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Ioannis Ioannou
George Serafeim

Working Paper 19-065

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Ioannis Ioannou
London Business School

George Serafeim
Harvard Business School

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Abstract: We explore the extent of adoption of sustainability practices over time and the implications for firm performance. We find that for almost all industries, sustainability practices converge within an industry over time, implying that they spread as common practices. We also find that the extent of convergence across industries is associated with the adoption of sustainability by the industry's market leaders and the relative importance of environmental and social issues compared to governance issues. Further, we distinguish between a set of sustainability practices on which companies converge within an industry, which we term "common practices," and a set on which they do not, which we term "strategic." We subsequently explore performance implications and find that the adoption of *strategic* sustainability practices is significantly and positively associated with both return on capital and expectations of future performance as reflected in price to book valuation multiples, whereas the adoption of *common* sustainability practices is reliably correlated only with expectations of future performance. Overall, we provide evidence about the role of sustainability as a long-term corporate strategy *and* as a common practice.

Keywords: *sustainability, corporate social responsibility, strategy, strategic management, convergence/divergence, best practices, performance, sustainability strategy*

* Ioannis Ioannou is an Associate Professor of Strategy and Entrepreneurship at London Business School. George Serafeim is a Professor of Business Administration at Harvard Business School. George Serafeim is grateful for financial support from the Division of Faculty and Research Development at Harvard Business School. Contact details for Ioannis Ioannou: London Business School, Sussex Place, Regent's Park, London, NW1 4SA, United Kingdom, Tel: +44 (0) 20 7000 8748, e-mail: iioannou@london.edu. Contact details for George Serafeim: Harvard Business School, 381 Morgan Hall, Boston, MA, 02163, United States, Tel: +1 (617) 495 6548, e-mail: gserafeim@hbs.edu.

Introduction

In recent years, a growing number of companies around the world voluntarily adopt and implement a broad range of sustainability practices as a response to emerging challenges and stakeholder expectations across the environmental, social and governance (ESG) domains. In doing so, they try to integrate sustainability into their strategy, business models, and organizational processes and structures (Eccles, Ioannou and Serafeim, 2014). In fact, the accelerating rate of adoption of these practices has also provoked an academic as well as a wider debate about the nature of sustainability adoption and its long-term implications for organizations: specifically, is the adoption of sustainability practices a form of strategic differentiation that can lead to superior financial performance or is it a strategic necessity that can ensure corporate survival but not necessarily outperformance?

On one hand, there are those who argue that sustainability is spreading as a "common practice" and as such, it may be a necessary condition for *survival*, but it cannot be a sufficient condition for building a competitive advantage. For example, some companies adopt environmental, or water or waste management systems to exploit cost efficiencies and thus improve their bottom line. Although such systems would typically be considered as adoption of sustainability practices – and would be accounted for in ESG ratings – arguably few, if any, companies would expect to establish a competitive advantage simply by adopting them. Typically, competitors can easily acquire such systems directly from third parties. In this spirit, Porter and Kramer (2011) explicitly note that sustainability, like philanthropy, is "at the margin" of what companies do rather than at the center and therefore, these are not practices through which they can achieve economic success (p.4). More broadly, the literature provides evidence for a link between the extent of imitation and reductions in inter-firm performance heterogeneity (e.g. Barney, 1991; Posen and Martignoni, 2018). Thus, when an imitator copies the focal firm's practices, these practices make the imitator and the focal firm more similar,

and consequently, profitability converges (Posen and Martignoni, 2018) and likely declines. Yet, by adopting common practices (i.e. by being the "same as" peers), a firm can benefit by being recognized as legitimate (DiMaggio and Powell, 1983; Meyer and Rowan, 1977; Pfeffer and Salancik, 1978; Suchman, 1995; Deephouse, 1999).

On the other hand, there are those who argue that sustainability can be a strategy that generates a competitive advantage and therefore, results in above-average performance (i.e. "doing well by doing good"). For example, companies that adopt innovative circular-economy-based business models, or adopt practices that enhance employee recruitment, engagement and retention through a unique corporate purpose (Gartenberg, Prat and Serafeim, 2018) do so to differentiate themselves and therefore, occupy an unexploited or underexploited position through developing a unique and difficult to imitate strategy. This could result in persistently superior performance because a unique and successful strategy can remain unmatched even though it is open to public scrutiny, and it can also be slow to diffuse even if it leads to superior profits (Rivkin, 2000). In this sense, by being different, a firm may benefit because it would face less competition (Barney, 1991; Baum and Mezias, 1992; Deephouse, 1999; Porter, 1991).

This debate, we argue, raises fundamental questions for scholars of organizations in general, and strategy scholars in particular. In fact, the arguments on both sides conceptually relate to Michael Porter's seminal 1996 *"What is Strategy"* article in which he draws a sharp distinction between operational effectiveness and strategy. He argues that strategy "is about being different" and that "the essence of strategy is choosing a unique and valuable position rooted in systems of activities that are much more difficult to match" (p. 64). The debate also relates to an ongoing discussion in the literature that focuses on the tension between the need for a firm to be different, so as to limit competition, and the need to be the same, so as to gain legitimacy (e.g. Deephouse, 1999). Is sustainability then a differentiating strategy or a practice that is bound to spread through imitation and thus, has limited potential to be a basis for a

competitive advantage? To what extent have firms in recent years converged in their adoption of sustainability practices? What are the likely drivers of inter-industry variation in the extent of convergence? And importantly, what are the implications for corporate performance accounting for the industry-level trends in terms of overall convergence of practices?

In this study, we shed light on this debate by focusing on understanding the spread of sustainability practices over time and across industries, as well as the implications for current and future financial performance. More specifically, we argue that developing this understanding is imperative for three main reasons. First, the accelerating rate of adoption, implementation and reporting on sustainability practices highlights that for more and more companies globally, sustainability has already become a central issue for the practice of strategic management. Indicatively, 93% of the largest 250 companies in the world issue a corporate sustainability report and more importantly, 78% of them already include and/or integrate sustainability information in their (audited) annual financial reports (KPMG, 2017) suggesting that financial and ESG considerations are increasingly perceived as the two sides of the same coin. Second, a rich literature in management emphasizes the importance of sustainability for organizations and provides evidence of its impact on financial performance (e.g. Eccles et al., 2014; Flammer, 2015; see also Aguinis and Glavas (2012) for a recent review of the literature). Third, another large body of work finds that sustainability practices significantly impact a company's relationships with its material stakeholders, including its customers (e.g. Bhattacharya and Sen, 2003, 2004; Luo and Bhattacharya, 2006), its employees (e.g. Bode, Singh and Rogan, 2015; Burbano, 2016), and investment analysts and the broader investment community (e.g. Cheng, Ioannou and Serafeim, 2014; Ioannou and Serafeim, 2015).

Our overarching thesis in this paper is that investigating the extent of convergence of sustainability practices over time within an industry is important for understanding whether

such practices can become the foundation of a competitive advantage. To develop our theoretical propositions, we draw extensively on the institutional theory, and we build on prior literature (e.g. Hawn and Ioannou, 2016; Durand, Hawn and Ioannou, 2018) to argue that it may not always be useful to consider sustainability as a monolithic theoretical construct; instead, the extent of convergence can help us distinguish between practices that are increasingly more common over time, and those that are not. This latter set of practices arguably identifies sustainability dimensions along which companies try to implement relatively more differentiated strategies. Hence, we would expect that although common practices are necessary for survival and for acquiring legitimacy, it is the less common sustainability practices that will be associated with strategic differentiation and therefore, superior performance. At the same time, we expect to observe differences across industries in the magnitude of convergence as a function of the industrial organization of sustainability practices. Shedding light on the determinants of inter-industry variation also improves our understanding of why some industries have more developed practices than others in the broader domain of corporate sustainability.

