

5-2018

Beyond Numbers: How investment managers accommodate societal issues in financial decisions

Diane-Laure Arjaliès
Ivey Business School, darjalies@ivey.ca

Pratima Bansal
Ivey Business School

Follow this and additional works at: <https://ir.lib.uwo.ca/iveypub>

 Part of the [Finance and Financial Management Commons](#)

Citation of this paper:

Arjaliès, Diane-Laure and Bansal, Pratima, "Beyond Numbers: How investment managers accommodate societal issues in financial decisions" (2018). *Business Publications*. 8.
<https://ir.lib.uwo.ca/iveypub/8>

Beyond numbers:

How investment managers accommodate societal issues in financial decisions

Diane-Laure Arjaliès

Ivey Business School, Western University (Canada)

Pratima (Tima) Bansal

Ivey Business School, Western University (Canada)

8 February 2018

Referred as: Arjaliès D-L., Bansal T. (2018), Beyond Numbers: How Investment Managers Accommodate Societal Issues in Financial Decisions, *Organization Studies*, 39, 695-725.

Abstract

Investment managers use financial numbers to assess the quality of their portfolios, which requires them to estimate the market value of their assets—i.e., the priced trading of such assets. Prior research has shown that investment managers tend to disregard information that does not easily integrate into financial numbers, such as environmental, social and governance (ESG) criteria. We argue that when investment managers use visuals to incarnate ESG criteria, they are more likely to accommodate societal issues in their financial decisions. We undertook a three-year ethnography of an asset management company to better understand how investment managers respond to ESG criteria. We found that *fixed-income* investment managers attempted to include ESG criteria in their financial models by financializing the data, so that ESG-related information could be commensurated with their existing models. *Equity* investment managers, on the other hand, did not financialize ESG issues, but introduced the use of visuals, specifically emojis, to incarnate ESG issues. In this way, ESG criteria were juxtaposed with, rather than integrated into, financial criteria. In doing so, equity managers created a sense of dissonance between financial numbers and the visuals, which fostered creative friction. The visuals permitted equity managers to analyze the ESG criteria not only for their financial insights, but also for

the social and environmental information that could not be financialized. We discuss the implications of these findings for prior research on financialization and calculative devices.

Keywords

calculative devices, dissonance, equity, financialization, fixed-income, socially responsible investment (SRI), visuals

Acknowledgments

We would like to thank the three anonymous reviewers and the editors of the special issue, Eva Boxenbaum, Candaces Jones, Renate Meyer and Silviya Svejnova, for their exceptional guidance throughout the revision process. We also thank Mélodie Cartel, Roger Friedland, Delphine Gibassier, Donald MacKenzie, Afshin Mehrpouya and the members of the Sustainability Group and the Accounting and Managerial Group at the Ivey Business School for their valuable insights on earlier versions of this article. The first author is particularly grateful for all the comments and suggestions she has received since this project first arose as her doctoral work. Research is a journey that grows out of the inestimable support of colleagues and friends.

Beyond numbers:

How investment managers accommodate societal issues in financial decisions

The financial services industry has profoundly transformed capitalism since the 1970s. By December 2013, investment management firms managed US\$97 trillion assets globally—the equivalent of the global annual gross domestic product (GDP) (Lund et al., 2013; TheCityUK, 2014). Financial motives and markets now shape the day-to-day operation of economies and societies (Arjaliès, Grant, Hardie, MacKenzie, & Svetlova, 2017; Epstein, 2005; Krippner, 2005). This growth in the importance of the financial sector, known as *financialization*, is the process of evaluating objects, practices and individuals based on their market value. Financialization implies that almost any thing can be assigned a monetary equivalent for its tradeable value in a market. These values are often expressed as financial numbers and ratios, such as net present value and price-to-book ratio. Not only does such reasoning transform the non-financial into the financial (Chiapello, 2017), such calculative processes also discard information that is incommensurable with numbers, such as information embodied in human values and emotions. Through this process of financialization, it is possible to argue that the financial sector has been fashioning society (Davis, 2010; Davis & Kim, 2015).

Some researchers have argued that society has also been fashioning the financial sector by accommodating an ever-widening range of information, including environmental, social and governance (ESG) criteria, which capture societal issues, such as pollution, labour policies and directors' independence (e.g. Sullivan, Martindale, Feller, & Bordon, 2015). Most prior research in this area shows that these ESG criteria are simply quantified, in order to introduce societal issues efficiently into existing financial analysis (Crane, Graham, & Himick, 2015; Eccles, Krzus, Rogers, & Serafeim, 2012).

However, this view presents almost a caricature of investment managers as *homo economicus* who efficiently and automatically calculate firm value based on financial numbers; yet, there is ample evidence to show that many investment managers use personal judgments and intuition (de Larminat, 2013; Godechot, 2001; Ortiz, 2014). If so, then it is quite possible that the range of reactions of

investment managers to ESG criteria has not been fully uncovered. Therefore, we were interested in understanding *how investment managers accommodate ESG criteria in their investment decisions*. To shed light on this question, we conducted a three-year ethnographic study of a French asset management company, investigating the decisions made by investment managers in selecting fixed-income and equities portfolios. We collected insights from participant observations, interviews and corporate documents.

We found that the behavior of *fixed-income managers* was consistent with prior literature: fixed income managers relied heavily on financial numbers, so that ESG criteria became a constraint, which was ultimately abandoned. In stark contrast, *equity managers* did not fashion ESG criteria into financial numbers, but found ways to sustain the different type of information embodied in ESG criteria by representing societal issues through visuals, such as emojis. Consequently, ESG criteria were not commensurated with financial numbers and created a “sense of dissonance” (Stark, 2011) between the financial and societal aspects of the decision. Equity managers were able to generate a fruitful friction between the two different types of calculative devices (numbers and visuals) and thereby sustain the richness inherent in ESG criteria.

These empirical insights permit us to theorize the mechanisms through which the form of expression (e.g., financial numbers versus emojis) can stimulate a sense of dissonance to help address ESG issues that may otherwise disappear when commensurated with financial numbers. We elaborate on the experiences of fixed-income managers and equity managers to describe the methods by which non-financial, societal issues can enter the financial sphere while maintaining their qualitative differences. Our insights offer important implications for research on financialization and calculative devices.

Literature Review

Financial numbers as calculative devices

Financial numbers are a form of calculative device, which we define as the artifacts and physical objects that help actors establish “distinctions between things or states of the world, and by imagining and

estimating courses of action associated with those things or with those states as well as their consequences” (Callon & Muniesa, 2005, p. 1231). These devices include not only financial numbers, but also visuals, graphs, texts, colors and processes. Such calculative devices matter in organizations and organizing because they mediate between the social and the material, and are often seen as socio-material arrangements or simply sociomateriality (Beunza, Hardie, & MacKenzie, 2006; Callon, 1998; MacKenzie, 2009), as they reflect what is deemed valuable in a specific context (Barman, 2015; Gond & Nyberg, 2017). They help market actors make decisions.

The primary calculative devices used in the financial services industry are financial numbers—prices, ratios, probabilities and formulas. Financial numbers do not need to be expressed in monetary terms (e.g., as measures of risk and volatility), but they must help organizations assess the worth of their assets based on their market value. For this reason, financial numbers tend to rely heavily on financial economics and mathematical finance.

Financialization has permeated all types of organizations, making financial numbers the dominant calculative device of contemporary societies (Chiapello, 2017; Davis, 2010). There are several reasons for this hegemony (Alvehus & Spicer, 2012; Chiapello, 2014). First, financial numbers are particularly effective in aligning diverse viewpoints (Vollmer, Mennicken, & Preda, 2009). They provide market actors with common criteria across disciplinary boundaries. Second, neoclassical economics—on which much management theory builds—assumes that prices are the best means of coordinating supply and demand. Third, financial numbers facilitate the commensuration process, which transforms diverse qualities into a common set of specific metrics (Espeland & Stevens, 1998). Commensuration standardizes decision processes, thereby securing control and building efficiencies that save time and help organizations scale up.

Last, financial numbers are attractive because they convey authority and imbue confidence, thanks to their perceived scientific basis (Porter, 1996; Power, 2004). Whitley (1986, p. 175) argues that the use of large computers and databases in the 1950s and 1960s made quantitative capital markets research more “scientific” and “rigorous” than “old” business finance. Chua (1996, p. 140) further explains that market actors preferred financial numbers because they expressed “neutrality”,

“objectivity” and “independence.” In sharp contrast, she argues that non-quantitative calculative devices were dismissed as “subjective”, “mere opinion” or “metaphysical speculation.” The absence of substitutes to financial numbers has transformed the latter into a kind of “fatal remedy” (Power, 2004, p. 767), so that actors focus on the measures rather than the problem being solved.

Visuals as calculative devices

Visuals are also a form of calculative device and can include graphs, pictures, drawings, schemas, color codes and images.¹ Previous research has notably shown that visuals are appropriate devices to convey emotions and ideals (Qu & Cooper, 2011), and visuals appeal to specific forms of reasoning (Meyer, Höllerer, Jancsary, & Van Leeuwen, 2013). For these reasons, corporate social responsibility reports include images to better communicate organizational ideology and values (Höllerer, Jancsary, Meyer, & Vettori, 2013; Preston, Wright, & Young, 1996). Likewise, social activists and non-governmental organizations (NGOs) often employ provocative visuals to evoke public reactions (Meyer et al., 2013). Visuals are persuasive, by representing abstract ideas in concrete and clear forms (Pollock & D’Adderio, 2012). Most prior research on visuals tends to compare visuals with text, but little work has investigated the relationship between numbers and visuals.

Visuals are particularly useful in addressing inconsistencies in organizational life. For example, the physical attributes of visuals permit different viewpoints or objectives to be assembled in the same figure, such as a little girl standing in front of a nuclear plant (Höllerer et al., 2013; Kaplan, 2011). Unlike the case of financial numbers, activities cannot be commensurated into a single number in the case of visuals. Instead visuals connect different entities and sustain their differences (Busco & Quattrone, 2015; Justesen & Mouritsen, 2009). Individuals are encouraged to fill the “blank” spaces of visuals with their own thoughts and connect them to their own practical experiences (e.g., through a Balanced Scorecard). Similarly, colors can evoke emotions and signal associations in ways that numbers

¹ Although graphs are a form of visuals, for the purposes of this paper, we treat them as financial numbers, as, in the context of investment management, they often derive from financial numbers (i.e., graphical representations of financial and mathematical equations).

cannot. Thanks to their multivocality and flexibility, visuals channel the creation of knowledge by acting as “rhetorical machines” (Busco & Quattrone, 2017).

Little research has been undertaken on the role of visuals in the financialization process, likely because of the financial sector’s heavy reliance on financial numbers as calculative devices. In practice, however, investment managers have been shown to inform their investment decisions by mobilizing alternative forms of knowledge, including intuition, personal judgments, emotions and even scents (Arjaliès et al., 2017). In a context similar to investment managers, Cabantous and Dupont-Courtade (2015) show that catastrophe risk analysts—who evaluate the exposure of insurance companies to catastrophic risks (e.g., hurricanes and earthquakes)—do not rely blindly on catastrophe modelling. Instead, the risk analysts form their own judgments of the extent and nature of the risks under study. This interplay between “literary” (personal judgment) work and “computational” (financial numbers) work—referred to as “qualculative practices” (Cochoy, 2008; Cochoy & Dubuisson-Quellier, 2013)—is central to the finance industry (Taffler, Spence, & Eshraghi, 2017), yet has received little scholarly attention.

The financialization of environmental, social and governance criteria

Businesses are expected to help solve societal problems (Ferraro, Etzion, & Gehman, 2015; Scherer & Palazzo, 2011), and they can do so by assessing their environmental, social and governance (ESG) performance (e.g., Dubuisson-Quellier, 2013; Gond & Nyberg, 2017). As in the rest of the economy, the “ideology of numbers” (Chelli & Gendron, 2013) has dominated the construction of ESG criteria (Giamporcaro & Gond, 2016), which are often reflected by financial numbers. For instance, carbon emissions are priced according to their market value, and safety incidents are priced by time lost through injuries. Cooper et al. (2016) demonstrate how the network of social institutions and agents that protect homeless people in London (UK) calculate the “average net present value” of each individual cohort member entering the social system. This type of calculation is driven by those who advocate for the integration of ESG issues into business, in their quest to provide market actors with standardized, quantitative metrics that can render such impacts calculable, financially valuable and achievable (Barman, 2015; Déjean, Gond, & Leca, 2004; Etzion & Ferraro, 2010).

