shows ethical motives only have a significant impact on sustainability performance in the case of the product responsibility dimension. This is somewhat surprising, since we would have expected ethical motives to have a broader influence that spread across all sustainability dimensions, irrespectively of the companies' strategic choices, and the differences between the strengths of firms' moral motives would be particularly evident in times of macro-economic crisis.

It is also worth observing that, despite the equal ex-ante relevance of the three sustainability dimensions analyzed, the combined influence of motives and strategic orientation differs substantially across them.

An important research agenda for the strategy field might be for scholars to focus their future attention on the interdependencies between the evolution of sustainability-related strategic choices and firms' competitive and growth strategies. This might not only generate potential progress in understanding each of the sub-fields of strategy (competitive, corporate and sustainability strategy decisions), but, perhaps more importantly, start the process of collective development of an integrated model of firms' strategic behaviors. Given the increasing levels of diversity and of specialization in strategy research, this would be a much

needed evolution.

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Table 1 - Statistical significance (Levene's test) of differences in variance of the main sustainability performance dimensions pre- vs. post-financial crisis

Index	N° of items	Δ 2007-2011 <i>N=2264</i>
Environmental sustainability		
Emission reduction	131	9.19
Resource reduction	94	8.30
Product innovation	94	30.24 (**)
Social sustainability		
Customer / product responsibility	113	8.00 (**)
Society / community	124	1.47
Society / human rights	50	112.32 (***)
Workforce / employment quality	75	-43.65 (**)
Workforce / health & safety	61	7.52
Workforce / diversity and opportunity	48	12.43
Workforce / training and development	38	-21.36

*** $p < 0.001$ ** $p < 0.01$ * $p < 0.05$

^a Source: Thomson Reuters Asset4

Table 2 – Sample composition (Region and Sector)

Region	Number of Firms	Sector	Number of Firms
Africa	1	Banking and insurance	2
Asia	366	Finance	66
Australia	45	Food and beverages	90
Europe	519	Healthcare	98
North America	490	ICT	128
South America	1	Materials	202
<i>N = 1422</i>		Mechanics, engineering and constructions	333
		Personal Goods and services	208
		Retail	132
		Transportation	61
		Utilities	102

Table 3 – Descriptive statistics and correlation Matrix

	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D. Var. – Env. product innovation	9.838	25.277	1															
D. Var. - Human rights	10.404	24.842	0.142***	1														
D. Var. - Product responsibility	6.832	27.790	0.143***	0.130***	1													
Differentiation strategy	0	1	0.088	-0.024	0.082	1												
Cost strategy	0	1	0.022	0.014	-0.060**	0.013	1											
Legitimacy motives	0	1	0.177***	0.065**	0.055*	-0.596***	0.003	1										
Economic motives	0	1	-0.010	0.032	-0.077**	0.282***	0.050	-0.307***	1									
Ethical motives	0	1	-0.155***	-0.036	0.032	0.376***	-0.013	-0.765***	0.190***	1								
Path dep. product innovation	50.335	26.705	-0.302***	-0.031	0.001	0.376***	-0.080**	-0.715***	0.085***	0.539***	1							
Path dep. human rights	48.762	26.984	-0.080***	-0.273***	-0.010	0.428***	-0.002	-0.619***	0.201***	0.573***	0.502***	1						
Path dep. product responsibility	50.515	25.637	-0.028	-0.034	-0.305***	0.442***	-0.004	-0.560***	0.166***	0.351***	0.438***	0.405***	1					
Resource slack (current ratio)	1.769	1.371	0.008	0.018	-0.032	-0.117***	0.012	0.182***	0.060*	-0.164***	-0.114***	-0.166***	-0.064**	1				
Profitability (ROA)	7.089	6.610	-0.025	0.037	0.023	0.004	0.177***	0.006	0.278***	0.012	-0.079**	0.020	-0.063	0.079**	1			
External growth (N of deals)	4.755	6.558	-0.013	-0.020	-0.020	0.180***	0.027	-0.252***	0.200***	0.147***	0.142***	0.183***	0.152***	-0.050	0.011	1		
Size (Log Tot Assets)	22.534	1.297	-0.109***	-0.044	-0.048	0.382***	-0.043	-0.569***	0.150***	0.465***	0.458***	0.401***	0.268***	-0.244***	-0.221***	0.246***	1	
Increase in profit during crisis	-2.010	9.361	0.027	-0.012	-0.052	0.038	-0.017	-0.002	-0.058*	-0.019	0.001	-0.012	0.043	0.042	-0.419***	0.021	0.054*	1