We use data from MSCI ESG Ratings, the largest provider of ESG data in the world, for the period 2012-2017 for all companies that appear in the MSCI consistently across all years – i.e. about 3,802 companies – to ensure that our analysis is not contaminated by changes in sample composition. We find that within most industries, sustainability practices have converged over time. This finding implies that, on average, companies adopted an increasingly similar set of sustainability practices during the sample period, raising the possibility that they are becoming common practices and as such, are less likely to serve as a strategic differentiator and more likely to be a strategic necessity. Moreover, we explore the determinants of inter-industry variation and find that one of the most important factors associated with a higher level of convergence is the (early in our sample period) adoption of sustainability practices by the

industry market leader; relatedly, we find that the overall degree of convergence is affected by the extent to which environmental and/or social issues are more important than governance issues.

The granularity of the MSCI ESG dataset also allows us to distinguish across sustainability practices and to investigate performance implications: in particular, for each industry, we identify the set of sustainability practices upon which companies converge over time – which we term "common practices" – and those for which they do not – which we term "strategic." Our exploratory results confirm that the adoption of strategic sustainability practices is significantly and positively associated with both return on capital and market valuation multiples, even after accounting for the focal firm's past financial performance. In contrast, the adoption of common sustainability practices is not associated with return on capital, but it is positively associated with market valuation multiples. We describe further tests and caveats to our results later in the paper.

Overall, we make three contributions to the extant literature. First, to the best of our knowledge, ours is the first study to empirically explore the convergence of sustainability practices over time within (and across) industries, and the implications for firm performance. We provide evidence that sustainability practices are converging over time. Moreover, strategic sustainability practices are associated with both the efficiency of turning capital into profits (i.e. return on capital measure) as well as expectations of future financial performance as reflected in market valuation multiples (i.e. price to book ratio). In contrast, common sustainability practices are only associated with expectations of future financial performance, in particular expectations of future growth and risk. Second, we contribute to the stream of work that distinguishes between different types of sustainability practices to generate a more nuanced understanding of the impact of sustainability on corporate performance (e.g. Hawn and Ioannou, 2016; Durand, Hawn and Ioannou, 2018). Specifically, we put forward a

distinction between increasingly more common practices and those that are less common and thus, we argue, more unique and strategic in nature. This important distinction further informs the debate about whether and how sustainability practices can help companies establish a competitive advantage. Third, we contribute towards moving the field of corporate sustainability beyond the cross-sectional understanding of sustainability initiatives and their implications for companies, towards understanding the dynamics of their adoption by proposing a categorization of practices and exploring their differential impact on corporate performance.

Convergence of Sustainability Practices within Industries

Imitation is a central theoretical concept in strategic management (Ethiraj and Zhu, 2008). Several streams of literature, anchored in various disciplines, argue that companies tend to imitate the practices of other companies within the same social reference group (for a comprehensive review see Lieberman and Asaba, 2006), including imitation of social responsibility practices (e.g. Briscoe and Safford, 2008). In fact, Liebermand and Asaba (2006) argue that imitation is founded on rationality and is premised on perceptions of effectiveness (Gupta and Misangyi, 2018; Strang and Meyer, 1993). Moreover, the institutional theory focuses on understanding the imitation of practices – termed as "isomorphism" (which often leads to an increasing homogenization across organizations) – as the outcome of a process through which companies seek to acquire legitimacy by conforming to regulative, normative and cultural-cognitive pressures (Meyer and Rowan, 1977; Oliver, 1991, 1997). A company's strategy is considered legitimate if it is acceptable to its organizational field (Aldrich and Fiol, 1994; DiMaggio and Powell, 1983; Scott, 1995; Suchman, 1995) and it is cognitively legitimized if it is aligned with the cognitive consensus or industry recipe (Porac, Thomas and Baden-Fuller, 1989).

Legitimacy challenges hamper companies' ability to acquire resources and therefore, to achieve and maintain legitimacy, companies have to respond to coercive, normative and mimetic pressures (DiMaggio and Powell, 1983). Coercive influence is usually exerted by powerful actors (e.g. through legal or regulatory means and contractual obligations) and when faced with coercive pressures, companies are likely to acquiesce and ceremonially adopt practices in response (e.g. Weber, Davis, and Lounsbury, 2009). In addition, the antecedents of normative pressures comprise of standards of behavior and normative expectations that arise within a focal community. When faced with this type of pressure, companies are likely to respond by substantively adopting practices that are associated with legitimacy (or performance) outcomes but also, they only ceremonially conform to practices that are not directly linked to such outcomes (Weber et al., 2009). Lastly, companies are more likely to mimic the practices of other actors (e.g. competitors, industry peers) when they perceive such practices as enhancing performance (Oliver, 1991), and particularly when confronted with organizational uncertainty (DiMaggio and Powell, 1983).

In the sustainability context, some extant literature finds that suppliers, customers, alliance partners and even the general public, exert institutional pressures on companies to adopt more responsible or sustainable practices (e.g. Husted, Jamali and Saffar, 2016, Durand, Hawn and Ioannou, 2018). As our baseline hypothesis therefore, we posit that all three types of pressures are present in the domain of corporate sustainability[1] and consequently, we expect a high degree of isomorphism; that is, we predict that sustainability practices will converge within industries over time. We also note that industry is the relevant social reference group for sustainability given that (a) companies typically benchmark their sustainability

[1] Relatedly, we note that the adoption of CSR practices has been studied through an institutional theory lens in existing work (e.g. Brammer, Jackson and Matten 2012; Campbell, 2007). In fact, prior studies such as Matten and Moon (2008) have argued for the presence of all three types of pressures in the context of "explicit" CSR practices and for earlier time periods. Building on this tradition, here we suggest that the sustainability pressures that companies are facing in more recent years essentially represent an evolution of the prior pressures within what was termed at the time as the CSR domain.

performance against competitors, (b) accounting standard setters such as the Sustainability Accounting Standards Board (SASB) create industry-specific sustainability standards, (c) investors use "best-in-class" approaches where they seek to understand a firm's sustainability activities relative to the industry common practices, and (d) data providers create industry-adjusted sustainability scores (Khan, Serafeim and Yoon, 2016; Amel-Zadeh and Serafeim, 2018).

Sustainability practices have also been associated with the emergence of a new institutional logic (i.e. a wider stakeholder focus) that is gradually weakening the dominant agency logic in public equity markets (Ioannou and Serafeim, 2015). Given that this shift in logics towards sustainability is significantly influencing analysts' recommendations but also capital markets more broadly (Cheng, Ioannou and Serafeim, 2014), we argue that companies are increasingly facing normative pressures and are seeking to acquire legitimacy – and thus, access to valuable resources such as financial capital – by adopting more sustainability practices. These pressures are also reinforced by the momentum of integrating sustainability data in investment decisions, which has been growing in many countries around the world, in conjunction with the emergence of numerous information intermediaries (e.g. Bloomberg ESG, Sustainalytics, Thomson Reuters ESG among many others) that rate and rank companies based on their ESG performance.

In addition, a number of studies in recent years (e.g. Eccles et al., 2014; Flammer, 2015) provide evidence of a positive link between sustainability practices and financial performance, thus contributing to the emergence and institutionalization of what has been termed as the "business case for sustainability." There is also evidence that, at the very least, sustainability practices can mitigate risk or act as an insurance-like protection for the relationship-based intangible assets of a company (Godfrey, 2005; Ioannou and Serafeim, 2015). In this sense, companies also face mimetic pressures to substantively adopt sustainability practices that are

being implemented by their industry peers because they likely perceive these practices as being performance (or legitimacy) enhancing.