The process of converting ESG issues into financial numbers is a reflection of financialization, which is the “gradual colonisation by specific ‘financialized’ techniques and calculation methods” of spaces that were previously outside the financial sphere (Chiapello, 2014). Some researchers praise the use of financial measures through ESG criteria to account for the financial impact of ESG issues on business, whether positive or negative (Eccles et al., 2012; Ioannou & Serafeim, 2015). Financialization has provided legitimacy to ESG issues within organizations and markets because ESG criteria conform more generally with market value (Arjaliès, 2010; Gond & Boxenbaum, 2013).

Others have denounced the financialization of social and environmental issues because nature and life should not or cannot be priced (Chelli & Gendron, 2013; Chiapello, 2014). Opponents worry that “these forms of quantification come to dominate others, imposing their forms of valuation, and building up a world that could be described as one-dimensional (Marcuse, 1964)” (Chiapello, 2014, p. 15). Important dimensions and positions of ESG issues may be subordinated or missed, so that actors penalize some stakeholders or harm the planet (Chua, 1996).

As well, the financialization of ESG issues risks losing the original distinction between financial and ESG issues. Actors can reify the financial values assigned to ESG issues, missing the non-financial dimensions that may also be at play. Financializing ESG criteria decontextualizes the societal and natural environment, so that the criteria no longer reflect the phenomena they were intended to represent. For instance, the ability to purchase naming rights of parks and civic spaces enables funding for these spaces, but also commodifies these spaces, by suggesting they can be bought and sold (Sandel, 2012).

Financialization can also have a detrimental effect on ESG issues themselves. Gneezy and Rustichini (2000) find that imposing fines on parents who pick up their children late from daycare does not reduce, but rather increases, their tardiness. The authors show that parents feel entitled to be late because they pay for the service. Vik (2016) argues that quantifying a monetized value for the social impact generated prevents the microfinance sector from credibly determining its impacts on customers, which is detrimental to the beneficiaries themselves. Although criticisms could be levied against financializing ESG criteria, little discussion has addressed the alternative forms of calculative devices in which ESG criteria can be fashioned.

Beyond numbers: Creating a sense of dissonance

A few scholars have studied how financial actors accommodate ESG criteria in their decision making. Mehrpouya and Samiolo's (2016) ethnography describes how analysts rank companies based on the access to medicine that these companies provide in developing countries. The authors find that ESG analysts behave as "robots" (p. 22), putting aside their own judgments of the rankings, to be "impersonal" and "mechanical" (p. 25).

ESG analysts argue that the financialization processes give them legitimacy, but they also confess that these obligations conflict with their own value systems that do not lend themselves to financial numbers. Tan (2014) identifies similar tensions in his study of the integration of corporate governance by sell-side financial analysts, as does du Rietz (2014) in her study of Swedish institutional investors applying ESG criteria to their investments. This dissonance between financial numbers and other calculative devices is not confined to ESG analysts but can also be seen among financial actors more broadly.

Addressing this issue, Beunza and Stark (2012) study how traders in an arbitrage room used dialogue and analogies to build cognitive distance between the financial analysis and their interpretation, in order to create a "sense of dissonance." This distance stimulated creative friction and deliberate thought, ultimately leading to better financial decisions. Dissonance arises because there is "more than one framework for measuring worth" (Hutter, Stark, & Berthoin Antal, 2015, p. 5), and the different frameworks yield different outcomes. Understanding how traders complement computational work with literary work (Cochoy, 2008; Cochoy & Dubuisson-Quellier, 2013) offers potential alternatives to the financialization of ESG issues.

Research Methods

The research context

Between 2000 and 2005, most asset management companies in France were only starting to integrate ESG criteria into their investment processes. The company we studied—a small asset management company, managing €2 billion worth of assets, and a subsidiary of one of the biggest French mutual

insurance companies—began introducing Socially Responsible Investment (SRI) funds as early as 1997. This interest in SRI funds was motivated by the parent company, which belongs to the social economy sector that puts people before profits and therefore aims to invest its assets responsibly. Despite its position as a pioneer in the field, the company lost ground to its competitors and was having difficulty attracting new clients.

In 2005, a new CEO, recruited to reverse this trend, launched two working groups tasked with integrating ESG criteria in both equity and fixed-income investment processes. Whereas equity investments entailed buying shares on the stock market to capitalize on increases in their future value, fixed-income investments involved lending money to borrowers (a company or public issuer) in exchange for principal plus interest. Each group was composed of investment managers, ESG analysts and sales managers. The investment managers differed between both groups: equity managers were responsible for the redesign of the equity investment processes, and fixed-income managers for the fixed-income investment processes. ESG analysts were buy-side analysts (i.e., employed by the asset management company itself) whose job was to help investment managers identify the best socially responsible and financially interesting companies and public issuers. The timeline for this redesign process was expected to last several weeks, but ultimately took one year.

Data sources

The study initially began with a broad research question examining how fixed-income and equity managers were integrating ESG criteria into their practices. To better understand this phenomenon, the first author conducted a three-year ethnographic study of this asset management company.

Participant observation. The ethnographer observed investment managers and ESG analysts almost every day for two and a half years (2006–2009). This access was made possible by a research contract between the French Ministry of Research and Education, the University and the company, known as CIFRE (Convention Industrielle de Formation par la Recherche en Entreprise).

The ethnographer's formal role was as an ESG analyst, in which she analyzed companies and countries using the calculative devices associated with each type of investment. She attended all the

meetings of both working groups and gleaned insights in informal settings, such as coffee and lunch breaks. She spoke regularly at the meetings, together with the other ESG analysts. For instance, she explained the potential effects of investment managers' suggestions on the ESG analysis of companies she was assessing. Following a reflexive ethnographic approach (Whyte, 1943), she detailed the main events of each day in a diary, which in the end comprised hundreds of pages of notes. To gain industry-level insights, she also participated in think-tank events, working groups, SRI roadshows, conferences and business meetings with consultants, agencies and brokers, attending nearly 40 formal events per year. These formal meetings were complemented by many informal discussions with various industry actors.

Semi-structured interviews. To supplement this rich ethnographic data, the ethnographer conducted three rounds of interviews (23 in total). The first round in 2006, prior to the official launch of the working groups, assessed analysts' practices before the redesign. She asked interviewees to describe their jobs, their views on SRI funds and the corporation where they were working.

The ethnographer conducted a second round of interviews, after the redesign process in 2009, in which she aimed to understand interviewees' perceptions of the process—whether it was successful, how the redesign unfolded, why group members acted in certain ways and how they interpreted the actions of other members. A third round of follow-up interviews in 2015 involved interviewing prior working group members and new employees working on the investment processes. These interviews, designed to delve deeper into the long-term effects of the redesign of investment processes, were coupled with two days of observation.

Documents and secondary evidence. We collected and scrutinized large volumes of data, including minutes of meetings, emails, information on calculative devices and presentations of processes to clients. Our analysis also included documents and secondary sources at the industry level, including the social rating agencies' and brokers' evaluation tools purchased by the company. Appendix 1 summarizes the data sources.

Data Analysis

We analyzed the data in four stages. At each stage, we moved back and forth between the data, the literature and the emerging theoretical constructs, as is frequently the practice in qualitative studies of organizational change processes. We were most interested in analyzing the fixed-income analysts' and equity analysts' different approaches to financializing ESG issues. Our investigation found that calculative devices, specifically the legitimacy extended to non-financial numbers, to be of primary importance in the (non) financialization of ESG issues. The analysis unfolded through an inductive open-ended process of gradual abstraction, which we elaborate on below.

Stage 1: Developing working group narratives

For each working group, we created a narrative description and a timeline of key debates and changes to investment practices during the (re)design (Golden-Biddle & Locke, 2007). Observation and interview data provided in-depth insights into the evolution of meanings, interactions, practices and calculative devices. Once we had constructed a narrative account for each group, we confirmed the accuracy of the accounts by reporting them to company managers. Using multiple data sources, we began identifying key features of the equity and fixed-income managers' calculative devices that helped us differentiate between each group's interpretations of ESG criteria.

Stage 2: Identifying key codes

Using the chronological narrative developed in the previous stage, we organized the data using "generative" (Strauss & Corbin, 1994, p. 274) questions as a schema: How did each group perceive ESG issues? How did each group adopt ESG criteria? This schema served as a guide for categorizing the codes and clustering them into themes. Being empirically grounded, these first-order codes were not yet formulated in theoretical terms, and used actors' own language (Van Maanen, 1979). For example, we developed codes such as "fixed-income as a rational process" or "role as a manager to serve society." Throughout the coding process, we tracked emerging and recurring codes along with representative quotes and examples.

We used field observations and documentary evidence to verify the accuracy of the

interviewees' statements. For instance, when fixed-income managers explained that it was impossible to integrate ESG criteria into their financial models, we asked for these financial models and discussed their content with finance colleagues. We carried out the coding process until we had a clear picture of the first-order codes. At the end of this stage, we had a comprehensive understanding of the experiences in each working group.

Stage 3: Identifying ESG adoption patterns

We used axial coding (Strauss & Corbin, 1998) to identify commonalities and differences *across* the two types of investment (Eisenhardt & Graebner, 2007; Santos & Eisenhardt, 2009). This process allowed us to generate a set of second-order codes that enabled us to differentiate between each group's interpretations and actions. Iterations between the raw data, codes, narratives and theory allowed us to refine our findings and relate them to existing theories on calculative devices and on financialization (Santos & Eisenhardt, 2009). Given the central role of ESG criteria, we compared both groups on the calculative devices they used and their perception of ESG issues. At the end of this analysis, we were convinced of the importance of the role of calculative devices in fashioning the practices of each group.

Stage 4: Understanding the nature of calculative devices

During the last stage of analysis, we sought to understand how the calculative devices we discovered shaped the practices of each group. We were particularly interested in exploring further whether the form of calculative devices influenced the financialization of ESG criteria. Our analysis was informed by performative approaches used in visual accounting research (Davison & Warren, 2017; Justesen & Mouritsen, 2009). Drawing on Actor Network Theory (Latour, 1992), these approaches are based on the assumption that realities are constructed through the interactions between individuals and their inscriptions. This research method follows the trajectories of calculative devices and considers their effects on practices. The attention is not on the inscriptions that are produced (i.e., the financial numbers or the ESG criteria), but on the unfolding of practices produced by these inscriptions. Key to this analysis is the study of the relationships between the devices themselves, which in our study is the relationship between emojis and financial numbers.

Findings

In the following sections, we will show that fixed-income managers did not integrate ESG issues into their investment practices because they could not fit ESG criteria into their financial models. Equity managers, on the other hand, financialized the ESG criteria provided by social rating agencies by creating new calculative devices that avoided financialization. We will show that the combination of two different physical forms of calculative devices—financial numbers and visuals—helped trigger a sense of dissonance between ESG and financial criteria.

Appendices 2 and 3 summarize the investment processes; further details about why these two processes occurred are described below. Unless otherwise indicated, all interviewees' excerpts used in the findings originate from the 2009 round of interviews.

Fixed-income Managers

The inability to design ESG criteria that mirrored financial criteria. Fixed-income managers did not integrate ESG issues into their investment practices primarily because they claimed to be unable to quantify the financial value of ESG impacts. Two types of problems prevented the design of such calculative devices.

First, the ESG criteria provided by social rating agencies appeared less objective and reliable than the financial criteria that they often used:

RESEARCHER: So, in theory, ESG criteria could be useful for you but they're no help at the moment?

FIXED-INCOME MANAGER: Exactly, since we don't have anything to measure them, there's no point in looking at them [ESG criteria]. [...] I think that [social] rating agencies are totally incapable of doing this. [...] They [ESG criteria] are so approximate that it's impossible to rely on them.

RESEARCHER: You mean that finance is much more reliable?

FIXED-INCOME MANAGER: I think so. First, there are a lot more obligations regarding finance: very simple things such as publishing the accounts, having them certified,

etcetera. [...] The data are comparable; they've existed for a very long time. It's arithmetical, not qualitative. They aren't declarations or protocols... but concrete information we can verify.

