ANALYSIS OF RELATION BETWEEN CORPORATE ENVIRONMENTAL PERFORMANCE AND FINANCIAL PERFORMANCE FOR ENVIRONMENTAL EVALUATION OF MANUFACTURING FIRMS

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ABSTRACT

In 1991, Michel Porter proposed a hypothesis that environmental regulation increases firms' competitiveness in international market because the regulation promotes technological innovation and efficiency improvement. (Porter, 1991) Since then, several studies have proved that firms' environmental performance has a positive impact to financial performance in certain conditions. At the same time, private firms started to engage in CSR activities, Corporate Social Responsibility, to strategically improve their brand image since responsibility of corporation has become an enormous concern of consumers. In response to such a social trend, use of so-called SRI or ESG investment, an investment method considering not only financial aspect but also environmental, social, and governance aspects of firms, has increased in the stock market in 2000s. (Social Investment Forum Japan, 2008&2011) As Knoepfel (2001) argued that sustainable companies have more predictable result in the long term, investors and funds expect long-term return from such investment methods. However, by comparing performance of Dow Jones Sustainability Index, one of the most popular sustainability indexes, with its benchmark, Dow Jones Industrial Average, for 10 years, it is found that the volatility of Sustainable Index performance is greater than its benchmark. (Dow Jones, 2011) Also, some researcher like Filbeck and Gorman (2003) still doubt the relationship between environmental and financial performance. Since there is no

agreed understanding of the relationship, the main forces of this research, therefore, is to identify if overall environmental performance of a firm has a positive impact on financial performance in manufacturing sector of Japan. In the process, the research will also identify which aspects of environmental performance are more related to financial performance. This is to propose which parts of environmental performance should be empathized in the corporate evaluation process.

This research tests if the environmental performance of a corporation has positive impact on its financial performance using multiple regression models. It examines 91 companies in chemical, food and beverage, home appliance, automobile, and heavy industries including machine, precision material, and metal industries from 2004 to 2011. The result will be presented in four industries (chemical, food and beverage, appliance and automobile) and entire manufacturing sector including above four and heavy industries. The following equation and variables, the same as Nakao et al. (2007), is used for the research:

$ROA_{i,t}$ = (constant term) + $a1$(rate of increase in revenue)$_{i,t-1}$
+ $a2$ (advertising expenses/sales ratio)$_{i,t-1}$ + $a3$(R&D expenses/sales ratio)$_{i,t-1}$
+ $a4$(financial leverage)$_{i,t-1}$ + $a5$(sales/total assets ratio)$_{i,t-1}$
+ $a6$(environmental management scores)$_{i,t}$ + (error term).

Financial data is taken from financial statements through eol, financial information database, and EDINET. Five environmental scores from Nikkei Environmental Management Survey are used for environmental data. The scores are given in 10-100 scales for environmental performance on environmental management, contamination and biodiversity, recycling and resource management, products, and global warming respectively. In order to avoid multi-collinearity problem, the research takes three steps and the result will be judged comprehensively. First step includes all environmental variables in the equation at the same time. Secondly, each environmental variable is incorporated to the equation respectively.

Lastly, environmental variables without environmental performance on global warming are included into the equation simultaneously. The reason why the variable of global warming is excluded in the last step is the coefficients of correlation associated with the global warming and other four scores are higher compared to other environmental variables.

Statistical test showed environmental management, product, and recycle and resource management variables have statistical significance to firms' financial performance in limited industries. First, environmental management has a positive impact to ROA in chemical, appliance, and automobile industries. This is because well-managed environmental management system would improve efficiency in production and eventually reduces cost of the business. In fact, Lo et al. (2010) found increase of ROA within three-years from ISO 14000 certification in fashion and textile industry. Secondly, environmentally concerned product benefits firms' financial performance in chemical and appliance industries. In chemical industry, one of the factors in product that impact firms ROA is firms' green procurement of raw material. Since the EU requires all exporting firms to disclose included material in chemical products, firms sales channel to downstream firms will be narrowed if chemical firms fail to procure non-SVHC (Substances of Very High Concern) and disclose information. In appliance industry, statistical significance is only found in 2008 to 2011 when Japanese government promoted sales of TV, refrigerator and air conditioner by a campaign called promotion of green appliance by use of eco point (Ecopoint no katsuyouniyoru greenkaden fukyuujigyou). Therefore, positive relationship in appliance industry may be attributed to the sales promotion campaign rather than nature of environmentally concerned product. Last, firms' effort in recycle and resource management positively impact firms' ROA in chemical and automobile industry. Nikkei's evaluation of this variable is based on waste disposal and water use management. Therefore, positive impact should be confirmed in firms that reduce the cost of raw material procurement and water usage by implementing effective

recycle measures. Fujifilm, one of the top scorers, reported JPY 9.4 billion of cost reduction in 2006 by material recycle and water saving initiatives. Considering the firm's absolute for 2006 is JPY 37 billion, it can be said that firm's efficient recycle and resource management is actually related with financial performance.

In short, the research revealed that 1) relationship between environmental and financial performance is different by each industry and 2) environmental aspects associated with financial return are limited to environmental management, product, and recycle and resource management. The result also found that it is worth to conduct detail research focusing on each industry or environmental aspects for further improvement of corporate evaluation considering corporate environmental performance.

Key words: Corporate Environmental Performance, Regression Analysis, Socially Responsible Investment