Furthermore, powerful actors in the sustainability space, such as governments, international organizations as well as activist investors, are pushing companies towards the adoption of sustainability practices. For example, the number of environmental and social issues that are the subject of shareholder resolutions in the United States has been increasing significantly (Carroll et al., 2012; Glac, 2010), and these resolutions are increasingly more successful (Mathiasen, Mell, and Gallimore, 2012). At the international level, in 2015, 193 members of the United Nations and global civil society signed a broad intergovernmental agreement that came to be known as the "Sustainable Development Goals (SDGs)" – a collection of 17 global goals for sustainable development set by the United Nations.

Additionally, the Paris agreement of 2015 – an agreement within the United Nations Framework Convention on Climate change dealing with greenhouse-gas-emissions mitigation, adaptation and financing – has been signed by 195 members and 180 have become party to it. Admittedly, only some parts of the agreement are legally binding, but in conjunction with the SDGs, these initiatives generated a powerful message of commitment towards the imminent adoption of socially- and environmentally-oriented laws and regulations by a large number of countries around the world. In fact, some countries and national governments (e.g. South Africa, Malaysia, China, EU, Brazil) have already mandated that (large) companies disclose not only on financial data but also on their sustainability practices. This is important because the state, as ultimate authority, plays a critical role by endorsing or rejecting certain strategies (DiMaggio and Powell, 1983; Dobbin, Sutton, Meyer and Scott, 1993; Edelman, 1992). In sum, firms are also facing coercive pressures to adopt more sustainability practices. Based on all of the above arguments therefore, we formulate the following hypothesis:

Hypothesis 1: Companies will converge on their adoption of sustainability practices within industries over time.

The Industry Determinants of the Extent of Convergence

Adoption of Sustainability Practices by the Market Leader

Although, as argued previously, sustainability practices may converge, a question arises as to whether and to what extent industries may experience differential levels of convergence due to their unique attributes, such as the behavior of the market leaders as well as the relative importance of the underlying environmental and/or social issues compared to governance issues. The evidence to date suggests that companies are more likely to mimic the practices of their industry peers when they perceive them as enhancing performance (Oliver, 1991), and particularly when confronted with organizational uncertainty (DiMaggio and Powell, 1983). Moreover, some studies find that the actions of organizations with high visibility and prestige influence other organizations (Burns and Wholey, 1993) and that the most profitable and largest organizations in any industry serve as models for the rest (Dutton and Freedman, 1985; Burns and Wholey, 1993; Wholey and Burns, 1993; Haunschild and Miner, 1997; Mezias and Lant, 2002).

Building on these arguments, and given that sustainability has typically been perceived as a high uncertainty domain due to its often-contested scope and nature (e.g. Moon, Crane and Matten, 2005), we posit that in industries in which the market leaders are also leading in terms of their adoption of sustainability practices, the extent of convergence will be higher compared to industries in which the market leaders do not do so. This is because companies are more attentive to the practices of market leaders and thus, the adoption of sustainability practices by market leaders will likely enhance the legitimacy of these practices within the industry (i.e. by reducing the uncertainty around their contested nature). Moreover, the sustainability practices may be perceived as performance-enhancing given that they are adopted by the industry's best

performing firms. We therefore expect a higher degree of imitation of market leaders by the other industry players and hence, more extensive convergence, within industries in which the market leaders are also sustainability leaders compared to industries in which this is not the case. We therefore formulate the following hypothesis:

> *Hypothesis 2: The extent of convergence of sustainability practices will be positively associated with the presence of market leading firms that are also sustainability leaders.*

The Type of Sustainability Issues That Are Material for An Industry

In this section we explicitly consider which sustainability issues are most important within each industry. This is because different sustainability issues can be more or less important across industries as a function of the resources and the impact that the focal industry has on society. For example, while climate change is a universal issue, carbon emissions are a key issue for electric utility companies and relatively less so for financial companies. Similarly, data privacy is a key issue for technology companies and less so for firms in the agriculture industry, where issues of water scarcity and efficiency are more critical instead. Organizations such as SASB, have adopted this perspective and designated sustainability issues as "material" using the SEC definition of materiality as interpreted by the U.S. Supreme Court, whereby the standard for materiality reflects "a substantial likelihood that the disclosure of the omitted fact would have been viewed by the reasonable investor as having significantly altered the 'total mix' of information made available." [2] In line with the general concept of materiality, data and rating providers, such as MSCI, apply different weights on environmental, social and governance issues based on their likely materiality for different industries. The literature shows that focusing on material sustainability issues yields more robust results for the relationship

[2] TSC Industries v. Northway, Inc., 426 U.S. 438, 449 (1976). See also Basic, Inc. v. Levinson, 485 U.S. 224 (1988).

between sustainability and financial performance, both in stock market and accounting terms (e.g. Khan, Serafeim and Yoon, 2016).

Accordingly, we expect to find greater convergence in industries where environmental and/or social issues are deemed to be more material than governance issues and therefore, they are assigned greater weight (i.e. higher materiality score) when constructing measures of sustainability practices. This is because throughout most of the 1990s and 2000s, as documented in a long stream of literature on corporate governance, investors, regulators and stock exchanges had already placed pressure on companies to adopt best governance practices (Gompers, Ishii and Metrick 2003; Bebchuck, Cohen and Ferrell 2008) as defined by corporate governance codes (Aguilera and Cuervo-Cazurra 2004). Consequently, we suggest that relative to environmental and social issues, the convergence on governance practices within industries is likely to have already occurred prior to the period of our study.

In contrast, institutional pressures for environmental and social issues and demands for the adoption of environmentally and socially responsible best practices, are a more recent phenomenon (Amel-Zadeh and Serafeim 2018). For example, while investor activism on governance issues through private dialogues and shareholder proposals has been a frequent phenomenon for decades - and a long literature establishes its consequences - investor activism on environmental and social issues is a relatively more recent phenomenon (Dimson, Karakas and Li 2015). Given that institutional dependencies may restrict further convergence on governance issues at the industry level – i.e. because governance is a cultural as well as a legal construct (Aggarwal, Erel, Ferreira, and Matos 2011) – we posit that within an industry, there is relatively more scope for adoption of practices that address material environmental and social issues rather than material governance issues.

It follows that industries face heterogenous pressures for the adoption of sustainability practices, and these pressures are contingent upon the underlying composition of material

issues for the industry. As such, we expect that for industries in which there are relatively more material environmental and social issues than governance issues we will find a greater extent of convergence of sustainability practices over time due to a wider available scope of adoption compared to industries with fewer such issues. We thus formulate the following hypothesis based on these arguments:

> *Hypothesis 3: The extent of convergence of sustainability practices will be higher for industries in which environmental and social issues are relatively more material compared to governance issues.*

Data and Empirical Analysis

Data on firm sustainability practices comes from MSCI ESG Ratings. [3] Given that there is no generally accepted definition of what constitutes a holistic picture of a firm's sustainability practices, we use the MSCI ESG ratings as a proxy for the market's view because they are the most widely used measures by the investment community. Out of the 50 largest asset managers in the world, ranked by assets under management, 46 are clients of MSCI ESG ratings according to MSCI, with the total number of clients reaching more than 1,200 investment firms. MSCI defines the purpose of their ratings as "to help investors to understand ESG risks and opportunities and integrate these factors into their portfolio construction and management process." MSCI's coverage universe is based on major MSCI indices (e.g. MSCI World Index, MSCI Emerging Markets Index, MSCI country specific Investible Market Indices) that include the world's largest and most liquid stocks.