RESEARCHER: So you can rely on financial criteria, but you cannot rely on ESG criteria?

FIXED-INCOME MANAGER: Yes, in order to work, ESG criteria should be like financial criteria. The social rating process should be like the financial one.

Fixed-income managers lent money to borrowers for defined periods of time. The interest rates used in such fixed-income investments changed over time for a variety of reasons, primarily related to macroeconomic issues. For example, if the market had few actors with little cash to lend, the issuer could charge a higher interest rate. A fixed-income manager would, therefore, assess the appropriate interest rate by relying heavily on econometric models and the yield curve (see Figure 1), the latter indicating the cumulative priorities of all lenders relative to a particular borrower. Given the importance of these models, fixed-income managers argued that their investment practice was heavily mathematics-driven. Financial models substituted for human agency, imbuing rationality into the investment process and sidelining emotions and personal judgments in investment decisions. Fixed-income managers strongly resisted any intervention, such as the use of ESG criteria, that could threaten the perceived scientific basis of their valuation processes.

Insert Figure 1

ESG analysts failed to convince fixed-income managers about the validity of integrating ESG criteria into econometric models. ESG analysts were unable to provide fixed-income managers ESG data that could help them commensurate with the existing financial models, in part because the data did not yet exist and in part because the ESG analysts did not fully understand the mathematics underlying the models. Table 1 provides an example of the sector-based ranking used by ESG analysts, and Table 2 provides an example of a company factsheet that summarizes a company's financial and ESG profiles.

Insert Tables 1 and 2

We illustrate our point through an example. Suppose Company X has a higher carbon dioxide (CO₂) emissions than Company Y, but these differences are attributable to a wide range of criteria,

including transparency in reporting, actual emissions and frequency of data collection. These differences, however, may not reflect Company Y's recent investments in low carbon technologies, which will reduce carbon emissions in subsequent years. ESG analysts could provide commentary that would offer greater meaning to the different ratings, and recommend investing in Company Y instead of Company X. ESG analysts could provide a comparative analysis of these companies but would be unable to answer the fixed-income managers' two main questions: Would a company likely go bankrupt due to these CO2 emissions? and What should the fixed-income manager do if only one of these two companies offered bonds (i.e., buy it or not)?

An ESG analyst explained how difficult it was to meet the demands of fixed-income managers:

[The fixed-income manager] asked us to find the “philosopher’s stone” of ESG. [...] To find the essence that all asset management companies are looking for today [i.e., the financial value of ESG], an essence they aren’t finding. They aren’t finding it because it’s a bit too early, there are no historical data and they find it difficult to identify all these things.

In addition, ESG analysts found it almost impossible to understand the investment practices of fixed-income managers and therefore to include ESG criteria, such as the yield curve, into the financial models used by fixed-income managers. Fixed-income managers argued that their calculative devices were too technical for individuals with so little financial background. ESG analysts then said that it was therefore impossible to integrate ESG criteria into what seemed to be impenetrable, inflexible econometric models.

As a result, fixed-income managers and ESG analysts did not embed ESG criteria into the fixed-income managers' calculative devices. To overcome this impediment, the fixed-income group decided to tack on an ESG constraint, which had little relationship with investment practices. Fixed-income managers tried to build a portfolio with at least some proportion comprising companies with strong ESG ratings, and with no one company with a poor rating representing a too large proportion of the total investment. Due to the CEO's pressure, fixed-income managers reluctantly agreed to select the bonds as usual and to subsequently verify that the portfolio met the conditions imposed by the ESG constraint.

The incapacity of seeing the benefits of ESG issues. Fixed-income managers' lack of interest in ESG issues also impeded their ability to integrate ESG criteria into the fixed-income investment practices. Although the yield curve is future-oriented, fixed-income managers rarely incorporated this time horizon in their analysis. Since the fixed-income managers studied interest rates that usually depended on the company's present borrowing capacity and market conditions, they were deeply concerned with current liquidity and arbitrage issues. The financial performance of fixed-income investments was less related to predicting companies' success than to the ability to constantly capitalize on price differentials between markets. As a fixed-income manager explained during the redesign, he had "no time to spend on things that were not related to his daily job." Fixed-income managers did not see ESG criteria as assisting their job, and ESG issues were, therefore, irrelevant. The CEO explained:

There's something abstract about fixed income; it's an actuarial model [...] fixed income can't be embodied in reality, so it's difficult to incorporate ESG. [...] In fixed income, all investments involve permanent arbitrage, so there's total volatility. It's very difficult to embody something that is linked to sustainability in an investment that is, by design, volatile.

Since fixed-income managers were primarily interested in bankruptcy and this situation could not be causally related to ESG criteria, fixed-income managers saw ESG criteria as nothing more than a burden or a constraint, as reflected in the following dialogue.

RESEARCHER: What does SRI (Socially Responsible Investing) mean for you?

FIXED-INCOME MANAGER: It's a constraint you have to abide by when investing, like any constraint.

RESEARCHER: When a constraint applies, is it difficult to manage?

FIXED-INCOME MANAGER: It's always difficult to manage a constraint.

RESEARCHER: Is that because it's an SRI constraint?

FIXED-INCOME MANAGER: No, no. It's not linked to the fact that it's a constraint.

RESEARCHER: OK. So SRI is a constraint like any other constraint. But does it contribute anything to your investment activity?

FIXED-INCOME MANAGER: Personally, I don't think so.

Equity Managers

The rejection of financial numbers. Whereas fixed-income managers had difficulty embedding ESG criteria into their work, equity managers were able to find a way forward. Equity managers relied on sophisticated financial models, such as the best “optimized couple return/risk” in each sector (cf. Figure 2)—a process referred to as “portfolio optimization” (Markowitz, 1952). To match this portfolio management approach, social rating agencies offered ESG criteria that took the form of numbers that ranked companies within each sector. As a result of this mirroring approach, equity managers were able to draw a direct relationship between the equity investment practices and the ESG criteria, such as when they calculated the financial impact of CO2 emissions on EBITDA (earnings before interest, taxes, depreciation and amortization; see Table 1, the “beta carbone” column).

Insert Figure 2

However, unlike fixed-income managers who relied extensively on their financial models, equity managers treated financial numbers as a doctor treats her instruments and medicines—useful for diagnosis and treatment but the patient requires a thorough examination of the malaise. In one informal exchange, an equity analysis said, “You need to know what is behind the numbers, get the full picture.” The equity managers believed that each investment decision needed to be analyzed in depth. Yet, until the redesign, they had never really paid attention to the content of the ESG criteria.

I was making my investment decisions, then I was checking whether the ESG average grade of the portfolio (obtained by adding the ESG grade of each company in the portfolio) was above 50/100, which eventually made me adjust the quantity of shares I was buying or selling. I was thinking more at the aggregate level of the portfolio, not really at the individual level of companies.

The redesign presented an occasion for the equity managers to encourage the ESG analysts to innovate and determine whether something better was available than what the social rating agencies could offer. Stimulated by this encouragement, ESG analysts suggested that numbers-based ESG criteria be transformed into emojis that indicated personal judgments, as conveyed in a company factsheet (cf. Table 3).

Insert Table 3

ESG analysts advanced two reasons for this approach. First, ESG analysts believed that their personal views of the companies mattered more than the ratings provided by social rating agencies. Thus, the section on the company factsheet that summarizes the advice of ESG analysts from social rating agencies included no figures. Several ESG analysts had previously worked for social rating agencies and recognized that each agency exerted considerable judgment in establishing ESG criteria. During a redesign meeting, an ESG analyst joked:

ESG ANALYST: Tell me what you want to prove and I will find the data you need!

EQUITY MANAGER: The same as in finance in fact. (Laughing)

ESG analysts felt that too much meaning or precision could not be ascribed to the numbers and, therefore, personal analyses were more appropriate. One ESG analyst said in informal discussions, “You know each rating agency has its own bias; you just need to know what they are, to use these data appropriately.” They told us that visuals provided them with greater “freedom” and more “human power.” By using emojis, ESG analysts felt that they were no longer obliged to aggregate ESG ratings, which generated a number that did not necessarily reflect their qualitative impression of the company. The company evaluation factsheet (e.g., Table 2) accounts for ESG analysts’ overall view of these companies, which could not be quantified in financial numbers.

Second, ESG analysts judged numbers to be too “neutral” and “cold”. In a “snapshot”, emojis conveyed the ESG analysts’ emotional feelings about a company: “You just see this face and you know directly that it is bad,” an ESG analyst explained to us in an informal exchange. ESG analysts felt that financial numbers would mask their personal values. They insisted that ESG issues were important for what they were—societal issues—not only for their contribution to the corporation’s financial performance. Emojis and their personal comments incarnated the ESG analysts’ “passion” and their “fight” for societal concerns. Emojis also corresponded to their way of interacting with each other—an instant message mode of communication they used daily and from which they borrowed the emojis themselves.

Equity managers believed that this approach toward visuals was promising for several reasons. Equity managers judged that using emojis with their comments was easier to understand than the numerical ESG criteria themselves. Equity managers did not understand the meaning of these numbers in practice; they preferred receiving the advice of ESG analysts. Equity managers explained that they did not expect ESG analysts to be like them: “Why have ESG analysts in such a case?”, an equity manager commented. Equity managers, therefore, welcomed the personal approach of ESG analysts: “It is sometimes a bit extreme, but they are doing their job.” (informal exchanges)

Using visuals for ESG criteria, in addition to the financial numbers, also permitted equity managers to compare relevant data, but without commensurating the data, so that inconsistencies and differences were possible to see. The two different forms of knowledge associated with visuals and financial numbers required more cognitive attention than just financial numbers—a difference that was epitomized in the company factsheet where financial analysis was juxtaposed with ESG analysis. Inconsistencies could evoke a sense of dissonance, as shown by the informal exchange below at the beginning of the redesign:

EQUITY MANAGER: Basically, ESG criteria can help me identify companies that are overvalued by the market?

ESG ANALYST: It would clearly help you better understand the fundamentals of [a company's] strategies. We have data on governance, social aspects such as the employee stress, carbon emissions, NGO controversies. We've got plenty of interesting stuff.

EQUITY MANAGER: But how come this company is so badly assessed by you guys? It's a leader, financially speaking. I don't understand.

ESG ANALYST: Easy, they are completely behind when it comes to energy diversification. It's a German utility, so basically they're into coal. They haven't anticipated the green revolution. This one, in comparison, is investing a lot in renewable energy and has no coal.

EQUITY MANAGER: Is that the case for many companies? Does it happen more often in specific sectors? Countries? Is it always an environmental problem? Does it change over time? How are the ESG criteria built?

Equity managers and ESG analysts eventually created a new investment decision matrix (cf. Table 4). Equity managers juxtaposed ESG criteria with financial criteria, so the equity managers could identify and favor the companies with the best combinations of ESG *and* financial profiles. Equity

managers excluded from the portfolio companies considered as “laggards” in both finance and ESG. Depending on their position in the matrix, equity managers favored companies that were over, equally, or under represented in portfolios, compared with their benchmark index (i.e., DJ Eurostoxx 300). For instance, a company that was assessed to be “average” in ESG criteria and a “leader” in financial criteria was deemed equivalent to a “leader” in ESG criteria and “average” in financial criteria, thereby demonstrating that both issues were valued equally.

Insert Table 4

The exchange below illustrates how an equity manager and an ESG analyst explained to potential new clients their evaluation criteria based on emojis. It shows the strong belief of the team in their new investment system:

TRUSTEE: So how do you manage the ESG and financial aspects of the fund?

EQUITY MANAGER: We have developed an investment decision matrix that combines financial and ESG analyses. The idea is to make investment managers and ESG analysts talk to each other, exchange about the companies, especially those having contradictory evaluation. (...)

ESG ANALYST: We have developed this system of emojis whose idea is to force each ESG analyst to step in the evaluation process, to give his/her recommendation, exactly as a financial analyst would do. (...)

TRUSTEE: But how can you be sure that a company should be excluded?

EQUITY MANAGER: Of course, one never knows the future but we did a lot of back testing. We know these companies very well.

