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Toward Mandatory Environmental Disclosure for Capital Markets: Discussion and Empirical Evidence from Japan

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I. Introduction

Environmental reporting has occurred voluntarily in most countries. However, increasing demand for ESG (environmental, social and governance) data by capital markets, mainly due to growth in socially responsible investment (SRI), has amplified discussions calling for mandatory environmental disclosure.(1) A mandatory approach may better fulfil the needs of investors and, in the long term, mandating environmental reporting may become a task for policymakers in many countries. To facilitate the design of effective mandatory environmental disclosure, the problems and shortcomings of current voluntary disclosure processes must be clarified. Where exactly are the problems and shortcomings with respect to voluntary environmental reporting from an investor's perspective? Can they be mitigated or eliminated through mandating disclosure? Would there be a change regarding the role of policymaking?

This paper discusses the capabilities and shortcomings of voluntary

(1) For example, the European Sustainable Investment Forum (Eurosif) asked the European Union to mandate ESG reporting (Eurosif, 2011).The Domini Social Investments and Social Investment Forum (2008), through a survey of cases of mandatory social and environmental disclosure outside the United States, summarised their view that mandatory disclosure is preferable.

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environmental disclosure in delivering useful information to investors. For this purpose, we focus on sus-tainability reports published in Japan. As in most countries, sustainability reports are voluntarily disclosed in Japan. Due to environmental reporting guidelines from the Ministry of Environment Japan (MOEJ), most sustainability reports in Japan contain a wide range of quantitative environmental data. Survey (MOEJ, 2010) results showed that in 2009, 1,091 sustainability reports were published in Japan. KPMG (2011) indi-cated that 99 of the largest 100 companies in Japan reported on their corporate responsibility activities and that Japan is a "traditional leader" in this area, along with the United Kingdom. A reporting analyst at Thomson Reuters, an ESG data provider, stated "Japanese companies have been strong when it comes to reporting environmental data" (Kamath, 2010, p.3). Japan may be one of the ideal countries to conduct an empirical survey on voluntary environmental disclosure.

The most promising way to utilise voluntary environmental disclosure to fulfil an investor's demand seems to be currently practiced by global information vendors such as Bloomberg, Thomson Reuters and Morgan Stanley Capital International (MSCI).[2] The ESG data disclosed in sustainability reports are collected, eventually complemented by questionnaires and provided to investors on unified platforms. This process eliminates, or at least mitigates, a well-known fault of voluntary disclosure that a non-standardised format display hinders an investor's ability to integrate environmental factors into their mathematical models and spreadsheets.

To discuss the capabilities and shortcomings of voluntary environmental disclosure, the authors take an approach similar to that of information vendors. This study develops a database of corporate environmental data gathered from the sustainability reports[3] of 225 Japanese companies listed on the

(2) For further information, see the websites of the corresponding companies (URL addresses are found in the References section).

(3) In this paper, the term 'sustainability reports' refers to voluntarily disclosed non-financial reports. Therefore, these reports include voluntarily disclosed non-financial reports published under titles such as 'environmental reports', 'corporate responsibility reports', and others.

Nikkei Index (Nikkei225), which includes leading companies[4] from different industrial sectors. Through the development and an analysis of the database, implications for future policymaking are derived for mandating environmental disclosure.

This article is organised in four sections. The first section outlines the framework of the research by describing the environmental impact assessment method employed. The second section describes the data collection procedure and presents an overview of the main features of the developed database. Section three provides an analysis and discussions of the database; blanks and discrepancies are discussed as shortcomings of voluntary environmental disclosure. The last section concludes by referring to issues associated with mandating environmental disclosure from the perspective of policymakers.

II. Framework

The research employs an environmental impact assessment method, the JEPIX (Japan Environmental Policy Index), as a framework to enable conversion of different emission data into comparable metrics.[5] Figure 1 provides an overview of the conversion by JEPIX. The method is designed to evaluate emission data on greenhouse gases (GHGs), pollutant release and transfer registers (PRTR), nitrogen oxide (NOx), sulphur oxide (SOx), chemical oxygen demand (COD), biochemical oxygen demand (BOD), nitrogen (N), phosphorus (P), and landfill waste. The evaluation is carried out according to the distance from actual flow to target flow, a type of method derived from the lifecycle assessment (LCA) community. A larger distance from actual flow to target flow requires more urgency in reducing the actual

(4) A list of constituents is available at http://e.nikkei.com/e/app/fr/market/constituents.aspx (accessed 11/Feb/2012).

(5) For detailed information on the JEPIX, see Miyazaki *et al*. (2003) and the JEPIX website: http://www.jepix.org.

flow; hence, the evaluation factor will be higher.(6) The result of the evaluation is a comparable metric of environmental impact points (EIP), with which total EIP is calculated.