MSCI ESG Ratings are based off 37 "Key Issues". Key Issues correspond to one of ten macro themes that MSCI identifies as being of concern to investors: climate change, natural capital, pollution and waste, environmental opportunities, human capital, product liability,

[3] The full methodology for MSCI ESG ratings can be found at the following link (last accessed Nov 16th, 2018): https://www.msci.com/documents/10199/123a2b2b-1395-4aa2-a121-ea14de6d708a

stakeholder opposition, social opportunities, corporate governance, and corporate behavior. Key Issues are annually selected for each of the 156 GICS Sub-Industries and weighted according to MSCI's materiality mapping framework. Each Key Issue score consists of a risk exposure – a company's exposure to a key issue – and risk management – the company's management of each material issue – component. For a given Key Issue score the required risk management component score is conditional on the risk exposure faced by the company; a company with a greater risk exposure would be required to have stronger risk management practices in place. Conversely, a company with minimal management strategies on a low exposure risk issue would not be penalized. For Key Issues that measure opportunity (e.g. Opportunities in Green Building, Opportunities in Renewable Energy, Opportunities in Nutrition and Health, Access to Health Care), exposure indicates the relevance of this opportunity to a given company based on its current business and geographic segments.

MSCI measures the risk and opportunity exposure of each company by combining company-specific practices with Key Issue relevant macro-level data relating to a companies' geographies of operations and business segments. Company operations data are sourced from corporate reporting, such as annual reports, investor presentations, and financial and regulatory filings, with macro-level data being sourced from a wide variety of academic, government, and NGO databases. In a similar fashion, risk and opportunity management related data come from corporate documents, government data, news media, relevant organizations and professionals, and an assortment of popular, trade, and academic journals. As part of their data verification process, MSCI engages in direct communication with companies and invites companies to participate in a data review process, which includes commenting on the accuracy of company data for all MSCI ESG Research reports. MSCI aggregates the issue data to an overall score (*Susty*) whereby each issue is weighted according to its assessed materiality in each industry. The score ranges from zero to ten with zero (ten) being the worst (best) possible performance.

Because we are interested in the convergence of sustainability practices over time, we restrict our sample to companies that appear in the MSCI dataset across all years.[4] We choose the starting period of our sample to be 2012 for multiple reasons. First, to avoid the convergence metrics being influenced by changes in the composition of our sample, we require firms to appear consistently over the years covered in our dataset. Because data coverage by MSCI increased significantly starting in 2012, extending our sample before 2012 decreases the sample by almost 50% by adding one year (i.e. 2011) and by 75% by adding two years (i.e. 2011 and 2010). Therefore, we view the benefit of adding one- or two-years' worth of data as not justifying the cost of dropping a very large number of firms from the sample. Moreover, the number of companies and investors that disclose and use sustainability data has increased significantly after 2010 while increasing the market valuation of sustainability activities (Serafeim, 2018). The MSCI data coverage within the period increases from close to 4,000 companies to 6,000 companies because MSCI increased the number of countries that it covers, and also, it increasingly added more smaller firms. Therefore, 3,802 firms appear consistently across all years in the MSCI dataset and this is the final sample that we use to calculate the convergence metrics.[5] Although the overwhelming majority of the firms have global operations, in terms of country of domicile, 46% of the sample is domiciled in the US, 8.1% in Japan, 6% in the UK, 3.6% in Australia, and 2.9% in Canada. The rest of the sample is dispersed across many countries.

Descriptive Evidence on Convergence of Sustainability Practices

[4] We use a firm's ISIN as the indicator to track presence over time. If a firm's ISIN changes over time then we are dropping that firm from the sample even though it is covered by MSCI. However, in most cases these are firms that have undergone significant corporate restructuring, such as a merger, and therefore their sustainability practices might be changing because of that restructuring. Therefore, we would want to drop these firms from the sample either way as the change in sustainability practices might be driven by changes in their business operations, industrial membership etc.

[5] A small number of companies change industry classification across years. This is about 1% of the sample. We use the latest industry classification to keep the sample constant within each industry. However, excluding these companies from the sample leaves all the statistics unchanged.

For each industry *j* in year *t* we calculate the coefficient of variation of sustainability practices as: $CV_{jt} = \sigma_{jt} / \mu_{jt}$ where σ_{jt} is the standard deviation of *Susty* across all firms in year *t* and industry *j* and μ_{jt} is the average of *Susty* across all firms in year *t* and industry *j*.

Table 1 presents the average CV, σ and μ across all 65 industries covered by MSCI in each year. The coefficient of variation decreases over time and, by 2017, it declines by a third compared to its 2012 level. This decline occurs in every year with most of the total decline taking place by 2016. Moreover, consistent with our theoretical prediction regarding isomorphism, the decline is driven by a decrease in the standard deviation rather than an increase in the mean. Figure 1 presents the cross-industry statistics for 2012 and 2017 showing that the distribution of sustainability practices has become much more concentrated over the sample period.

Table 2 presents the ratio of the coefficient of variation in 2017 over 2012 in percentage terms (*CV Ratio*). A ratio of a 100 suggests that the coefficient of variation is identical over time. The data shows that the convergence is not isolated to a few industries. Rather, all industries other than two (i.e. integrated oil and gas and automobiles) have a ratio of less than 100. Fifty-three industries have a ratio of less than 80 implying that by the end of the period the coefficient of variation is only 80% of what it was in the beginning of the period. These changes are significant at 1% and consequently, taken together, the evidence in Tables 1 and 2 provide support for hypothesis 1 which argues that over time, and within industries, corporate sustainability practices would converge.

Industry-level Factors Affecting the Extent of Convergence

Table 3 Panel A shows summary statistics and the correlation matrix for all variables used in the models explaining the extent of convergence. Table 3 Panel B presents ordinary least squares (OLS) models where the dependent variable is *CV Ratio* from Table 2 for each industry and therefore, the number of observations is 65. To understand better the relative significance

of the different independent variables, we report the standardized coefficients where each coefficient can be interpreted as the change in the dependent variable for a one standard deviation change in the independent variable. We also describe the effects in terms of the unstandardized coefficients which can be interpreted as percentage declines of the coefficient of variation over time.

Leader is measured as the percentage of large firms in an industry (i.e. top quartile in market capitalization in 2012) that are also sustainability leaders (i.e. top quartile in terms of *Susty* in their industry). The variable ranges from zero to one and it has a mean of 30 percent and a standard deviation of 27 percent (Panel A), suggesting that across industries, on average, 30 percent of large firms are also sustainability leaders. As Table 3 Panel B shows, the coefficient on *Leader* is negative and significant implying that in industries where the market leaders are also sustainability leaders, there is higher convergence of sustainability practices, providing support for hypothesis 2. For industries with a 30% increase in the *Leader* variable the coefficient of variation declines by 5 percentage points. Indicatively, we mention that in our sample, this is equivalent to the difference between the Household and Personal Products industry and the Life and Health Insurance industry.

The *Environmental Materiality* and *Social Materiality* variables are taken directly from MSCI. They represent the weights placed on environmental issues and social issues respectively, for each industry, on an annual basis. These weights vary very little over time within the period of our study and therefore we calculate the average weight across the sample period. *Environmental Materiality* has a mean of 31 percent and a standard deviation of 19 percent and *Social Materiality* has a mean of 41 percent and a standard deviation of 16 percent (Panel A). Both the environmental and social materiality variables load with a negative and significant coefficient. The omitted category is the weight on governance issues. Thereby, the results represent the effect of placing more weight on environmental or social issues relative to

governance issues. This implies that in industries in which most of the sustainability practices are driven by underlying environmental and social issues rather than governance issues, we observe higher levels of convergence. The estimated coefficient on the *Environmental Materiality* is even larger than the one on *Social Materiality* implying that convergence is even stronger in industries where most of the sustainability practices are adopted in the environmental space. Shifting 20 percentage points in the weight of governance towards environmental issues, as one moves across industries, translates into 11 percentage points decline in the coefficient of variation. The equivalent effect towards social issues is 7 percentage points. These results provide support for hypothesis 3.

To ensure that our findings are not driven by changes in the mean estimate of the distribution, we also report results where our dependent variable is the standard deviation (σ_{jt}). The results are very similar. Some of the coefficients on the control variables are also significant. We find stronger convergence in industries where firms are, on average, smaller (*Size*), more profitable (*ROC*) and that trade on lower price to earnings multiples (*PE*). The coefficient on the Herfindahl index does not obtain significance.