The expected benefits of ESG issues. The desire to give ESG and financial criteria the same weight in the decision-making process notably emerged since equity managers believed that improvements were possible. Equity managers did not perceive their existing calculative devices to be fixed and constant, but instead as incomplete and open-ended. In particular, both equity managers and ESG analysts were intrigued that they could not explain why some companies with poor ESG ratings performed well financially, and other companies with good ESG ratings performed poorly. Their attempts to understand this situation prompted cooperation and fostered mutual dependencies between equity managers and ESG analysts.

Equity managers' future orientation of investment strategies was also essential in triggering interest in embracing ESG criteria. Because they believed that a firm's market value was directly related to its ability to manage ESG issues, equity managers trusted that ESG criteria would identify companies whose value would increase in the future. ESG criteria were expanding their knowledge of companies. An equity manager explained:

I don't want to keep a sort of watertight division between ESG analysis and my analysis. I want them to be correlated. Otherwise, it would mean that I select issuers on criteria I can't verify at all, and that wouldn't be credible for clients.

Equity managers did not want to translate ESG criteria into financial numbers. Instead, they were interested in the tensions that emerged between the ESG and financial criteria. They wanted to understand what was behind the financial numbers, not what was displayed. In other words, they were interested in the unseen risks that did not appear in the financial numbers.

The matrix decision and the evaluation factsheet were used as a basis for discussing the discrepancies between ESG and financial criteria. For instance, the "consensus" section on the company evaluation factsheet in Table 2 shows that while brokerage companies recommended buying more shares of the company under study (see consensus), the equity manager suggested selling the shares. The justification is written below the financial ratios and, interestingly, uses arguments from ESG criteria (i.e., carbon emissions) that were not directly visible in the financial numbers. The text in the financial section of the evaluation factsheet illustrates the penetration of the ESG issues into the financial world of the equity manager. As such, both the ESG analysts and equity managers questioned the industry's trust in financial numbers.

At the end of the redesign, equity managers judged that ESG criteria had enriched their investment activities by making them more interesting and more elaborate. The processes of selecting, projecting and evaluating the outcomes of market transactions had been transformed.

RESEARCHER: Has the incorporation of SRI changed the way you invest?

EQUITY MANAGER: Yes. It's made it more interesting, more elaborate and it enhances the investment activity. [...] It's surprising, but you sometimes see companies with a very good financial profile and a very bad SRI profile. When you

read financial analyses, they appear to be excellent. But when you listen to the ESG analysts, they describe things that aren't working inside those companies. So I wonder how such companies can succeed at the end of the day. How can they make up for bad working conditions, for example?

ESG issues had become an integral part of equity investment practices because ESG criteria not only informed financial success but also reflected the company's social responsibility, which equity analysts saw as an increasingly important dimension in their job. The world as perceived and evaluated by the equity managers shifted from being only financial to also involving ESG criteria, which was reinforced over the years.

Our job is to generate returns but in a way that is not detrimental to the planet. I mean the world has changed our job too. We are accountable to the society for what we do, and this is good. We have to find new ways of investing that incorporate both dimensions. (equity manager, 2015)

Epilogue

We interviewed equity managers and ESG analysts again in 2015. These actors gave the impression that they were incorporating both financial and ESG issues into their work. Although we cannot deduce a causal relationship, the equity fund performed well financially, particularly when compared with the fixed-income fund that significantly under-performed in the subsequent years (both vis-à-vis the benchmark and the other funds of its category). The equity fund also received several ESG awards from the investment industry.

The company maintained all the calculative devices that were fabricated during the redesign, but omitted the emojis from the company evaluation factsheet for several reasons. First, the Bloomberg terminals used by managers to buy and sell shares could not support functions that included emojis. Second, some clients appeared to be uncomfortable with the use of emojis in a financial context, although the reasons for their discomfort were unclear. As a result, the CEO found it prudent to remove emojis from institutional documents (after they appeared in these documents for two years). In response, ESG analysts replaced the emojis with color codes. ESG analysts were still encouraged to offer their personal opinions.

We maintain our SRI approach; it's constraining but it's SRI. The clients who are not convinced by SRI, we won't convince them. (equity manager, 2015)

In fixed-income investments, ESG analysts still attempted to integrate quantitative ESG criteria into the financial models, by seeking a relationship between ESG criteria and bankruptcy risk. In our 2015 wave of interviews, we expected the new fixed-income manager to tell us that fixed-income managers had failed to integrate ESG criteria into their financial analyses, and she did not disappoint, saying that "nothing had changed really." We were thus surprised when she appeared to be passionate about the new green energy fixed-income fund she wanted to launch:

It's a real long-term conviction. We could all win by financing companies that would help transitioning towards green energy. (...) I mean we are parents too. We want the best world for our children. (fixed-income manager, 2015)

She was inspired to develop this product to help build a better world for future generations. At the time of the interview, she was trying to convince her chief to foster change and innovation by softening the heavy use of financial numbers in fixed-income investments. She believed that social responsibility would require a change of perspective. When we asked whether she planned to transform ESG criteria into financial criteria and then integrate the financial criteria into all credit ratings, she answered:

No, I don't think so. It will be a real impact fund. We need to integrate ESG criteria: we should start from them. We should not start from the market, not from the benchmark. (...) We are lucky enough to be part of a generation more sensitive to these topics; we have more resources to think about it. The fixed-income profession is made of old dinosaurs who are afraid. It's a fear of the elderly who don't want to change. The next generation of professionals might be more sensitive to these problems. (fixed-income manager, 2015)

She wanted to embrace ESG issues for what they were, not for what they could bring to financial performance. As a fixed-income manager, she believed that she could use her investment practices to serve society at large.

Discussion

This research examines how investment managers use calculative devices to accommodate societal issues in their investment decisions. Although previous literature has examined the role of ESG criteria in investment decisions, it has largely assumed that financializing ESG issues is unavoidable (Chelli & Gendron, 2013; Chiapello, 2014; Déjean et al., 2004). In practice, the inability to design calculative devices that assign a market value to ESG criteria often leads to ESG issues being abandoned (Huault & Rainelli-Weiss, 2011). While previous research has studied the benefits of visuals in nurturing questions among organizational actors (e.g., Busco & Quattrone, 2015; Kaplan, 2011), these studies say little about how such questioning affects decision making.

This article fills these gaps by studying how two groups of investment managers, specifically fixed-income and equity managers within a French asset management company, responded to ESG criteria, which carried different values from those associated with financialization. Consistent with prior literature (e.g., Déjean et al., 2004; Giamporcaro & Gond, 2016), we found that fixed-income managers attempted to financialize ESG issues, and subsequently deemed these issues to be too difficult to include in the financial models in use, and therefore did not integrate them into their investment processes. In contrast, equity managers introduced visuals, specifically emojis, to assess ESG criteria in their decision making. In doing so, equity managers deliberately created a sense of dissonance between financial numbers and the visuals, which fostered creative friction (Stark, 2011). The rest of this section elaborates on the implications of our findings to the study of financialization and calculative devices.

An Alternative Path to Financialization

Equity managers felt that visuals helped to better value firms. Visuals ensured ESG criteria remained independent and separate from financial numbers, rather than disappearing through the commensuration process (Espeland & Stevens, 1998). The emojis in the company factsheets brought attention, in a different way from financial numbers, to the performance of the company. Equity managers appreciated that the emotive expressions of emojis were connected to social and environmental problems and avoided the need to apply precision to imprecise concepts. Emojis expressed the opinions that could not be expressed in financial numbers. Unlike fixed-income managers who aimed to render ESG criteria

into “objective” and “scientific” financial criteria, equity managers encouraged ESG analysts to use their personal judgments.

Equity managers also liked visuals because they incarnated the differences between ESG and financial criteria, such as when a company performed well financially but was rated poor environmentally. Such contrasts led to equity managers engaging more deliberately and carefully with the data, rather than automatically applying financial analysis. Equity managers used the emojis that embodied ESG criteria to distance themselves from their own calculative devices to better identify the factors that financial markets did not seem to value. The visual vis-à-vis the numerical prevented equity managers from standardizing the analysis and forced equity managers to focus on each company’s specific data. Visuals detuned routines, so that equity managers needed to look behind the financial numbers and not just apply simple aggregated numbers in their decision analysis. As a result, equity managers improved their judgment skills, as we illustrated in the text on carbon emissions in the financial evaluation section of the evaluation factsheet (see Table 2).

Our study shows that creating a sense of dissonance between ESG and financial criteria also enabled the pursuit of ESG goals. With ESG issues standing apart from financial concerns, ESG issues garnered their own value, not in service of financial performance, but for what they were: environmental, social and governmental concerns. Visuals made the differences between financial and ESG issues visually perceptible. In doing so, ESG goals held the same importance as financial goals, as demonstrated by the joint decision matrix in Table 4. As a result, equity managers perceived firms performance as not only financial, but also societal. Thus, societal concerns became a new and critical consideration for equity managers.

Prior research has highlighted the financialization of economy and society (Alvehus & Spicer, 2012; Chiapello, 2014), but our findings show that non-financial calculative devices can advance social and environmental concerns into the financial sector. Such inclusion, however, might in itself indirectly contribute to the growing influence of the financial industry on society because ESG criteria are also used to assess market value. The penetration of societal benefits into the financial industry is likely a side effect of the financialization of the rest of the economy and society.

Since an increasing number of public actors are asking financial actors to solve societal issues, financial actors are feeling increasingly responsible for addressing environmental and social problems, a movement that is also seen in academic finance (Marti & Scherer, 2016). We cannot comment on whether this inclusion of social and environmental issues is actually a new form of financializing society or an account of (de)financializing finance, but this question warrants further study. The distinction between finance and society is indeed increasingly tenuous. More research is needed to evaluate the effects of adopting such forms of calculative devices on a wide range of investment managers and on ESG issues themselves.

How Visuals Simulate a Sense of Dissonance

By identifying the conditions under which visuals can help simulate a creative friction between financial and ESG criteria, this study enriches previous research on the sense of dissonance (Beunza & Stark, 2012; Stark, 2011). Existing research argues that organizations introduce a sense of dissonance by creating physical spaces that encourage interactions among organizational members (Farias, 2015; Hutter et al., 2015), favor different hierarchical relationships, or “heterarchy” (Stark, 2011) or combine different accounts of performance (Chenhall, Hall, & Smith, 2013).

We complement this research by showing that a sense of dissonance can also be spurred by the introduction of calculative devices whose physical form differs from the established form and cannot be absorbed through commensuration or other processes. This combination of calculative devices creates dissonance beyond personal relationships among individuals, enabling a sense of dissonance at the organizational level of analysis.

We also show that the physical form of the calculative devices that trigger dissonance matters. Emojis and company factsheets possessed qualities that made them attractive to both equity managers and ESG analysts. First, emojis were familiar to both communities. All those within the organization used emojis in emails or instant messages. Second, emojis conveyed information efficiently. They provided equity managers with an instant snapshot of a company’s ESG performance. The emojis were consistent with the organization’s communications style and the fast pace of the financial markets;

emails could be exchanged containing only a title and an image, and, if needed, additional explanation would be offered.

Emojis' human-like faces captured emotion through their expressions, in stark contrast to the neutrality projected by financial numbers; both elements were essential to creating a sense of dissonance. Visuals generated positive emotions, such as enthusiasm when the equity manager discovered information previously unknown, thereby helping to alleviate the anxiety generated by financial numbers and the impossible expectations of objectivity incurred by their use (see, for example, Taffler et al., 2017). The incompleteness of emojis generated new knowledge by encouraging equity managers to interpret the information provided by ESG analysts and thereby participate in the co-creation of knowledge. The physical structure of the company factsheets that showed financial and ESG criteria in opposition also contributed to rendering visible the dissonance between both. Emojis could not easily be commensurated with financial numbers.

Although we argue that different forms of calculative devices can spur a sense of dissonance, we also acknowledge that some individuals are more likely to embrace dissonance than others. We found that fixed-income managers refused ESG criteria because they were judged as too "qualitative" to be included in their financial models. Individuals indeed tend to favor the techniques that are central to their occupations' social practices (Callon, 1998).