III. Development of corporate environmental database

Emission data were collected from sustainability reports or other equivalent non-financial reports voluntarily disclosed either in paper or in electronic format. Data collection relied exclusively on company-sourced information disclosed to the public. This study does not use any information derived from interviews, questionnaires or governmental databases. Emission data from sustainability reports were entered in a Microsoft Excel spreadsheet equipped with JEPIX evaluation factors.

A snapshot of the environmental database developed is provided in Table1, and its major features are as follows. First, the database covers 185 companies from 35 industry sectors over two years (2007 - 2008), as we found that these 185 companies from the Nikkei 225 published environmental data in their sustainability reports. Second, environmental impact data are expressed by EIP metrics in the database. Environmental impact displayed under categories of 'global warming', 'air pollution', 'toxic substances', 'water pollution', and 'landfill waste' add up to total EIP, enabling a measure of the total environmental impact caused by companies and their breakdowns. Third, the environmental metrics of one company can be compared over time, enabling investors to carry out screening to select only companies with decreasing environmental impact. Fourth, the database includes basic financial data such as sales and profits, enabling integration of environmental criteria into financial valuation and vice

(6) The evaluation factor is calculated using the following formula:
Evaluation factor $=F/F_k \times 1/F_k \times c$
F = actual flow of the emission
F_k= target flow of the emission
$c = 10^{12}$ *(constant)*
Development of JEPIX is strongly influenced by the Eco-Scarcity Method developed by the Federal Office for Environment Swiss. For details of the Eco-Scarcity Method, see Öbu (2006).

versa.

IV. Analysis and discussions

On one hand, the authors found that the database is capable of fulfilling at least a portion of an investor's demand. On the other hand, two major obstacles—blank data and discrepancies in boundaries—were encountered when developing the database.

1. Blank data

The contents of the reports are not compulsory in Japan, as in most countries. A lack of such rules creates a situation in which some companies disclose a variety of environmental data, while others disclose little information. Table 1 contains cells indicated by 'N.A.', representing the fact that emission data were not disclosed in sustainability reports. The JEPIX framework has five different data points for each company, providing up to 925 data points in the database for the 185 companies disclosing sustainability reports. In reality, 768 data points were available and the remaining 157 data points were blank.(7)

From an investor's perspective, blanks hinder comparability and the reliability of the data. A company may not disclose emission data because of either zero emissions or a reluctance to report such information. Therefore, some indication is required to enable investors to differentiate zero emissions from information that is not available. Companies with a positive attitude toward environmental disclosure may be prone to disclose a wider variety of environmental data and their total environmental impact is likely larger than that of companies with a reluctant attitude. From a company perspective, "honesty does not pay," which could cause companies to have adverse incentives toward environmental reporting.

For information vendors, blank data raise simple questions such as whether

(7) The breakdown of the blank data is as follows: global warming 0, air pollution 53, toxic substances 61, water pollution 97 and landfill waste 22.

they should attempt to acquire data from other available sources, such as governmental databases or questionnaires. Furthermore, blank data raises the issue of whether to derive data through estimations using available factors such as industry average, region average, and others.[8] Data estimation is often associated with risk evaluation; high risk generally results in high estimation. Estimations may turn information vendors into ESG rating agencies.

2. Discrepancies in boundaries

This issue deals with the question of how the emission data were calculated. A boundary refers to "the range of entities (e.g. subsidiaries, joint ventures, subcontractors, etc.) whose performance is represented by the report" (GRI, 2011, p.12). Environmental data in a sustainability report are calculated based on boundaries set by the company, and significant discrepancies were observed among boundaries set by Nikkei225 companies.

These boundary discrepancies are discussed from two perspectives. First, organisational boundaries refer to the range of entities over which the company exercises *control* and are usually linked to definitions used in financial reporting (GRI, 2011; WBCSD and WRI, 2004). In our database, 149 out of the 185 companies disclose their environmental data on a "consolidated basis." However, "consolidated basis" only means that the reporting company includes emissions of subsidiaries at a certain level; 62 companies include GHG emissions from foreign subsidiaries, while the remaining87 include data only from domestic subsidiaries. Compared with consolidation in financial reporting, consolidation in sustainability reports is only partial. While the 185 companies consolidate 13,029 subsidiaries for financial reporting, only 4,060 subsidiaries are consolidated for sustainability reporting.

Second, operational boundary (more often called scope 3) refers to the range of entities in upstream (e.g., supply chain) and downstream (e.g., distribution

(8) A case study developed by Marquis *et al*. (2010) deals with the issue as to whether Bloomberg, an information vendor, should derive ESG data by estimation.

and users of products and services) over which the reporting company exercises *influence* (GRI, 2011; WBCSD and WRI, 2004). According to our survey, 82 out of the 185 companies disclose emissions from commissioned distribution, whereas 91 do not.(9) Twenty companies disclose emissions from users of their products and services and the remaining 165 do not.