Convergence of Sustainability Practices and Financial Performance

Having documented that sustainability practices converge within industries over time, we now turn to the firm-level to explore how these trends in conjunction with the adoption of different sustainability practices over time (i.e. common vs. strategic) by companies may be associated with differential performance outcomes. The literature argues that companies experience pressures to be different or unique to face less competition, but they also face pressures to conform and to be more similar to peers so as to gain legitimacy (e.g. Deephouse, 1999). In the sustainability context, this implies that firms face a tension between the need to adopt practices upon which their industry is converging and the need to adopt practices that are sufficiently different or unique so as to potentially generate a competitive advantage. In this sense,

conformity to common practices could limit legitimacy challenges but also, it may limit opportunities for superior performance.

Effectively, we argue that common practices are the outcome of a process of isomorphism and therefore, they are more likely to be associated with survival rather than outperformance or, similarly, they may be associated with risk mitigation. This argument is consistent with the institutional theory that has mainly focused on organizational survival – rather than financial performance – as the main implication of gaining organizational legitimacy (Meyer and Rowan, 1977). Accordingly, legitimacy has been shown to increase the survival rates for Toronto non-profits (Baum and Oliver, 1991; 1992; Singh, Tucker and House, 1986) while managerial and technical legitimacy was associated with a reduction in the exit rates of US hospitals (Ruef and Scott, 1998). In the same spirit, studies in the organizational ecology literature find that legitimacy (typically measured as the density of firms in an industry) may increase the survival rates across a range of organizational populations, particularly in the early years (Hannan and Carroll, 1992; Deephouse, Bundy, Tost and Suchman, 2017).

However, with very few exceptions (e.g. Lamin and Zaheer, 2012; Bansal and Clelland, 2004), studies that explore the impact of legitimacy on performance are scarcer and have mostly focused on outcomes other than financial performance, such as, for example, the value of initial public offerings (Cohen and Dean, 2005; Pollock and Rindova, 2003). Consequently, given the theoretical foundation of legitimacy as an outcome of a process of isomorphism as well as its link to organizational survival, it is unclear and theoretically ambiguous how the adoption of common sustainability practices and financial performance may be associated. In fact, we expect that the adoption of common sustainability practices will most likely *not* be associated with product market benefits due to customer loyalty and satisfaction (Bhattacharya and Sen, 2003, 2004; Luo and Bhattacharya, 2006), labor market benefits due to employee satisfaction, attraction and engagement (Bode, Singh and Rogan, 2015; Burbano, 2016) or capital market

benefits due to cost of capital effects (Chen et al. 2014). This is because common sustainability practices will likely fail to differentiate the companies that adopt them and therefore, decision makers in these markets (e.g. labor markets, capital markets, etc.) will be unable to confer the corresponding benefits (e.g. customer loyalty, employee engagement, etc.). However, negative performance implications may actually be expected for some companies that fail to converge by adopting these common practices as they will likely stand out as outliers in a negative manner (i.e. perceived as "falling behind") within their own industry.

On the other hand, we maintain somewhat stronger priors that *strategic* sustainability practices will be correlated with performance. This is because, more broadly, a unique strategy based on the *ex-ante* selection of a position that is perceived to be unexploited or underexploited (Porter, 1991) and as such, it is implemented via the adoption of practices that are distinct, will enable a firm to enjoy superior performance due to lower levels of competition or even a local monopoly (Baum and Mezias, 1992; Baum and Singh, 1994; Porter, 1980, 1991). In our setting though, it remains an open empirical question as to whether companies choose their strategic sustainability practices in a way that in fact enables them to occupy a position that is unexploited or underexploited and hence, a position with superior profitability potential. It may well be the case that sustainability practices that are different or unique (relative to the industry) are not necessarily superior. Instead, they may well be inferior strategies and as such, result in negative performance implications. Consequently, in what follows, we adopt an exploratory approach and present an empirical investigation of the significance and the directionality of the association between common and strategic sustainability practices and financial performance. In so doing, as we explain in detail in the next section, we also distinguish between measures that reflect a company's efficiency to currently turn capital into profitability (i.e. return on capital) and investor expectations of future growth and risk, as reflected in price to book valuation multiples.

Performance Implications Results

Table 4 reports results of OLS models where the dependent variable is *Return-on-Capital* (ROC) or the natural logarithm of the *Price-to-Book equity ratio* (PTB) at the end of the sample period. In the case of ROC, we measure it for fiscal year 2017 and in the case of PTB, we measure it for calendar year end 2017. We control for the level of the dependent variable in the beginning of the sample period (i.e. fiscal or calendar year end 2011) to account for a firm's pre-existing financial performance. As expected, the lagged dependent variable is very highly correlated with the dependent variable and explains a large part of the variation; this finding is well documented in the literature on the persistence in accounting profitability and market valuation multiples (Healy et al. 2015). Moreover, we include industry and country fixed effects along with a variable that controls for the size of the firm, measured as the natural logarithm of the firm's market capitalization at calendar year-end of 2017 in US dollars. Our sample comprises of 3,609 unique firms for which we have financial data from WorldScope or Bloomberg across all years needed.

The two variables of interest are the adoption of common and strategic sustainability practices over time by the focal firm. We measure these variables as follows. For each industry-sustainability practice pair we calculate the ratio of Table 2 (i.e. the coefficient of variation in 2017 over the coefficient of variation in 2012). Then we classify a given pair as a *common* sustainability practice if by 2017 the coefficient of variation is equal to or less than 90% of the coefficient of variation in 2012. Therefore, we classify practices as common if they have converged by at least 10% during the sample period, else we classify them as *strategic*. We require 90% instead of 99% to increase our confidence that indeed there is a significant extent of convergence rather than a small random decline. In untabulated analyses, we also increased and reduced the threshold to 80% or 99% respectively and our results remained very similar. We note that a given sustainability practice, for example human capital management, can be

classified as common in one industry and as strategic in another given that the construction of the variable allows for an industry-varying classification of sustainability practices.

We then create indicator variables that take the value of one or zero based on whether sustainability practice *k* for industry *m* is common (C_{km}) or strategic (S_{km}). Within our sample, we observe convergence least frequently on human capital management and most frequently on environmental opportunities. Drilling deeper at the issue level in the MSCI data reveals substantial variation even within themes. For example, we observe very low frequency of convergence on data privacy, water stress, human capital development and product carbon footprint issues. In contrast, we observe high frequency of convergence in green building opportunities, clean tech opportunities, labor related supply chain, and employee health and safety issues.

Finally, we measure the adoption of common sustainability practices for firm *i* as the change in the weighted score of common practices between the beginning *T* and end period *t* of our sample, adjusted for the change in average practices adopted by firms in the same industry *k*:

Common Practice$_i$ =

$$(\sum_m Score_{ikmt}\ x\ Weight_{kmt}\ x\ C_{km} - \sum_m Score_{ikmT}\ x\ Weight_{kmT}\ x\ C_{km})\ -$$

$$(\sum_m AvScore_{kmt}\ x\ Weight_{kmt}\ x\ C_{km} - \sum_m AvScore_{kmT}\ x\ Weight_{kmT}\ x\ C_{km})$$

Equivalently, for strategic practices the variable is calculated as:

Strategy Practice$_i$ =

$$(\sum_m Score_{ikmt}\ x\ Weight_{kmt}\ x\ S_{km} - \sum_m Score_{ikmT}\ x\ Weight_{kmT}\ x\ S_{km})\ -$$

$$(\sum_m AvScore_{kmt}\ x\ Weight_{kmt}\ x\ S_{km} - \sum_m AvScore_{kmT}\ x\ Weight_{kmT}\ x\ S_{km})$$

Both of these variables have a mean that is close to zero. This makes sense because relative to their industry average adoption, some firms will experience an increase and some firms a decrease. Nevertheless, there is significant variation across firms. For *Common*

Practice, the standard deviation is close to 0.78 with the minimum value being -3.95 and the maximum 3.62. For *Strategy Practice*, the standard deviation is close to 0.55 with the minimum value being close to -3 and the maximum 3. Interestingly, there is very little correlation between the two variables. In fact, the correlation is moderately negative at -0.06. This suggests that firms that adopt common practices are not necessarily the same as the ones that adopt strategic practices and vice versa.