This finding offers additional evidence of the importance of the form of calculative devices in creating a sense of dissonance. It also highlights the limitations and dangers of techniques that become so institutionalized or automated that they no longer evoke any dissonance that sparks deeper thinking. Financial numbers offer the benefits of efficiency because they can commensurate different types of information consistently, which retains meaning among diverse communities. However, financial numbers are limited in their capacity to sustain the complexity of human endeavors, such as ESG issues and emotions. In contrast, visuals offer a way of conveying information efficiently, and have the added benefit of not being easily commensurable and absorbed into financial numbers. We are not suggesting that financial numbers cannot create a sense of dissonance, as they sometimes do when two seemingly irreconcilable numbers are compared (Beunza & Stark, 2012). However, we are suggesting that there

are methods other than financial numbers that can efficiently convey information, while sustaining a sense of dissonance.

Just as calculative devices can evolve, individuals can change. Our epilogue suggests that fixed-income managers could abandon financial numbers and approach the ESG criteria as the equity managers had—by considering them for what they are, not for what they could offer financially. Although the article displays the difficulty of reversing the bias for financialization, the exchange with this fixed-income manager also indicates that there is no “fatal remedy” (Power, 2004, p. 767) to financial numbers.

The Role of Visuals in Organizations

This article contributes to previous research on the use of visuals in organizations. Previous studies show the benefits of visuals in generating new rationales by being a “means of interrogation and mediation” (Busco & Quattrone, 2015, p. 1250)—for example, the Balanced Scorecard or PowerPoint (e.g., Busco & Quattrone, 2015; Kaplan, 2011). Previous research on visuals argues that the flexibility and multivocality of visuals facilitate knowledge creation (Höllner et al., 2013; Meyer et al., 2013).

The dissonance approach we develop in this article brings a new perspective to the generative power of visuals. Visuals can help stimulate new knowledge by introducing an alternative calculative device that is incommensurable with the dominant form of calculative devices in use — here financial numbers, thereby creating a sense of dissonance (Stark, 2011). Visuals can also be used to convey information of a different nature, such as when the CEO decided to include emojis, then colors in the company factsheets. The goal of such visuals was to spur clients’ interest in ESG criteria.

Our study also shows that visuals are not only “rhetorical machines” (Busco and Quattrone, 2015, p. 1237)—e.g., wheels, PowerPoint or trees—that all organizational members could basically interpret as they wanted. Emojis were not “empty” in our study. They were full of content, but not content that could be easily expressed in numbers or words. The emojis conveyed emotions, personal judgments and choices. Our study hence demonstrates that visuals can exhibit expertise, to the same

extent that financial numbers do—despite their apparent lack of “scientific” anchorage (Chua, 1996; Whitley, 1986).

Last, our article suggests that as financial numbers point to financialization, visuals can also carry specific meanings beyond their specific situations of use (e.g., incarnating “society”). For instance, emojis helped humanize social and environmental issues, notably through their human-like faces. Emojis incarnated the ESG issues and rendered them visible in the investment processes. If ESG analysts had used only the numbers offered by social rating agencies during the redesign of investment processes, the inclusion of societal concerns would have been unlikely.

Numerous aspects of life may be important to organizational decision processes but are not considered because of the complexities of financialization; such aspects include intuition, love, community, spirituality, family and nature. The primacy given to financial numbers and financialization has rendered many issues invisible, despite their capacity to improve not only the organization’s performance but also societal well-being. For example, many theoretically abundant forms of calculative devices, such as images, text, videos, sounds, virtual reality, physicality and even smell, can help to elevate various aspects of life. Each form of calculative device may invoke different behaviors toward previously invisible criteria or goals and therefore each such form warrants attention. Behavioural research might be particularly appropriate for this purpose, as it could help us understand how and why organizational members react differently to different types of calculative devices.

Conclusion

This article suggests that research on the integration of ESG criteria into organizational practices needs to take the limits of financialization more seriously because such an approach not only discards difficult-to-value activities but also ignores the inherent non-financial values embedded in ESG issues. By assuming that financial actors require calculability in the form of financial numbers because they have always been portrayed this way, previous research may have actually contributed to the financialization of societal issues.

As societies recognize the importance of tackling social and environmental issues (e.g., climate change, poverty, hunger and inequality), problems related to the joint pursuit of financial and societal benefits will likely continue to surface. Different forms of calculative devices may offer an opportunity to consider the interface between finance and society, allowing the values of each to be sustained. It seems an egregious error to believe that one calculative device should be privileged over another or that the tide of financial drift cannot be reversed. Markets are thought to be self-fulfilling, and such a fate should be expected of our artifacts and rhetoric. As organizational scholars, we have the ability to make these distinctions carefully. If alternative ways of conducting business are to be considered, we must acknowledge that the new goals in capitalism might require new calculative devices, even if the foundational knowledge for these forms has not yet been developed.

References

- Alvehus, J., & Spicer, A. (2012). Financialization as a strategy of workplace control in professional service firms. *Critical Perspectives on Accounting*, 23, 497–510.
- Arjaliès, D.-L. (2010). A Social Movement Perspective on Finance: How Socially Responsible Investment Mattered. *Journal of Business Ethics*, 92, 57–78.
- Arjaliès, D.-L., Grant, P., Hardie, I., MacKenzie, D., & Svetlova, E. (2017). *Chains of Finance: How Investment Management is Shaped*. Oxford University Press.
- Barman, E. (2015). Of Principle and Principal: Value Plurality in the Market of Impact Investing. *Valuation Studies*, 3, 9–44.
- Beunza, D., Hardie, I., & MacKenzie, D. (2006). A price is a social thing: towards a material sociology of arbitrage. *Organization Studies*, 27, 721–745.
- Beunza, D., & Stark, D. (2012). From dissonance to resonance: cognitive interdependence in quantitative finance. *Economy and Society*, 41, 383–417.
- Busco, C., & Quattrone, P. (2015). Exploring how the Balanced Scorecard engages and unfolds: Articulating the visual power of accounting inscriptions. *Contemporary Accounting Research*, 32, 1236–1262.
- Busco, C., & Quattrone, P. (2017). In Search of the “Perfect One”: How accounting as a maieutic machine sustains inventions through generative ‘in-tensions.’ *Management Accounting Research*, <https://doi.org/10.1016/j.mar.2017.02.002>.
- Cabantous, L., & Dupont-Courtade, T. (2015). What Is a Catastrophe Model Worth? In M. Kornberger, L. Justesen, J. Mouritsen, & A. Koed Madsen (Eds.), *Making Things Valuable* (pp. 167–186). Oxford University Press.
- Callon, M. (1998). *The Laws of the Markets*. Oxford: Blackwell.
- Callon, M., & Muniesa, F. (2005). Peripheral Vision: Economic Markets as Calculative Collective

- Devices. *Organization Studies*, 26, 1229–1250.
- Chelli, M., & Gendron, Y. (2013). Sustainability ratings and the disciplinary power of the ideology of numbers. *Journal of Business Ethics*, 112, 187–203.
- Chenhall, R. H., Hall, M., & Smith, D. (2013). Performance measurement, modes of evaluation and the development of compromising accounts. *Accounting, Organizations and Society*, 38, 268–287.
- Chiapello, E. (2014). Financialisation of Valuation. *Human Studies*, 38, 13–35.
- Chiapello, E. (2017). La financiarisation des politiques publiques. *Mondes En Développement*, 23–40.
- Chua, W. F. (1996). Teaching and learning only the language of numbers—monolingualism in a multilingual world. *Critical Perspectives on Accounting*, 7, 129–156.
- Cochoy, F. (2008). Calculation, qualculation, calculation: shopping cart arithmetic, equipped cognition and the clustered consumer. *Marketing Theory*, 8, 15–44.
- Cochoy, F., & Dubuisson-Quellier, S. (2013). The sociology of market work. *Economic Sociology—The European Electronic Newsletter*, 15, 4–11.
- Cooper, C., Graham, C., & Himick, D. (2016). Social impact bonds: the securitization of the homeless. *Accounting, Organizations and Society*, 55, 63–82.
- Crane, A., Graham, C., & Himick, D. (2015). Financializing stakeholder claims. *Journal of Management Studies*, 52, 878–906.
- Davis, G. F. (2010). Not just a mortgage crisis: how finance maimed society. *Strategic Organization*, 8, 75–82.
- Davis, G. F., & Kim, S. (2015). Financialization of the Economy. *Annual Review of Sociology*, 41.
- Davison, J., & Warren, S. (2017). Visual methodologies for accounting and accountability. *The Routledge Companion to Qualitative Accounting Research Methods*, 112.
- de Larminat, P. (2013). Between “Quantitative” and “Qualitative” Analysis: The Evaluation of Asset Managers by Professional Investors. *L’Année Sociologique*, 63, 77–105.
- Déjean, F., Gond, J.-P., & Leca, B. (2004). Measuring the Unmeasured: An Institutional Entrepreneur Strategy in an Emerging Industry. *Human Relations*, 57, 741–764.
- Du Rietz, S. (2014). When accounts become information: A study of investors’ ESG analysis practice. *Scandinavian Journal of Management*, 30, 395–408.
- Dubuisson-Quellier, S. (2013). A market mediation strategy: How social movements seek to change firms’ practices by promoting new principles of product valuation. *Organization Studies*, 34, 683–703.
- Eccles, R. G., Krzus, M. P., Rogers, J., & Serafeim, G. (2012). The Need for Sector-Specific Materiality and Sustainability Reporting Standards. *Journal of Applied Corporate Finance*, 24, 65–71.
- Eisenhardt, K. M., & Graebner, M. E. (2007). Theory Building from Cases: Opportunities and Challenges. *Academy of Management Journal*, 50, 25–32.
- Epstein, G. A. (2005). *Financialization and the world economy*. Edward Elgar Publishing.
- Espeland, W. N., & Stevens, M. L. (1998). Commensuration as a social process. *Annual Review of Sociology*, 24, 313–343.
- Etzion, D., & Ferraro, F. (2010). The role of analogy in the institutionalization of sustainability

- reporting. *Organization Science*, 21, 1092–1107.
- Farias, I. (2015). Epistemic Dissonance: Reconfiguring Valuation in Architectural Practice. In A. Berthoin Antal, M. Hutter, & D. Stark (Eds.), *Moments of Valuation: Exploring Sites of Dissonance* (pp. 229–248). Oxford: Oxford University Press.
- Ferraro, F., Etzion, D., & Gehman, J. (2015). Tackling grand challenges pragmatically: robust action revisited. *Organization Studies*, 36, 363–390.
- Giamporcaro, S., & Gond, J.-P. (2016). Calculability as politics in the Construction of Markets: The Case of Socially Responsible Investment in France. *Organization Studies*, 37, 465–495.
- Gneezy, U., & Rustichini, A. (2000). A fine is a price. *Journal of Legal Studies*, 29, 1–17.
- Godechot, O. (2001). *Les traders: essai de sociologie des marchés financiers*. Editions La Découverte.
- Golden-Biddle, K., & Locke, K. (2007). *Composing qualitative research*. Sage.
- Gond, J.-P., & Boxenbaum, E. (2013). The glocalization of responsible investment: Contextualization work in France and Quebec. *Journal of Business Ethics*, 115, 707–721.
- Gond, J.-P., & Nyberg, D. (2017). Materializing Power to Recover Corporate Social Responsibility. *Organization Studies*, 38, 1127–1148.
- Höllerer, M. A., Jancsary, D., Meyer, R. E., & Vettori, O. (2013). Imageries of corporate social responsibility: Visual recontextualization and field-level meaning. In *Institutional Logics in Action, Part B* (pp. 139–174). Emerald Group Publishing Limited.
- Huault, I., & Rainelli-Weiss, H. (2011). A market for weather risk? Conflicting metrics, attempts at compromise, and limits to commensuration. *Organization Studies*, 32, 1395–1419.
- Hutter, M., Stark, D., & Berthoin Antal, A. (Eds.). (2015). *Moments of Valuation: Exploring Sites of Dissonance*. New York: Oxford University Press.
- Ioannou, I., & Serafeim, G. (2015). The impact of corporate social responsibility on investment recommendations: Analysts' perceptions and shifting institutional logics. *Strategic Management Journal*, 36, 1053–1081.
- Justesen, L., & Mouritsen, J. (2009). The triple visual: Translations between photographs, 3-D visualizations and calculations. *Accounting, Auditing & Accountability Journal*, 22, 973–990.
- Kaplan, S. (2011). Strategy and PowerPoint: An inquiry into the epistemic culture and machinery of strategy making. *Organization Science*, 22, 320–346.
- Krippner, G. R. (2005). The financialization of the American economy. *Socio-Economic Review*, 3, 173–208.
- Latour, B. (1992). *Aramis ou l'amour des techniques*. La Découverte.
- Lund, S., Daravula, T., Dobbs, R., Harle, P., Kwek, J.-H., & Falcon, R. (2013). Financial globalization: Retreat or reset? Available at <https://www.mckinsey.com/global-themes/employment-and-growth/financial-globalization>.
- MacKenzie, D. (2009). *Material markets: How economic agents are constructed*. Oxford University Press.
- Marcuse, H. (1964). *One dimensional man*, Boston (Beacon Press) 1964.
- Markowitz, H. M. (1952). Portfolio Selection. *The Journal of Finance*, 7, 77–91.