From an investor's perspective, discrepancies in boundaries raise issues of comparability, not only with other companies but also with financial data of one company. On the contrary, our database is associated with fewer problems regarding comparability of one company over time because companies would normally be inclined to stick to the same boundary set used during the previous year. Again, from a company's perspective, the principle "honesty does not pay" is hindering. A broader boundary allows for greater total environmental impact. Information vendors would be faced with the question of on which boundary basis should they develop their databases: consolidated or unconsolidated and with or without scope 3 emissions.

V. Conclusion

Discussions heretofore attributed blank data and discrepancies in boundaries to the shortcomings of voluntary environmental disclosure in providing useful information for an investor. These shortcomings may be eliminated or mitigated by introducing mandatory environmental disclosure that will be associated with new issues related to policy-making.

Mandating disclosure of emissions could eliminate blank data in the database, which may, on the one hand, facilitate a comparison between companies and industries. On the other hand, it may shed light on issues for policymakers. Certain industries are inevitably associated with huge environmental effects. In our database, the steel and power industries show a significantly larger impact on global warming compared with other industries.

(9) Remaining 13 companies are exempt from the survey, since they belong to transportation and distribution sector.

The pulp and paper industries also have a large impact on water pollution and similarly for construction companies with respect to land waste. Mandating disclosure of an emission could be either a significant advantage or a drawback for a company, depending on the industry to which it belongs. Another example is marine transportation, which emits a tremendous amount of air polluting substances from fuel combustion. However, most of the substances are emitted into non-residential areas into the outer seas. Simply mandating disclosure of air polluting emissions would be unfavourable to marine transportation companies because the effect of their emissions per unit on humans is much less compared with onshore emissions per unit. Managing interests among industries and companies will become an environmental disclosure policy-making task.

Our research notes that companies may preferably disclose emissions with narrower boundaries, suggesting that mandating environmental disclosure should be associated with compulsory rules on boundaries. As is always the case with financial reporting, subsidiaries could be utilised in 'window dressing' settlements in environmental disclosure. This will raise issues related to liabilities with an organisation that provides assur-ances.

At the dawn of environmental reporting, around the year 2000 in Japan, only a limited number of companies engaged in this type of reporting. During this time, companies could easily use environmental reporting to signal to the market and to society that they are progressive, advanced and environmentally friendly. Since publicly disclosed data was normally not used for in-depth analysis and comparison, companies were positively incentivised to engage in environmental reporting. The policymakers did not mandate environmental reporting, but an "invisible hand" has steadily raised the number of sustainability reports published by Japanese companies.

The current situation is drastically different in Japan, as our study shows that over 80% of leading businesses (185 out of 225) conduct environmental reporting. Furthermore, given the growing demand from the investor community, the environmental data are exposed to in-depth analysis and comparison, creating adverse incentives for companies to engage in environmental reporting;

therefore, a laissez-faire approach may not function as well as it did in the past. The adverse incentive indicates that the function of a policymaker in environmental disclosure may become more vital in the future.