Table 4 Panel A shows results where the dependent variable is ROC. The coefficients on both independent variables of interest are positive. However, the coefficient on *Common Practice* is insignificant. In contrast, the coefficient on *Strategy Practice* is statistically significant and the estimated effect is economically significant. A two-point increase in *Strategy Practice* is associated with about 1.1% higher ROC. In comparison, the average ROC in our sample is 8.3%. Model 2 replicates this analysis but includes additional variables. Specifically, we include indicator variables for firms that had been and remained laggards or leaders in terms of adoption of common or strategic practices during the sample period. We do this because two firms that have adopted few sustainability practices might be scoring the same in terms of change in the level of adoption, but they might be at a very different level of adoption. Some firms had been leaders and remained leaders while some firms had been laggards and remained laggards. Both types of firms would have similar scores in our (changes in) practices variables, i.e. small changes close to zero, but their financial performance characteristics could be very different, with leaders outperforming laggards. To preserve the symmetry with our two independent variables of interest, we include these indicator variables both for common as well as strategic sustainability practices. Therefore, *Remain Leader (Laggard) CP* is an indicator variable that takes the value of 1 if a firm was and remained a leader, i.e. above average ESG score within an industry taking into account only the ESG metrics that are classified as common practices for the industry, (laggard, below average ESG

Score within an industry) between 2012 and 2017. Similarly, *Remain Leader (Laggard) SP* is an indicator variable that takes the value of 1 if a firm was and remained a leader, i.e. above average ESG score within an industry taking into account only the ESG metrics that are classified as strategic practices for the industry, (laggard, below average ESG score within an industry).

Apart from increasing the power of our statistical tests (i.e. by differentiating across firms that are likely to be similarly measured by the adoption variables) there are also theoretical arguments that guide us towards differentiating between persistent leaders and persistent laggards. Specifically, we expect that persistent leaders are likely to exhibit superior performance and in fact, this is likely to be the case *both* for strategic *and* for common practices. First, we argue that the fact that these companies had been leaders in terms of strategic (i.e. unique) practices and they remained so implies that their competitors faced a certain difficulty in imitating them. Indeed, Rivkin (2000) finds that a unique and successful strategy may remain unmatched even though it is open to public scrutiny, and can also be slow to diffuse, because of its complexity. In this sense, companies that had been overall leaders in the adoption of sustainability practices and remained leaders by also adopting unique sustainability practices are likely to be associated with the highest levels of performance given that they arguably took advantage of their first mover status to build barriers to imitation (Lieberman and Montgomery, 1988; Reed and DeFillippi, 1990; Rumelt, 1987).

For different reasons, persistent leaders across common practices could also enjoy superior profitability. To the extent that the adoption of such sustainability practices involves initial fixed costs and, over time, increasing marginal productivity as a result of economies of scale, scope, and declining learning costs, first movers, in what subsequently becomes common practice, would likely enjoy cost advantages (e.g. Spence, 1981; Dixit, 1985; Lieberman, 1987; Gilbert and Newbery, 1982; Klepper, 2002; McMillan 1983).

Model 2 shows that the estimated coefficient on *Strategy Practice* increases and becomes even more significant. A two-point increase in *Strategy Practice* is now associated with about 1.2% higher ROC. The estimated coefficient on *Common Practice* also becomes more positive but it is still statistically insignificant. The reason why the estimated relation for *Common Practice* becomes stronger is because this variable is positively associated with the indicator variable for firms that started as laggards and remained laggards (correlation=0.32). The positive association is intuitive given that these are laggards that over time adopted some of those common practices, therefore exhibiting relatively high adoption rate but they still fell behind their industry peers. The indicator variable *Remain Laggard CP* obtains a negative and significant coefficient. Therefore, in models in which this indicator variable is not included, what happens is that the coefficient on the *Common Practice* variable picks up part of the negative effect of being a laggard and remaining a laggard in terms of common practices.

On the other hand, as we would expect, we find no such penalty for being a laggard and remaining a laggard in the case of strategic practices (*Remain Laggard SP*), controlling for the adoption of strategic sustainability practices. Finally, firms that were leaders and remained leaders on common practices tend to have better performance. The increase in significance of the adoption of strategic practices variable can also be partially explained by the fact that it exhibits a positive correlation with the laggard indicators, although in this case the correlation is much smaller (correlation=0.06).

In Panel B, we present results where the dependent variable is PTB to provide a complementary view on the relation between adoption of sustainability practices a and financial performance. While ROC reflects the current profitability of corporate activities relative to capital committed, PTB reflects not only current profitability but also, investor expectations regarding future growth of the business and the required cost of capital based on investor assessments of firm riskiness. This is because PTB increases in the profitability ratio

and the assumed growth rate and it decreases in the required cost of capital (Palepu and Healy 2007). Consistent with the results for ROC, in the first model, we find that *Strategy Practice* is positively and significantly correlated with PTB. A two-point increase in *Strategy Practice* is associated with about 7% higher PTB. This continues to be the case when we control for persistent leaders and laggards classifications in model 2. In addition, the coefficient on *Remain Leader SP* is positive and significant. In models 3 and 4, we control for the current level of ROC (the dependent variable in Panel A) to understand whether the effects on PTB are incremental to the effects of ROC because as we discussed above ROC is a determinant of PTB. We find that these effects persist, suggesting that the association with financial performance is not operating only through current profitability but also through investor expectations about future growth and/or risk. Firms that adopted strategic sustainability practices and that had been and remained leaders in strategic practices trade at significantly higher valuation multiples.

In contrast to the ROC results, we find that the coefficient on *Common Practice* is also positive and significant. Although both the magnitude and the significance of the coefficient are lower compared to the coefficient on *Strategy Practice*, we find this result intriguing. While adoption of common practices is not associated with current profitability it is associated with higher market valuation multiples, implying that perhaps investors view these firms as potentially less risky and/or as having higher growth opportunities. For example, investors might worry that firms failing to comply with emerging industry standards, as reflected in common practices, might be exposed to future exclusions from procurement contracts by customers, higher political and regulatory risk, or consumer boycotts.

Taken together, these results provide support for the argument that the adoption of strategic sustainability practices would be correlated with superior performance; in addition, the findings imply that companies that are ahead of their industry (i.e. leaders) in their adoption

of common and strategic sustainability practices also benefit in terms of financial performance while persistent laggards are more likely to suffer.

Robustness Checks and Caveats

Admittedly, our estimation process does not involve a natural experiment with random assignment. Therefore, our exploratory results provide evidence of association with performance and not necessarily causality. However, we do attempt to control for several variables that could threat the validity of our inferences. The first threat of inference validity could arise if a time-invariant firm characteristic could be correlated with both the sustainability practices adoption variables and financial performance at the end of the sample period. Yet, our models explicitly control for the beginning of sample period financial performance of the same firm, thereby controlling for all these time-invariant firm characteristics that should be influencing the level of a firm's performance at the beginning of the sample period as well.

A second threat to the validity of our findings is a time-varying firm characteristic that operates as a correlated omitted variable. However, it is hard to identify such a variable that would also have to have a differential impact across strategic and common sustainability practices. Since these are defined at the industry-level, and they are outside of the control of any given individual firm, they posit a higher hurdle for correlated omitted variable bias. Effectively, to affect our findings, it should be the case that a time-varying firm characteristic *is* correlated with firm adoption of sustainability practices only in industries where these practices *are not* adopted by other firms. However, this same time-varying firm characteristic should *not* be correlated with firm adoption of sustainability practices in industries where these practices *are* adopted by other firms.