- Marti, E., & Scherer, A. (2016). Financial Regulation and Social Welfare: The Critical Contribution of Management Theory. *Academy of Management Review*, *41*, 298–323.
- Mehrpouya, A., & Samiolo, R. (2016). Performance measurement in global governance: Ranking and the politics of variability. *Accounting, Organizations and Society*, *55*, 12–31.
- Meyer, R. E., Höllerer, M. A., Jancsary, D., & Van Leeuwen, T. (2013). The visual dimension in organizing, organization, and organization research: Core ideas, current developments, and promising avenues. *Academy of Management Annals*, *7*, 489–555.
- Ortiz, H. (2014). *Valeur financière et vérité: Enquête d'anthropologie politique sur l'évaluation des entreprises cotées en bourse*. Les Presses de SciencesPo.
- Pollock, N., & D'Adderio, L. (2012). Give me a two-by-two matrix and I will create the market: Rankings, graphic visualisations and sociomateriality. *Accounting, Organizations and Society*, *37*, 565–586.
- Porter, T. M. (1996). *Trust in numbers: The pursuit of objectivity in science and public life*. Princeton University Press.
- Power, M. (2004). Counting, control and calculation: Reflections on measuring and management. *Human Relations*, *57*, 765–783.
- Preston, A. M., Wright, C., & Young, J. J. (1996). Imag [in] ing annual reports. *Accounting, Organizations and Society*, *21*, 113–137.
- Qu, S. Q., & Cooper, D. J. (2011). The role of inscriptions in producing a balanced scorecard. *Accounting, Organizations and Society*, *36*, 344–362.
- Sandel, M. J. (2012). *What money can't buy: the moral limits of markets*. Macmillan.
- Santos, F. M., & Eisenhardt, K. M. (2009). Constructing markets and shaping boundaries: Entrepreneurial power in nascent fields. *Academy of Management Journal*, *52*, 643–671.
- Scherer, A. G., & Palazzo, G. (2011). The new political role of business in a globalized world: A review of a new perspective on CSR and its implications for the firm, governance, and democracy. *Journal of Management Studies*, *48*, 899–931.
- Stark, D. (2011). *The sense of dissonance: Accounts of worth in economic life*. Princeton University Press.
- Strauss, A., & Corbin, J. (1994). Grounded theory methodology. *Handbook of Qualitative Research*, 273–285.
- Strauss, A., & Corbin, J. (1998). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory* (Second). Thousand Oaks, CA: Sage.
- Sullivan, R., Martindale, W., Feller, E., & Bordon, A. (2015). *Fiduciary duty in the 21st century*. London, UK: Principles for Responsible Investment.
- Taffler, R. J., Spence, C., & Eshraghi, A. (2017). Emotional Economic Man: Calculation and Anxiety in Fund Management. *Accounting, Organizations and Society*, Available on line.
- Tan, Z. S. (2014). The construction of calculative expertise: The integration of corporate governance into investment analyses by sell-side financial analysts. *Accounting, Organizations and Society*, *39*, 362–384.
- TheCityUK. (2014). Fund Management 2013. Available at <http://thecityuk.com>.

Van Maanen, J. (1979). The fact of fiction in organizational ethnography. *Administrative Science Quarterly*, 24, 539–550.

Vik, P. (2016). What's so social about Social Return on Investment? A critique of quantitative social accounting approaches drawing on experiences of international microfinance. *Social and Environmental Accountability Journal*, 1–12.

Vollmer, H., Mennicken, A., & Preda, A. (2009). Tracking the Numbers: Across Accounting and Finance, Organizations and Markets. *Accounting, Organizations and Society*, 34, 619–637.

Whitley, R. (1986). The transformation of business finance into financial economics: The roles of academic expansion and changes in US capital markets. *Accounting, Organizations and Society*, 11, 171–192.

Whyte, W. F. (1943). *Street Corner Society: The Social Structure of an Italian Slum*. Chicago: University of Chicago Press.

LIST OF FIGURES AND TABLES

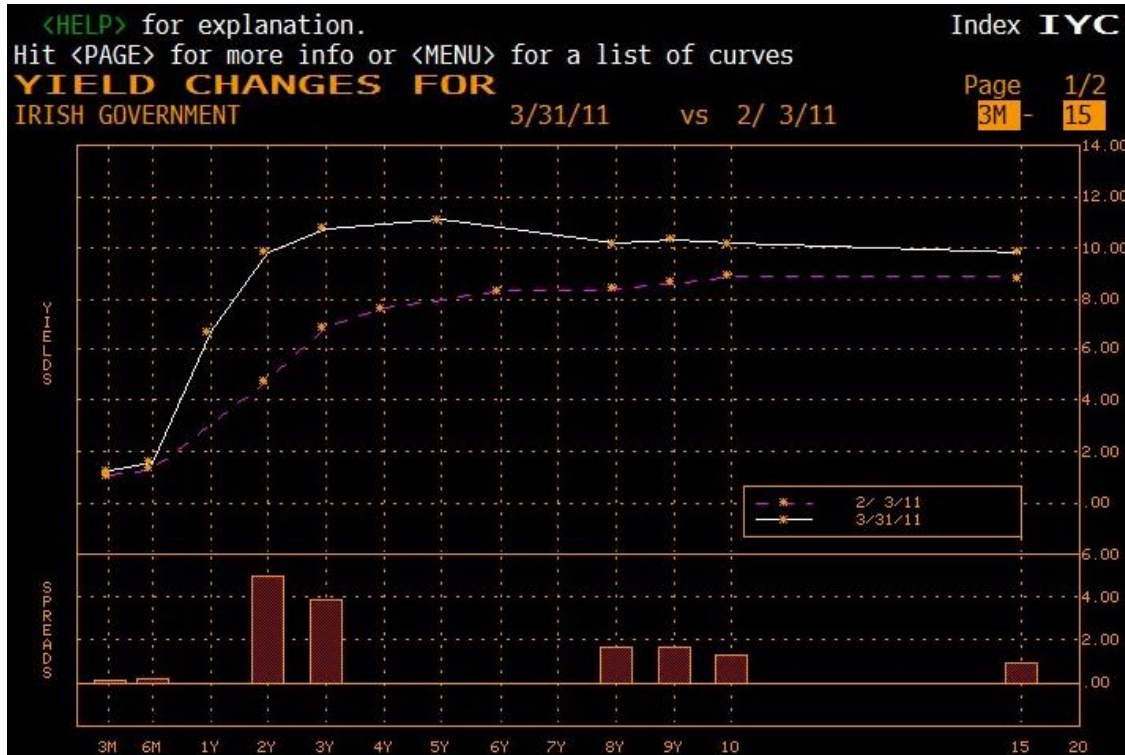


Figure 1. Example of yield curve and spread analysis.

Source: Bloomberg. https://www.bloomberg.com/professional/solution/bloomberg-terminal-learn-more/?utm_medium=dotcom&utm_campaign=Dotcom&utm_source=Website&utm_content=bcom-article&bbgsum=dg-ws-prof-bcom-a1

Table 1. Example of corporations' ESG ratings.