Figure 1: Conversion of emission data into environmental impacts by JEPIX

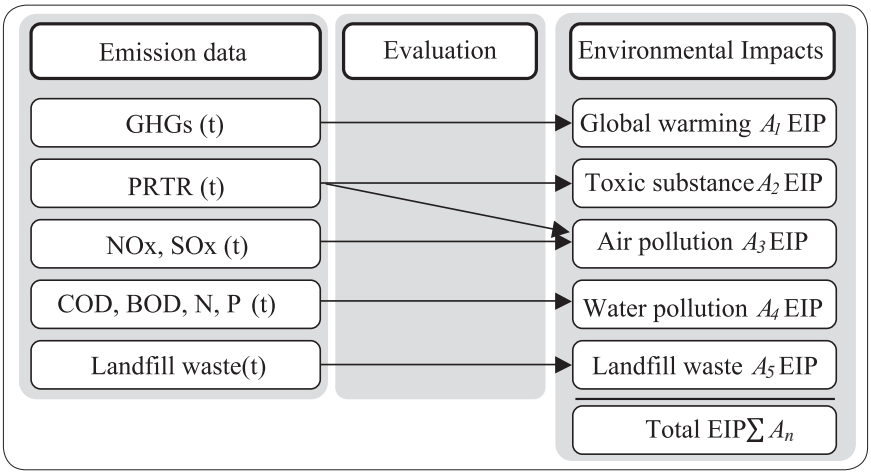

Table 1: Snapshot of the database

Unit: Million EIP | Unit: Million YEN

Industry Sector	Company Name	Boundary	Total EIP 2007	Total EIP 2008	Global Warming 2007	Global Warming 2008	Air Pollution 2007	Air Pollution 2008	Toxical Substance 2007	Toxical Substance 2008	Water Pollution 2007	Water Pollution 2008	Landfill Waste 2007	Landfill Waste 2008	Sales 2007	Sales 2008
Automotive	Toyota Motor Corp.	Business	15,141	16,176	7,013	8,422	N.A.	N.A.	N.A.	N.A.	852	831	7,275	6,923	23,948,091	26,289,240
Automotive	Honda Motor Co., Ltd.	Business	10,348	10,264	3,070	3,222	3,457	3,266	2,129	1,962	N.A.	N.A.	1,692	1,794	11,087,140	12,002,834
Automotive	Mazda Motor Corp.	Business	7,136	7,362	1,452	1,399	3,489	3,623	1,990	1,896	N.A.	N.A.	215	444	3,247,485	3,475,789
Automotive	Suzuki Motor Corp.	Business	5,315	4,811	399	419	2,928	2,663	1,976	1,728	N.A.	N.A.	131	1	3,163,669	3,502,419
Automotive	Fuji Heavy Industries Ltd.	Business	3,859	3,348	332	339	1,575	1,551	1,251	1,162	662	262	36	34	1,494,817	1,572,346
Automotive	Nissan Motor Co., Ltd.	Business	2,561	2,167	2,561	2,167	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	10,468,583	10,824,238
Automotive	Isuzu Motors Ltd.	Business	1,321	1,343	436	553	299	327	251	248	82	82	253	134	1,662,925	1,924,833
Automotive	Hino Motors, Ltd.	Business	865	711	345	359	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	520	353	1,287,668	1,368,633
Automotive	Mitsubishi Motors Corp.	Business	400	451	329	377	70	70	N.A.	N.A.	N.A.	N.A.	1	3	2,202,869	2,682,103
Chemicals	Asahi Kasei Corp.	Business	66,767	72,476	5,841	5,614	5,589	5,691	4,812	5,450	49,756	55,262	769	458	1,623,791	1,696,789
Chemicals	Denki Kagaku Kogyo K.K.	Business	15,960	15,469	3,152	3,063	4,855	5,049	2,278	1,852	5,464	5,333	211	172	329,262	363,996
Chemicals	Fujifilm Holdings Corp.	Business	6,213	5,773	1,520	1,490	893	745	46	33	3,023	2,751	731	754	2,782,526	2,846,828
Chemicals	Kao Corp.	Business	1,114	1,079	478	471	348	331	34	29	236	242	18	6	1,231,808	1,318,513
Chemicals	Mitsubishi Chemical Holdir	Business	82,710	79,193	9,506	9,169	12,995	8,891	11,600	11,855	47,106	48,197	1,563	1,082	2,622,820	2,929,810
Chemicals	Mitsui Chemicals, Inc.	Business	27,626	34,180	5,457	5,595	3,321	3,919	N.A.	0	17,414	16,948	1,434	1,649	1,688,062	1,786,680
Chemicals	Nippon Kayaku Co., Ltd.	Business	2,564	2,091	73	68	163	52	5	8	2,145	1,840	179	123	148,124	144,901
Chemicals	Nippon Soda Co., Ltd.	Business	1,567	1,566	199	181	140	153	1,049	1,076	127	124	52	31	145,300	157,561

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Toward Mandatory Environmental Disclosure for Capital Markets: Discussion and Em-pirical Evidence from Japan

<Summary>

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Increasing demand for environmental disclosure by capital markets has amplified discussions calling for mandatory environmental disclosure. Toward mandating, capabilities and shortcomings of current voluntary environmental reporting must be clarified from an investor's perspective. The authors carried out extensive empirical research in Japan, one of the most advanced countries in the world in terms of environmental reporting. Global information vendors are currently practicing a promising approach that enables investors to utilise environmental data disclosed voluntarily. Relying on their approach, the authors developed an environmental database that covers 185 companies in the Nikkei Index. This paper uses the information in this database to discuss the capabilities and shortcomings of voluntary environmental disclosure. The database enables investors to undertake simple analysis, but blanks and discrepancies in boundaries damage the comparability and reliability of the data. These fundamental shortcomings stem largely from the adverse incentive: the more a company is engaged in environmental reporting, the worse it could appear in the database we developed. In contrast to the fact that an "invisible hand" could increase the number of sustainability reports published voluntarily, the adverse incentive faced by companies indicates that policy-making in the area of environmental disclosure may become more vital in the future.