A third possibility is reverse causality. Firms adopt sustainability practices that other firms do not adopt in the same industry because corporate performance improves over time.

However, improvements of performance over time are not correlated with the adoption of sustainability practices that other firms also adopt in the same industry (i.e. common practices). We note this could be valid for the first case, i.e. the adoption of strategic sustainability practices is a 'luxury good', whereas in the second case, it is a competitive necessity and, as a result, less sensitive to a firm's performance. While certainly plausible, we note that this explanation is inconsistent with several aspects of our empirical findings. First, this reverse causality argument does not explain the superior financial performance of firms that have been persistent leaders. These are firms that adopted sustainability practices in the beginning of the sample period and their financial performance at the end of the sample period was superior even after accounting for the beginning of sample period financial performance. In other words, there is a lead-lag structure for this variable that spans six years. Second, we segment our sample to two samples based on their financial constraints. If the luxury good argument is valid then we expect a stronger relation between adoption of strategic sustainability practices and financial performance in the sample of low financial constraints (large firms with low leverage and high cash levels). In untabulated analyses, we find no statistically significant difference in the estimated relation between the two samples.

Discussion and Conclusion

In this article, we focus on the adoption of sustainability practices over time and ask what we believe to be a fundamental question for strategic management today: whether the adoption of these practices by companies globally – a trend that has accelerated in recent years – amounts to a strategy that can generate a competitive advantage, or it merely represents conformity to an industry's common best practices and as such, it is a strategic necessity with implications for survival but not outperformance.

The results presented in this study indicate that within most industries, companies adopted an increasingly similar set of sustainability practices between 2012 and 2017. The

extent of this convergence is contingent upon the adoption of sustainability practices by the industry market leaders as well as the extent to which environmental and social issues are relatively more important than governance issues within industries. In response to the debate presented at the beginning of this study, we find that it is the adoption of *strategic* sustainability practices that is more reliably, consistently and significantly associated with superior performance.

Therefore, with our work, we make three contributions to the existing literature. First, to the best of our knowledge, this is the first study to theoretically and empirically explore the convergence of sustainability practices within industries and over time for a large global sample, while investigating implications for corporate performance. In this sense, we contribute to the broader literature on corporate sustainability by introducing dynamic considerations around the adoption of such practices and in so doing, we provide evidence on how sustainability practices converged within different industries and why the adoption of those practices may be associated with superior financial performance. A related contribution of this paper is that we present a multi-level understanding of this phenomenon since we empirically explore industry-level factors as well as firm-level implications.

Second, we contribute to an emerging stream of research within corporate sustainability that argues for the need to, and the importance of, distinguishing across different types of sustainability practices rather than treating sustainability as a monolithic theoretical construct (e.g. Hawn and Ioannou, 2016; Durand, Hawn and Ioannou, 2018). Thus, in addition to current distinctions in the literature such as symbolic and substantive actions, and implicit versus explicit social responsibility, we propose a new distinction between increasingly more common sustainability practices and those that are less common and thus, more unique and potentially strategic in nature. Drawing from the work distinguishing between material and immaterial sustainability practices (Khan, Serafeim and Yoon 2016), we show that material sustainability

practices can be decomposed to common and strategic practices and that these two categories emerge from different industry dynamics and have differential corporate financial performance implications. This dynamic distinction allows us to shed light on the debate about whether and how sustainability practices can help companies establish a competitive advantage over time.

Finally, with our work, we contribute towards moving the broader field of corporate sustainability beyond the narrow focus on the cross-sectional understanding of sustainability practices and the implications for performance, towards developing a more dynamic, complex and multi-level understanding of the adoption of these practices over time. We hope, through the findings in this paper, to be opening up avenues for future research whereby the dynamics of adoption become a central consideration. For example, future work could explore why some sustainability practices may be more likely to develop into common sustainability practices over time and what is the role of decision making by companies in this process. Moreover, it would be interesting to ask under what conditions originally strategic practices become common over time through imitation or other form of diffusion, and under what conditions other strategic practices persist as strategic. In both of these cases, it would be also important to understand how decisions taken by individual firms affect these dynamic processes, and to also investigate potentially differential impacts on corporate performance.

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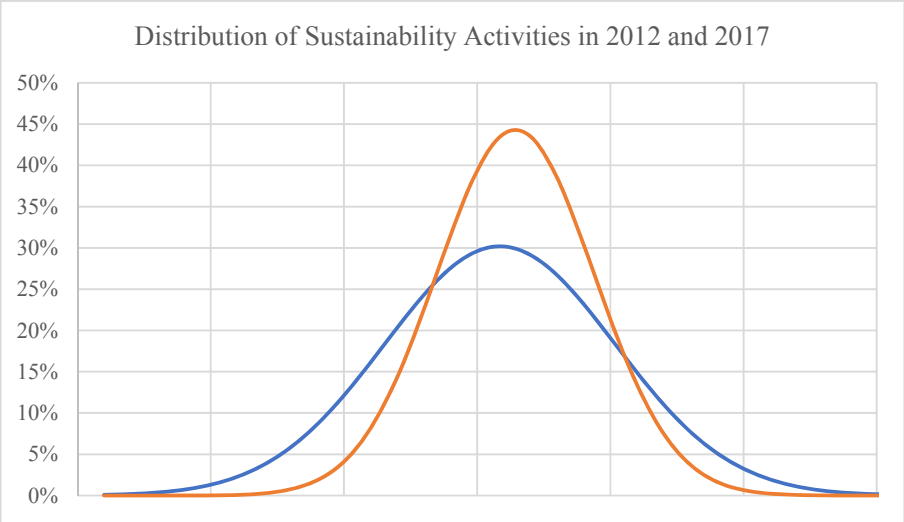
Figure 1



The blue (orange) line represents the estimated distribution of sustainability activities based on the mean and standard deviation of MSCI scores in 2012 (2017). Minimum value in the x axis is zero and maximum is ten. The y-axis represents the percentage of companies that take each score.

Table 1
Industry-level sustainability activity metrics over time

Year	CV	St Dev.	Mean
2012	30.00	1.32	4.53
2013	25.53	1.16	4.65
2014	22.44	1.05	4.76
2015	21.27	0.97	4.63
2016	19.71	0.91	4.67
2017	19.38	0.90	4.71

The table shows statistics for 65 MSCI IVA industries by year. CV is the mean coefficient of variation across all industries. For each industry, the coefficient of variation is calculated as standard deviation of sustainability scores over average sustainability score times 100. St Dev. is the mean of the within-industry standard deviation across all industries. Mean is the mean of the within-industry average sustainability score across all industries.