| ICB Sector | Vigeo Sector | % Stoxx 600 | % Stoxx 300 | % Stoxx 50 | Class ISR | Moyenne ICB | Mediane ICB | Ecart-Type ICB | Vigeo | Eiris | Beta Carbone | Environnement | Social | Gouvernance | Sociétal |
|-------------------------------|-------------------------|-------------|-------------|------------|-----------|-------------|-------------|----------------|-------|-------|--------------|---------------|--------|-------------|----------|
| Food Producers | Food | 0.04% | 0.07% | 0.00% | Faible | 34.65 | 30.60 | 18.20 | 18.26 | 0.00 | 33.33 | 1.65 | 9.75 | 50.50 | 16.55 |
| Forestry & Paper | Forest Products & Pa | 0.06% | 0.12% | 0.00% | Suiveur | 54.51 | 54.51 | 5.38 | 48.61 | 54.00 | 77.78 | 56.65 | 48.05 | 45.60 | 43.05 |
| Forestry & Paper | Forest Products & Pa | 0.10% | 0.19% | 0.00% | Faible | 54.51 | 54.51 | 5.38 | 44.96 | 48.00 | 77.78 | 49.95 | 53.40 | 55.70 | 24.35 |
| Gas, Water & Multiutilities | Waste & Water Utilitie | 0.26% | 0.50% | 0.00% | Leader | 49.48 | 47.09 | 10.73 | 48.30 | 54.00 | 77.78 | 43.05 | 45.05 | 50.25 | 54.38 |
| Gas, Water & Multiutilities | Electric & Gas Utilitie | 0.95% | 1.83% | 2.95% | Leader | 49.48 | 47.09 | 10.73 | 54.30 | 48.00 | 88.89 | 48.70 | 62.63 | 54.00 | 49.60 |
| Gas, Water & Multiutilities | Electric & Gas Utilitie | 0.15% | 0.29% | 0.00% | Leader | 49.48 | 47.09 | 10.73 | 50.11 | 35.00 | 100.00 | 49.85 | 54.98 | 43.90 | 53.95 |
| Gas, Water & Multiutilities | Electric & Gas Utilitie | 0.06% | 0.12% | 0.00% | Impliqué | 49.48 | 47.09 | 10.73 | 34.64 | 36.00 | 77.78 | 30.00 | 35.60 | 59.80 | 18.10 |
| Gas, Water & Multiutilities | Electric & Gas Utilitie | 0.09% | 0.17% | 0.00% | Impliqué | 49.48 | 47.09 | 10.73 | 37.42 | 45.00 | 88.89 | 34.30 | 42.10 | 45.70 | 38.08 |
| Gas, Water & Multiutilities | Electric & Gas Utilitie | 1.50% | 2.90% | 4.67% | Suiveur | 49.48 | 47.09 | 10.73 | 39.83 | 37.00 | 88.89 | 37.95 | 35.43 | 46.65 | 36.68 |
| Gas, Water & Multiutilities | #N/A | 0.02% | 0.03% | 0.00% | Suiveur | 49.48 | 47.09 | 10.73 | #N/A | 41.00 | #N/A | #N/A | #N/A | #N/A | #N/A |
| Gas, Water & Multiutilities | Electric & Gas Utilitie | 0.63% | 1.21% | 1.95% | Faible | 49.48 | 47.09 | 10.73 | 39.28 | 35.00 | 88.89 | 34.30 | 41.60 | 48.95 | 29.65 |
| Gas, Water & Multiutilities | Electric & Gas Utilitie | 0.05% | 0.10% | 0.00% | Faible | 49.48 | 47.09 | 10.73 | 26.15 | #N/A | 88.89 | 29.55 | 21.63 | 40.90 | 7.35 |
| General Financial | Banks | 0.02% | 0.05% | 0.00% | Leader | 25.84 | 23.95 | 18.50 | 48.97 | 1.00 | #N/A | 36.90 | 53.33 | 34.25 | 52.80 |
| General Financial | Financial Services - C | 0.25% | 0.48% | 0.77% | Leader | 25.84 | 23.95 | 18.50 | 44.72 | 0.00 | 88.89 | 8.40 | 45.90 | 63.95 | 41.10 |
| General Financial | Financial Services - C | 0.07% | 0.13% | 0.00% | Impliqué | 25.84 | 23.95 | 18.50 | 28.59 | 8.00 | 77.78 | 13.60 | 17.80 | 56.00 | 30.10 |
| General Financial | Financial Services - C | 0.04% | 0.08% | 0.00% | Suiveur | 25.84 | 23.95 | 18.50 | 17.32 | 0.00 | 44.44 | 4.60 | 17.85 | 25.60 | 19.75 |
| General Financial | Financial Services - C | 0.12% | 0.22% | 0.00% | Faible | 25.84 | 23.95 | 18.50 | 8.58 | 0.00 | 66.67 | 0.00 | 8.30 | 18.95 | 5.45 |
| General Financial | #N/A | 0.05% | 0.09% | 0.00% | Faible | 25.84 | 23.95 | 18.50 | #N/A | 0.00 | #N/A | #N/A | #N/A | #N/A | #N/A |
| General Industrials | Mining & Metals | 0.24% | 0.47% | 0.00% | Suiveur | 27.96 | 27.96 | 5.48 | 22.92 | 25.00 | 77.78 | 18.35 | 19.75 | 45.80 | 28.48 |
| General Industrials | Industrial Goods & Se | 0.06% | 0.12% | 0.00% | Faible | 27.96 | 27.96 | 5.48 | 33.11 | 0.00 | #N/A | 8.00 | 43.53 | 49.30 | 15.35 |
| General Retailers | Specialised Retail | 0.11% | 0.20% | 0.00% | Leader | 45.82 | 47.35 | 3.23 | 35.17 | 55.00 | 88.89 | 37.60 | 30.65 | 40.50 | 37.08 |
| General Retailers | Specialised Retail | 0.10% | 0.18% | 0.00% | Leader | 45.82 | 47.35 | 3.23 | 43.25 | 38.00 | 77.78 | 28.40 | 44.28 | 48.55 | 50.88 |
| General Retailers | Supermarkets | 0.08% | 0.15% | 0.00% | Impliqué | 45.82 | 47.35 | 3.23 | 42.69 | 39.00 | 44.44 | 41.40 | 38.88 | 46.85 | 49.45 |
| Health Care Equipment & Servi | Health Care Equipme | 0.15% | 0.29% | 0.00% | Impliqué | 36.40 | 35.77 | 5.30 | 32.50 | 36.00 | 88.89 | 27.15 | 26.15 | 47.40 | 36.20 |
| Health Care Equipment & Servi | Health Care Equipme | 0.12% | 0.24% | 0.00% | Impliqué | 36.40 | 35.77 | 5.30 | 33.12 | 0.00 | 100.00 | 14.15 | 29.50 | 51.50 | 38.25 |
| Health Care Equipment & Servi | Health Care Equipme | 0.08% | 0.15% | 0.00% | Faible | 36.40 | 35.77 | 5.30 | 25.41 | #N/A | 55.56 | 19.10 | 21.30 | 25.50 | 34.00 |
| Household Goods | Luxury Goods & Cosm | 0.08% | 0.16% | 0.00% | 0.00 | 56.90 | 56.90 | #DIV/0! | 46.13 | #N/A | 100.00 | 45.35 | 52.53 | 36.95 | 40.23 |
| Industrial Engineering | Industrial Goods & Se | 0.06% | 0.12% | 0.00% | Leader | 35.93 | 34.17 | 11.85 | 56.90 | 40.00 | 88.89 | 48.20 | 66.95 | 45.30 | 47.45 |
| Industrial Engineering | Mechanical Compon | 0.06% | 0.12% | 0.00% | Leader | 35.93 | 34.17 | 11.85 | 32.49 | 48.00 | 77.78 | 29.00 | 39.20 | 52.10 | 27.55 |
| Industrial Engineering | Automobiles | 0.13% | 0.26% | 0.00% | Leader | 35.93 | 34.17 | 11.85 | 32.78 | 35.00 | 77.78 | 30.05 | 26.45 | 48.20 | 39.63 |
| Industrial Engineering | Electric Components | 0.10% | 0.19% | 0.00% | Impliqué | 35.93 | 34.17 | 11.85 | 29.77 | 22.00 | 100.00 | 23.45 | 31.80 | 45.60 | 33.28 |
| Industrial Engineering | Mining & Metals | 0.22% | 0.42% | 0.00% | Impliqué | 35.93 | 34.17 | 11.85 | 44.58 | 7.00 | 33.33 | 50.55 | 58.95 | 34.60 | 38.60 |
| Industrial Engineering | Electric Components | 0.27% | 0.52% | 0.00% | Suiveur | 35.93 | 34.17 | 11.85 | 31.19 | 25.00 | 55.56 | 18.35 | 32.45 | 46.30 | 30.35 |
| Industrial Engineering | Mechanical Compon | 0.06% | 0.12% | 0.00% | Suiveur | 35.93 | 34.17 | 11.85 | 23.20 | #N/A | 55.56 | 20.90 | 21.05 | 27.70 | 25.25 |
| Industrial Engineering | Industrial Goods & Se | 0.02% | 0.03% | 0.00% | Faible | 35.93 | 34.17 | 11.85 | 25.52 | #N/A | 44.44 | 22.40 | 23.50 | 47.10 | 16.65 |
| Industrial Engineering | #N/A | 0.03% | 0.06% | 0.00% | Faible | 35.93 | 34.17 | 11.85 | 15.55 | #N/A | #N/A | 16.30 | 13.20 | 24.70 | 14.70 |
| Industrial Metals | Mining & Metals | 0.04% | 0.08% | 0.00% | Leader | 32.27 | 27.86 | 15.15 | 47.59 | #N/A | 77.78 | 62.05 | 40.90 | 54.30 | 40.63 |
| Industrial Metals | Mining & Metals | 0.93% | 1.80% | 2.90% | Leader | 32.27 | 27.86 | 15.15 | 32.99 | #N/A | #N/A | 29.80 | 30.70 | 62.20 | 35.08 |
| Industrial Metals | Mining & Metals | 0.10% | 0.20% | 0.00% | Impliqué | 32.27 | 27.86 | 15.15 | 21.11 | 20.00 | 66.67 | 22.60 | 17.65 | 43.60 | 20.78 |
| Industrial Metals | Mining & Metals | 0.20% | 0.39% | 0.00% | Suiveur | 32.27 | 27.86 | 15.15 | 18.15 | 0.00 | 66.67 | 9.50 | 17.00 | 34.20 | 24.73 |
| Industrial Metals | Mining & Metals | 0.04% | 0.07% | 0.00% | Faible | 32.27 | 27.86 | 15.15 | 9.95 | #N/A | 44.44 | 4.35 | 11.45 | 14.90 | 16.28 |
| Industrial Transportation | Transport & Logistics | 0.26% | 0.50% | 0.00% | Leader | 36.44 | 36.72 | 11.61 | 37.86 | 37.00 | 88.89 | 41.60 | 45.05 | 66.70 | 14.40 |
| Industrial Transportation | Transport & Logistics | 0.15% | 0.29% | 0.00% | Leader | 36.44 | 36.72 | 11.61 | 31.92 | 42.00 | 100.00 | 42.40 | 35.30 | 45.30 | 13.20 |
| Industrial Transportation | Travel & Tourism | 0.03% | 0.07% | 0.00% | Impliqué | 36.44 | 36.72 | 11.61 | 39.84 | 26.00 | 55.56 | 63.00 | 30.45 | 14.30 | 52.00 |
| Industrial Transportation | Transport & Logistics | 0.08% | 0.16% | 0.00% | Impliqué | 36.44 | 36.72 | 11.61 | 28.83 | 23.00 | 88.89 | 42.00 | 33.25 | 37.50 | 12.00 |
| Industrial Transportation | Transport & Logistics | 0.08% | 0.15% | 0.00% | Suiveur | 36.44 | 36.72 | 11.61 | 18.60 | 33.00 | 88.89 | 18.35 | 14.80 | 28.65 | 30.60 |
| Industrial Transportation | Transport & Logistics | 0.03% | 0.05% | 0.00% | Faible | 36.44 | 36.72 | 11.61 | 20.47 | #N/A | 77.78 | 27.25 | 24.40 | 61.25 | 26.28 |
| Industrial Transportation | Transport & Logistics | 0.04% | 0.08% | 0.00% | Faible | 36.44 | 36.72 | 11.61 | 16.31 | #N/A | #N/A | 25.35 | 16.10 | 35.80 | 14.95 |
| Leisure Goods | Technology-Hardwar | 0.40% | 0.77% | 1.24% | 0.00 | 55.29 | 55.29 | #DIV/0! | 45.35 | 52.00 | 100.00 | 39.00 | 41.58 | 58.40 | 49.80 |
| Life Insurance | Insurance | 0.75% | 1.44% | 2.32% | Leader | 47.96 | 45.66 | 10.01 | 52.29 | 47.00 | 100.00 | 42.15 | 54.63 | 68.85 | 56.45 |
| Life Insurance | Insurance | 0.20% | 0.39% | 0.63% | Leader | 47.96 | 45.66 | 10.01 | 47.94 | 32.00 | 100.00 | 47.90 | 43.38 | 57.35 | 48.00 |
| Life Insurance | Insurance | 0.03% | 0.06% | 0.00% | Impliqué | 47.96 | 45.66 | 10.01 | 47.89 | 32.00 | 88.89 | 31.40 | 44.65 | 55.95 | 59.13 |
| Life Insurance | Insurance | 0.05% | 0.09% | 0.00% | Suiveur | 47.96 | 45.66 | 10.01 | 50.25 | 18.00 | 66.67 | 39.45 | 51.30 | 44.65 | 59.40 |
| Life Insurance | Insurance | 0.05% | 0.10% | 0.00% | Faible | 47.96 | 45.66 | 10.01 | 41.37 | #N/A | 55.56 | 22.45 | 49.03 | 44.05 | 39.90 |

ESG: environmental, social and governance; ICB: industry classification benchmark; ISR: Socially responsible investment

Source: Internal Document, Company under study

Table 2. Example of a company evaluation factsheet.

| Company | | Sector | | | Country | Analyst | | Date | |
|---------------------------------|--------------------------------|---------------------------|------------------|------------------------|--|------------|--|--|---|
| | | Utilities | | | X | X | | X | |
| Financial Evaluation | | | | | SRI Evaluation | | | | |
| Exploitation ratios | | | | | Quantitative Filter | | | | |
| Sales (Millions Euros) | Increase of Sales (1 year / %) | EBITDA/SALES | Net Income/SALES | Net Income/EQUITY | Topic | Evaluation | | Innovation (+) | Late (-) |
| 41,053.00 | -4.24 | 12.84 | 6.48 | 11.95 | Environment | 🙄 | Bad | A few initiatives with "clean" factories | Extremely late when it comes to the management of Co2 emissions (lignite) |
| Structure ratios | | | | | Social | 😊 | Good | Good management of employees | Not many things on Human Rights (i.e. diversity) |
| LT Debt / Equity | EBITDA/ Fin Expenses | | | | Governance | 😐 | Average | No controversy - Work with government | No proactive approach |
| 35.62 | 5.84 | | | | Societal | 😐 | Average - the pollution problem holds | Advanced work with government | Little visibility on its relationships with stakeholders |
| Valorization ratios | | | | | Management Tools and Strategic Integration of CSR: > No consensus between social rating agencies > no access to management systems > Difficult to access reporting and light communication | | | | |
| Capitalization (Millions Euros) | PER (stock/net result) | Return % (divident/stock) | Share/Sakes | Share/Sales | Qualitative Filter | | | | |
| 44,802,150,000.00 | 11.22 | 3.8831 | | 1.11 | Homogeneity | 🙄 | Lack of homogeneity between subsidiaries | Within subsidiaries, integrated approach | The worst is with the best |
| Price to book (share/val.) | Previous Close | Higher | Lower | Variation (1 year - %) | Dynamism | 🐌 | Very late | Some subsidiaries are good | Just had a look at the SD stakes... |
| 3.38 | 81.12 € | 102.54 € | 72.22 € | 2.697 | Strategy | 🙄 | Late | "Clean" factories and work with government | Very reactive approach - No innovation |
| Consensus | | | | | Advice | | | | |
| Consensus | Number of Recommendations | Recom. Buy | Recom. Hold | Recom. Sell | > X suffers from the diversity of its subsidiaries in terms of SD level. The group consequently suffers from really bad things, that impacts other interesting initiatives. > Environmental management is really below the best of the industry. > In short, X is behind its competitors but knows that it has to do some work to catch up. The path will be long. > To avoid. | | | | |
| 3.7 | 40 | 22 | 12 | 6 | | | | | |
| Advice on Strategic Positioning | | | | | X is the third stock capitalisation and the 2nd one in terms of sales in the industry, far from Y and close to Z. Disappointed T1 (energy price effects and Co2 not completely compensated by prices). X presents a certain number of relative risks more important than its peers: regulatory risk in Z (more than 60% of sales), high Co2 risk, forced cessions (gaz) for anti-competitive practices (CE). Next event: results S1 on Y. Favor M. Sell. | | | | |
| | | | | | | | | | |