*** $p < 0.001$ ** $p < 0.01$ * $p < 0.05$

Table 4 – OLS regressions results

	ENVIRON. PRODUCT INNOVAT.			HUMAN RIGHTS			PRODUCT RESPONSIBILITY		
	<i>Model 1a</i>	<i>Model 2a</i>	<i>Model 3a</i>	<i>Model 1b</i>	<i>Model 2b</i>	<i>Model 3b</i>	<i>Model 1c</i>	<i>Model 2c</i>	<i>Model 3c</i>
Differentiation strategy		1.2919 (0.8426)	1.4261+ (0.8484)		0.6354 (0.8902)	0.6854 (0.8940)		2.2622* (0.9714)	2.3167* (0.9786)
Cost strategy		-0.3948 (1.0425)	-1.2313 (1.3216)		-0.3912 (1.0329)	-1.2770 (1.2773)		-3.1485** (1.0047)	-2.5575+ (1.3723)
Legitimacy motives		-3.3180* (1.5224)	-3.4616* (1.5217)		-4.3695** (1.4419)	-4.4381** (1.4443)		-2.0070 (1.4376)	-2.0094 (1.4386)
Ethical motives		-1.3630 (1.1423)	-1.4310 (1.1460)		1.5449 (1.1166)	1.5292 (1.1175)		2.3698+ (1.2811)	2.3348+ (1.2816)
Economic Motives		2.1237* (0.9607)	1.9861* (0.9691)		1.9912* (0.9368)	1.9307* (0.9386)		0.3546 (0.9919)	0.3205 (1.0010)
Economic mot. X diff strat.			1.3102+ (0.7510)			0.4546 (0.7518)			0.6214 (0.8503)
Economic mot. X cost strat			1.3879 (1.0969)			1.4608 (1.0380)			-0.9572 (1.2698)
External growth (N of M&A)	0.0694 (0.0826)	0.0799 (0.0944)	0.0718 (0.0943)	-0.1152 (0.0834)	-0.1262 (0.0990)	-0.1307 (0.0989)	0.1346 (0.0925)	0.1410 (0.1182)	0.1397 (0.1182)
Profitability (ROA)	-0.0841 (0.0905)	-0.1988+ (0.1165)	-0.2014+ (0.1177)	0.1813+ (0.0931)	0.0976 (0.1137)	0.1022 (0.1136)	-0.0153 (0.1080)	-0.0051 (0.1290)	-0.0149 (0.1294)
Resource slack (C. Ratio)	-0.7382*** (0.2195)	-0.6744 (0.4702)	-0.6995 (0.4784)	-0.2110 (0.2120)	-0.2900 (0.5042)	-0.3103 (0.4936)	-0.3916+ (0.2156)	-0.5490 (0.4719)	-0.5439 (0.4681)
Size (Log Tot Assets)	1.2524* (0.5150)	-0.0889 (0.6814)	-0.1962 (0.6860)	2.9220*** (0.5519)	0.5305 (0.6941)	0.4702 (0.6966)	1.1082* (0.5346)	-1.1452 (0.7419)	-1.1572 (0.7467)
Increase in profitability	0.0394 (0.0607)	0.0448 (0.0753)	0.0397 (0.0750)	-0.0025 (0.0621)	0.0064 (0.0779)	0.0054 (0.0773)	-0.0865 (0.0668)	-0.0672 (0.0760)	-0.0707 (0.0762)
Path depend. (DV in 2007)	-0.3830*** (0.0253)	-0.4633*** (0.0384)	-0.4667*** (0.0383)	-0.3476*** (0.0243)	-0.4601*** (0.0353)	-0.4620*** (0.0354)	-0.3916*** (0.0248)	-0.4686*** (0.0342)	-0.4673*** (0.0342)
Constant	2.9033 (11.6853)	41.6877* (16.5255)	43.9632** (16.6221)	-42.6671*** (12.6456)	21.1159 (16.6075)	22.1969 (16.6609)	1.7249 (12.5984)	57.3766** (18.2142)	57.8281** (18.2945)
Observations	1,422	1,422	1,422	1,422	1,422	1,422	1,422	1,422	1,422
R-squared	0.1390	0.1579	0.1604	0.1111	0.1315	0.1326	0.1509	0.1648	0.1654
Region Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES

*** $p < 0.001$ ** $p < 0.01$ * $p < 0.05$ + $p < 0.1$

Unstandardized beta coefficients, standard errors in parenthesis

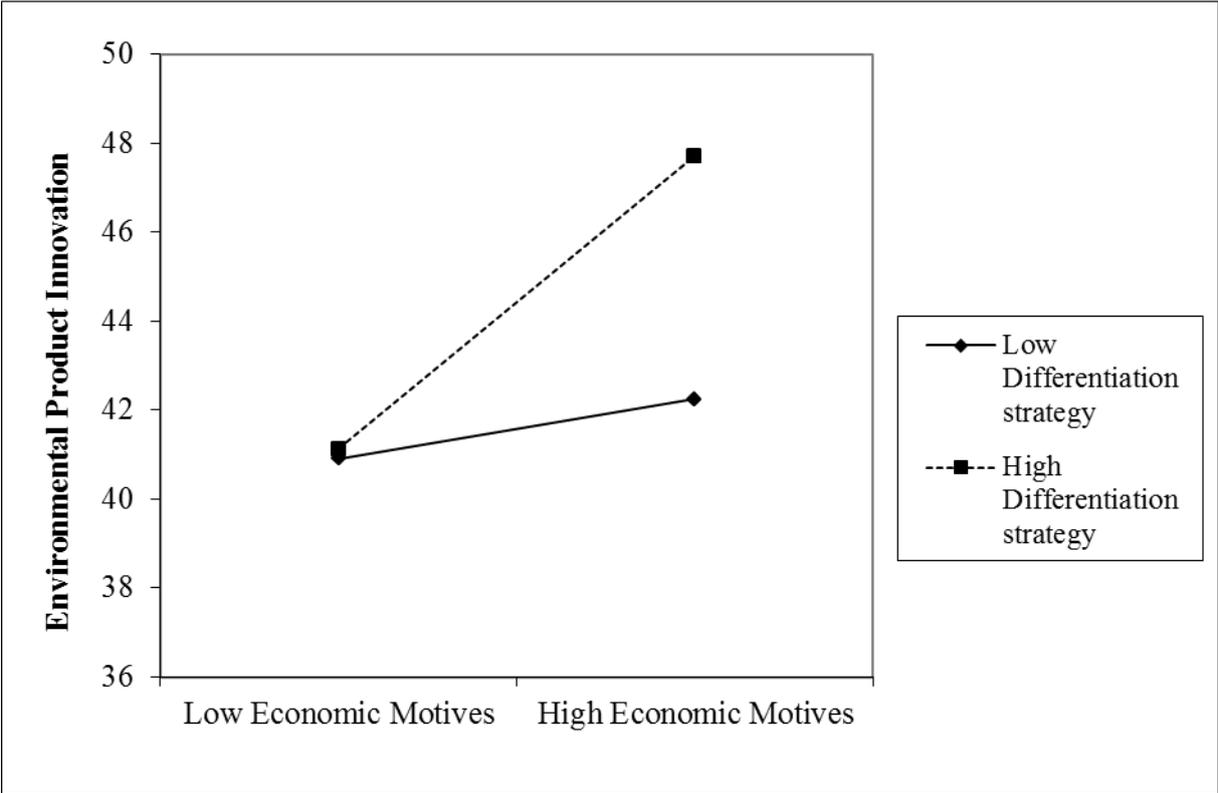


FIGURE 1 - Interaction between Economic Motives and Differentiation Strategy in Environmental product innovation (Model 3a)