Table 2
Sustainability activity convergence metric by industry

Industry	CV Ratio
Biotechnology	34.4
Auto Components	35.9
Tobacco	36.3
Household Durables	37.3
Semiconductors & Semiconductor Equipment	39.3
Technology Hardware, Storage & Peripherals	41.1
Airlines	43.3
Containers & Packaging	43.9
Paper & Forest Products	45.1
Building Products	46.1
Commodity Chemicals	48.3
Diversified Chemicals	50.2
Energy Equipment & Services	51.4
Air Freight & Logistics	52.3
Real Estate Development & Diversified Activities	56.1
Electrical Equipment	56.2
Construction & Farm Machinery & Heavy Trucks	56.9
Electronic Equipment, Instruments & Components	56.9
Marine Transport	57.2
Banks	57.4
Utilities	57.6
Asset Management & Custody Banks	58.2
Trading Companies & Distributors	59.0
Oil & Gas Exploration & Production	59.7
Specialty Chemicals	60.7
Casinos & Gaming	61.4
Hotels & Travel	62.2
Leisure Products	62.4
Textiles, Apparel & Luxury Goods	63.0
Software & Services	66.0
Metals and Mining - Precious Metals	66.7
Road & Rail Transport	67.1
Food Products	68.0
Restaurants	68.2
Health Care Providers & Services	69.3
Construction & Engineering	69.5
Property & Casualty Insurance	69.7
Diversified Financials	70.6
Household & Personal Products	71.2
Real Estate Management & Services	71.5
Beverages	72.8
Metals and Mining - Non-Precious Metals	73.5
Aerospace & Defense	73.8
Transportation Infrastructure	74.3
Steel	75.4

Life & Health Insurance	77.0
Consumer Finance	77.2
Multi-Line Insurance & Brokerage	77.4
Professional Services	77.6
Investment Banking & Brokerage	77.7
Retail - Consumer Discretionary	77.7
Industrial Conglomerates	78.5
Oil & Gas Refining, Marketing, Transportation & Storage	79.5
Media	80.4
Integrated Telecommunication Services	80.5
Construction Materials	84.0
Retail - Food & Staples	84.7
Health Care Equipment & Supplies	86.4
Industrial Machinery	88.8
Pharmaceuticals	89.2
Wireless Telecommunication Services	89.6
Commercial Services & Supplies	93.3
Broadcasting, Cable & Satellite	99.7
Integrated Oil & Gas	101.0
Automobiles	137.4

The table shows statistics for 65 MSCI IVA industries. For each industry, CV Ratio is the ratio of the coefficient of variation of sustainability scores in 2017 over the coefficient of variation in 2012 times 100.

Table 3
Panel A: Summary Statistics for Industry-Level Metrics

	Variable	Mean	St. Dev.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1)	CV Ratio	67.00	18.29	1.00							
(2)	St. Dev. Ratio	69.41	15.67	0.86	1.00						
(3)	Environmental Materiality	30.88	18.55	-0.23	-0.16	1.00					
(4)	Social Materiality	40.62	15.48	0.07	0.03	-0.82	1.00				
(5)	Leader	0.30	0.27	-0.25	-0.30	0.15	-0.08	1.00			
(6)	Size	21.97	0.81	0.23	0.16	0.21	-0.10	0.06	1.00		
(7)	ROC	8.41	3.64	-0.05	0.11	-0.16	0.31	-0.02	0.09	1.00	
(8)	PE	17.30	5.06	0.15	0.21	-0.03	0.05	0.08	-0.06	0.50	1.00
(9)	Herfindahl Index	0.01	0.01	-0.09	-0.09	-0.02	0.06	0.00	0.02	0.07	-0.20

Panel B: Models explaining industry level convergence of sustainability activities

Dependent Variable	CV Ratio		St. Dev. Ratio	
Parameter	Estimate	t-stat	Estimate	t-stat
Leader	-0.25	-2.76	-0.30	-3.04
Environmental Materiality	-0.55	-3.15	-0.43	-2.32
Social Materiality	-0.30	-1.70	-0.32	-1.79
Size	0.37	2.60	0.26	2.32
ROC	-0.24	-2.38	-0.02	-0.22
PE	0.31	2.98	0.26	2.40
Herfindahl Index	-0.01	-0.10	-0.03	-0.26
Intercept	0.00	0.00	0.00	0.00
Adjusted R-squared	22.7%		15.7%	
N	65		65	

Panel A presents summary statistics. Panel B presents OLS regressions with heteroscedasticity consistent standard errors where the unit of observation is the MSCI IVA industry and the estimated coefficients represent the change in the dependent variable for one standard deviation change in the independent variable. CV Ratio is the ratio of the coefficient of variation in 2017 over the coefficient of variation in 2012 times 100. St. Dev. Ratio is the ratio of the standard deviation of sustainability scores in 2017 over the standard deviation in 2012 times 100. Environmental Materiality is the average weight that MSCI places on environmental issues, relative to social and governance issues, across all sample years. Social Materiality is the average weight that MSCI places on social issues, relative to environment and governance issues, across all sample years. *Leader* is the percentage of large firms in an industry (i.e. top quartile in market capitalization in 2012) that are also sustainability leaders (i.e. top quartile in terms of MSCI sustainability scores) in the beginning of our sample. Size is the average natural logarithm of the market capitalization of all sample firms in an industry. ROC is the average Return on Capital of all sample firms in an industry. PE is the average Price to Earnings Ratio of all sample firms in an industry. Herfindahl index is the sum of the squares of the market shares of the firms within the industry where the market shares are expressed as fractions of all sample firms in an industry.

Table 4

Panel A: Relation between Sustainability Practices Adoption and Return on Capital

Dependent Variable	ROC			
	Model 1		**Model 2**	
	Estimate	t-stat	Estimate	t-stat
Common Practices	0.100	0.41	0.320	1.23
Strategy Practices	0.556	1.85	0.607	2.02
Remain Leader CP			0.722	1.69
Remain Laggard CP			-0.802	-1.72
Remain Leader SP			0.391	0.89
Remain Laggard SP			0.534	1.23
Intercept	7.050	1.29	6.930	1.27
Firm size	0.346	3.06	0.300	2.50
Lag ROC	0.405	12.02	0.405	12.07
Industry fixed effects	Yes		Yes	
Country fixed effects	Yes		Yes	
Adjusted R-squared	28.7%		28.9%	
N	3,467		3,467	

Panel B: Relation between Sustainability Practices Adoption and Market Valuation Multiples

Dependent Variable	PTB							
	Model 1		**Model 2**		**Model 3**		**Model 4**	
Variable	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat
Common Practices	0.018	2.34	0.028	3.35	0.017	2.27	0.024	3.07
Strategy Practices	0.035	3.18	0.039	3.45	0.031	3.11	0.033	3.35
Remain Leader CP			0.021	1.33			0.016	1.07
Remain Laggard CP			-0.024	-1.43			-0.013	-0.84
Remain Leader SP			0.038	2.38			0.037	2.43
Remain Laggard SP			-0.025	-1.50			-0.025	-1.71
ROC					0.012	13.13	0.012	13.06
Intercept	-0.712	-4.13	-0.680	-3.80	-0.738	-3.63	-0.709	-3.37
Firm size	0.027	5.39	0.022	4.30	0.021	4.33	0.017	3.44
Lag PTB	0.577	19.23	0.579	19.54	0.513	17.59	0.516	17.86
Industry fixed effects	Yes		Yes		Yes		Yes	
Country fixed effects	Yes		Yes		Yes		Yes	
Adjusted R-squared	60.1%		60.3%		65.5%		65.7%	
N	3,477		3,477		3,432		3,432	

The table shows estimates from OLS regressions with heteroscedasticity consistent standard errors. The unit of observation is a firm and the models include industry and country fixed effects. The dependent variable is the Return on Capital (ROC) or the natural logarithm of the equity price to book ratio (PTB) at the end of the sample period. Firm size is the natural logarithm of market capitalization at calendar year end 2017. Lag Dependent Variable is ROC or PTB at fiscal year end 2012 or calendar year end 2012 respectively. Common Practices is a variable that measures the over time adoption of sustainability practices that are classified as common within an industry and the precise calculation is provided in the text. Strategy Practices is a variable that measures the over-time adoption of sustainability practices that are classified as strategic within an industry and the precise calculation is provided in the text. Remain Leader (Laggard) CP is an indicator variable if a firm was and remained a leader, above average sustainability score within an industry, (laggard, below average sustainability score within an industry) in common sustainability practices between 2012 and 2017. Remain Leader (Laggard) SP is an indicator variable if a firm was and remained a leader, above average sustainability score within an industry, (laggard, below average sustainability score within an industry) in strategic sustainability practices between 2012 and 2017.