SRI: socially responsible investment; LT: long-term; EBITDA: earnings before interest, taxes, depreciation and amortization; PER: price-earning ratio; CSR: corporate social responsibility; SD: standard deviation

Source: Internal Document, Company under study

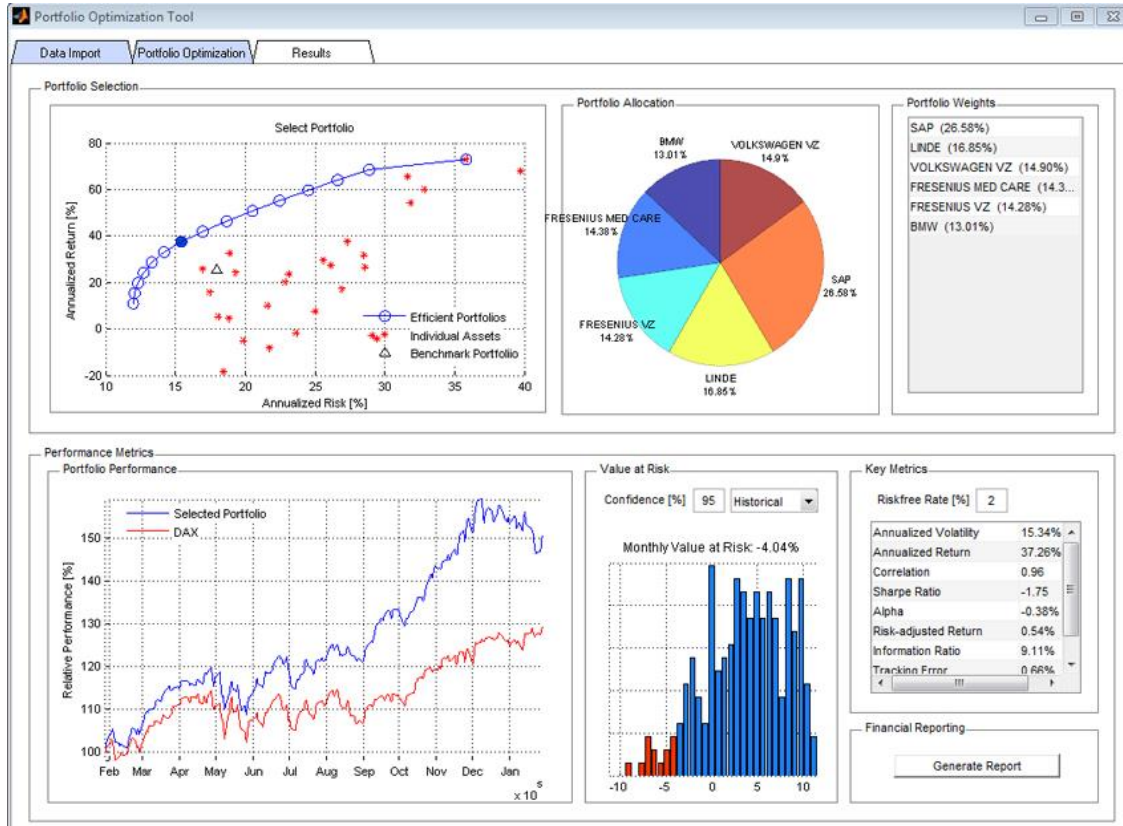












Figure 2. Example of portfolio optimization application using MATLAB, Financial Toolbox and object-oriented design

Source: MathWorks Inc., <http://www.mathworks.com/products/finance/features.html>.

Table 3. Emojis and their meanings in French and English

| Emoji | Meaning (French) | Meaning (English) |
|---|----------------------|----------------------------|
|  | A éviter à tout prix | To be avoided at all costs |
|  | Bien | Good |
|  | Coup de coeur | Kudos |
|  | Décevant | Disappointing |
|  | Dynamisme | Dynamism |
|  | Moyen | So so |
|  | Ouh la | Uh oh |
|  | Prometteuse | Promising |
|  | Sans dynamisme | Dull |
|  | Super | Super |

Source: Internal Document, Company under study

Table 4. Decision matrix used in equity investment.

| | | SRI PROFILE | | | | |
|-------------------|-----------|-------------|-----|---------|------|----------|
| | | Excellent | ... | Average | Poor | Laggards |
| FINANCIAL PROFILE | Excellent | | | | | |
| | ... | | | | | |
| | Average | | | | | |
| | Bad | | | | | |
| | Laggards | | | | | |

| | |
|--|---|
| | Company overrepresented in the portfolio compared to the benchmark index. |
|--|---|

| | |
|--|---|
| | Company equally represented in the portfolio and the benchmark index. |
|--|---|

| | |
|--|--|
| | Company underrepresented in the portfolio compared to the benchmark index. |
|--|--|

| | |
|--|--------------------------------------|
| | Company excluded from the portfolio. |
|--|--------------------------------------|

SRI: socially responsible investment
 Source: Internal Document, Company under study

LIST OF APPENDICES

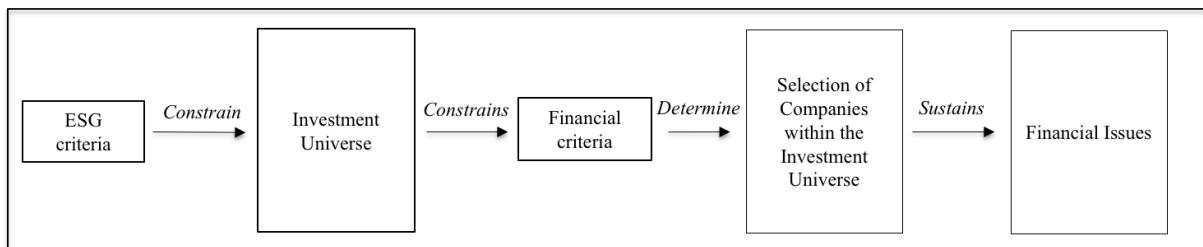
Appendix 1. Data sources.

| | Type | Occurrences |
|----------------------------------|--|--|
| Participative observation | Working Group's Weekly Meeting | 29 meetings lasting between 30 minutes and three hours: 25 Sept 2007–04 Oct 2007–09 Oct 2007–16 Oct 2007–23 Oct 2007–05 Nov 2007–14 Nov 2007–27 Nov 2007– 4 Dec 2007–18 Dec 2007–08 Jan 2008–10 Jan 2008–26 Feb 2008–29 Feb 2008–11 Mar 2008–18 Mar 2008–25 Mar 2008–01 Apr 2008– 08 Apr 2008–15 Apr 2008–29 Apr 2008–13 May 2008–20 May 2008–27 May 2008–17 June 2008–18 June 2008–24 June 2008–15 July 2008–29 July 2008 |
| | Day-to-day observation | 2006-2009: Two and a half years (350 pages of notes, single-spaced) 2015: Two days (5 pages of notes, single-spaced) |
| | External events (invitations to tender, meetings with consultants, road shows, etc.) | 2006-2009: 40 per year on average |
| Interviews | Semi-structured interviews with organizational actors (23 in total) | <u>1st set of interviews (2006)</u> : Fund of Funds Manager; Financial Analyst; Equity Manager; Middle Office Manager; Lawyer; Sales Manager; CEO; ESG Analyst |
| | <i>For each asset management class (equity, fixed-income, fund of funds), we were given access to the head of the team. We could</i> | <u>2nd set of interviews (2009)</u> : Equity Manager; Fixed-Income Manager; Head of SRI & Development; CEO; ESG Analyst (2); Sales Manager; Head of Support functions; |

| | Type | Occurrences |
|------------------|---|---|
| | <i>informally exchange with the rest of the team.</i> | <u>3rd set of interviews (2015)</u> : Equity Manager; Fixed-Income Manager; Head of SRI & Development; ESG Analyst (2); Sales Manager (1); Fund of Funds Manager (1) |
| Documents | ESG & Financial Artifacts | 3 final Excel files & methodological supports |
| | Company factsheets | 93 |
| | Minutes of the working group meetings | 23 |
| Emails | Exchanges between members of working groups (2006-2009) | 409 |

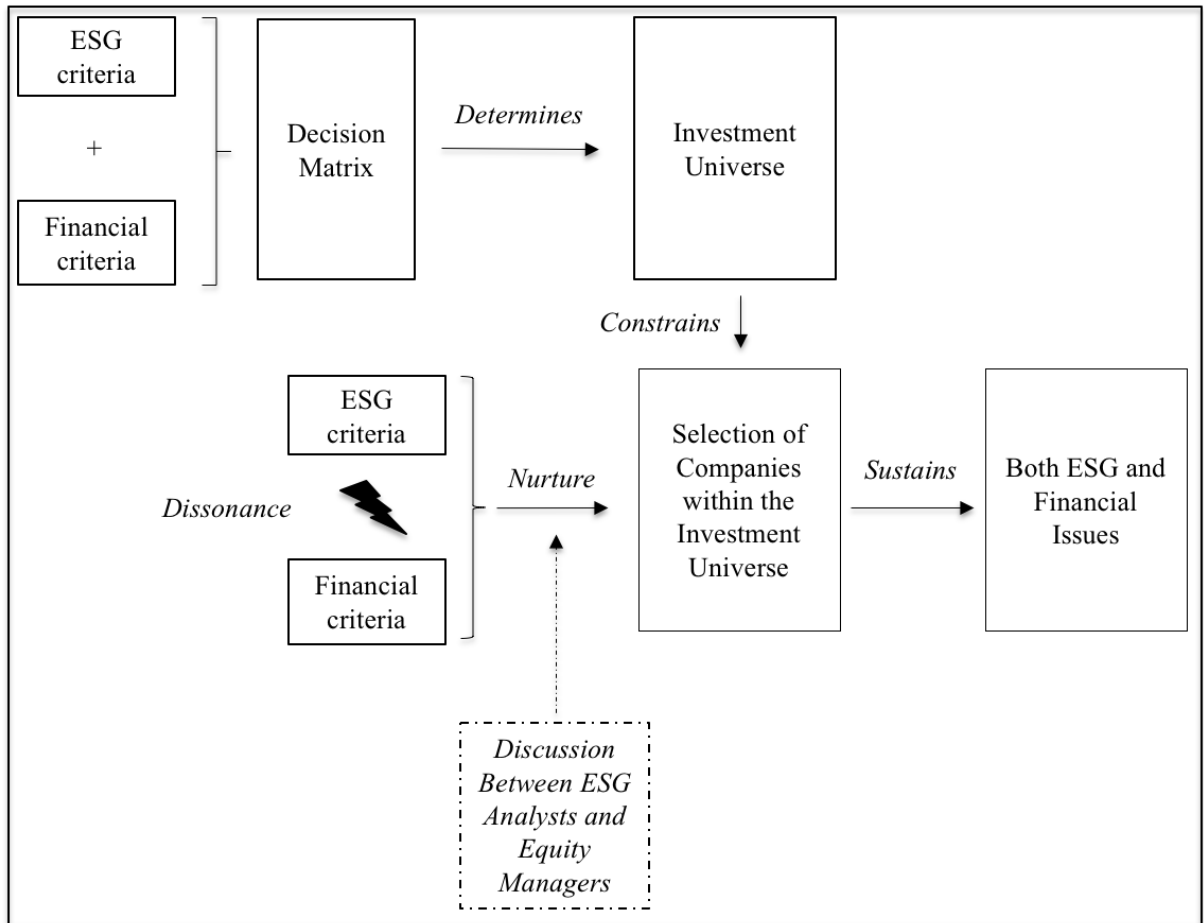
ESG: environmental, social and governance; SRI: socially responsible investment

Appendix 2. Fixed-income investment process



ESG: environmental, social and governance

Appendix 3. Equity investment process



ESG: environmental, social and governance