# *CONSERVATION OF THE GLOBAL ENVIRONMENT BY DEVELOPING DIGITAL PLATFORMS*

Dr. Masao TSUJIMOTO
Associate Professor, Japan University of Economics
Phone: +81-3-3463-4112, Email: masao.tsujimoto@gmail.com

## Overview

This presentation explores the achievement of both growth and environmental conservation by digital platform providers, employing financial performance and environmental impact data from six providers in the US and Japan. 1) The regression analyses confirm the Environmental Kuznets Curve (EKC) hypothesis in three combinations of earnings per share (EPS)–electricity consumption or waste generation, treasury stocks–water consumption, and an inverted N-shaped curve in the combination of EPS–Scope 2 $CO_2$ emissions. 2) The growing trend of Environment, Society, and Governance (ESG)-oriented investment has acted as competitive pressure on the providers for fundraising, especially in spurring them to disclose information. 3) Both increasing EPS to the verified thresholds and ESG-oriented management are deciding factors, and any advanced EPS and ESG-based approaches could contribute toward developing academic frontiers.

## Methods

This presentation verifies the relationship between the six digital platform providers' financial and environmental impact data, employing linear, quadratic, and cubic regressions. This approach differs from previous studies in using data from platform providers in both the US and Japan. Sources include US Form 10-K Reports for GAFA and Japan's Annual Securities Reports and each digital platform's environmental and ESG reports.

- Dependent variables: 4 or 7. (1) $CO_2$ emissions (Total, Scope 1, 2, and, 3)($CO_2$), (2) electricity consumption (ELC), (3) water consumption (AQU), and (4) waste generation (WST).
- Explanatory variables: 5. (1) net sales (SAL), (2) net income (INC), (3) earnings per share (EPS), (4) total assets (TAS), (5) property, plant, and equipment (PEQ), and (6) treasury stocks (RES).

The number of basic regression formulas includes 24 combinations of 4 x 6. The number of advanced formulas is 42 by 7 x 6 because each item decomposed in Scopes 1, 2, and 3 $CO_2$ emissions is tested in addition to total $CO_2$ emissions. The significance level of the p-value is set at 5% ($p < 0.05$). Then, the regression models are as follows, where $CO_2$ emission is the dependent variable and each variable from (1) SAL to (6) RES is placed as the explanatory variable.

$$Y\ (CO_2) = \alpha + \beta_1\ (SAL) + \varepsilon, \tag{1-1-1}$$

The order of the explanatory variables is the same as above, only replacing the dependent variable, while equations (2)–(4) are omitted.

Secondly, the Environment Kuznets Curve (EKC) hypothesis is examined. The hypothesis is valid when the linear term (positive: $\beta > 0$) and the squared term (negative: $\beta < 0$) are significant ($p < 0.05$).

$$Y\ (CO_2) = \alpha + \beta_{11}\ (SAL) + \beta_{12}\ (SAL)^2 + \varepsilon, \tag{1-1-2}$$

Thirdly, the success or failure of a cubic curve is tested. It is desirable to illustrate an inverted N-shaped curve in investigating the relationship between growth and environmental impact. The inverted N-shape is valid in cases wherein the environmental impact increases (positive: $\beta > 0$) at the first turning point (bottom), it decreases (negative: $\beta < 0$) at the second turning point (top).

$$Y\ (CO_2) = \alpha + \beta_{11}\ (SAL) + \beta_{12}\ (SAL)^2 + \beta_{13}\ (SAL)^3 + \varepsilon. \tag{1-1-3}$$

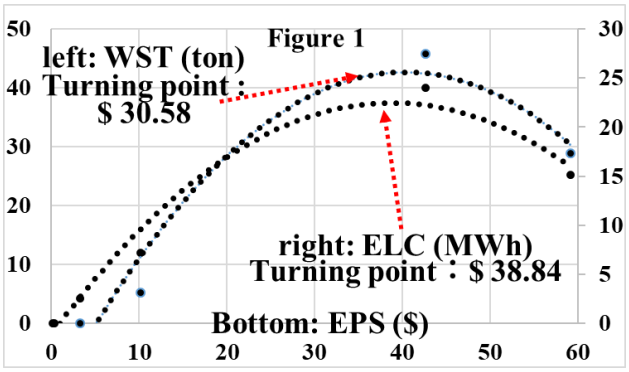
## Results

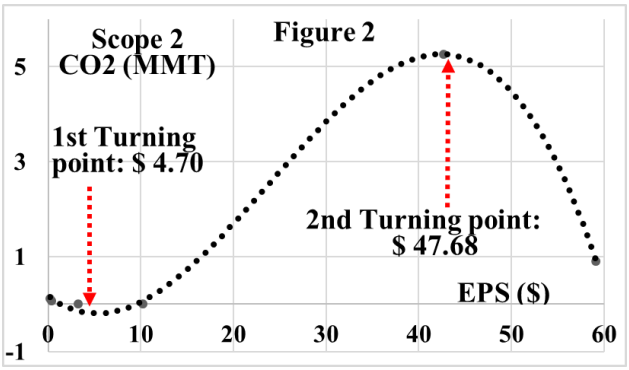
First, the linear regression analysis indicates significant monotonic relationships in eight cases of the 42 tested. The results illustrate a trend in which when financial performance expands, environmental impact increases.

Second, quadratic regression analysis confirmed the validity of the three combinations of EPS (earnings per share)–ELC (electricity consumption), EPS–WST (waste generation), and RES (treasury stocks)–AQU (water consumption).

Third, the inverted N-shaped curve is confirmed by the combination of EPS– Scope 2 $CO_2$ emission.

Figure 1 illustrates the explanatory variables (EPS) on the X-axis, while the dependent variables (ELC / WST) are on the Y-axis, revealing that the relationships depict inverted U-shaped curves with the turning points. And Figure 2 also illustrates the explanatory variables (EPS) on the X-axis, while the dependent variables (SCP 2) are on the Y-axis, depicting inverted N-shaped curves with the turning points.




As for the significant cases confirmed in the EKC and the inverted N-shaped curve, ESG-oriented investment and information disclosure progress should be noted. Investors' emphasis on ESG has been functioning as the compelling or driving force to advance digital platform providers' implementation of ESG-related environmental conservation, particularly in terms of information disclosure, through financing requirements, such as loans and underwriting of securities and bonds; the Principles for Responsible Investment (PRI), for example, have been increasingly emphasized by investors.

Without appropriate disclosure of ESG information, digital platforms providers face challenges in raising funds through the issuance of bonds and securities. In addition, disclosure requires the formulation and execution of corporate strategies that are worthy of disclosure, and the promotion of ESG activities, such as participation and signature on various ESG initiatives. As a result, platform providers have joined and signed various ESG initiatives to promote information disclosure. The following initiatives and ratings are relatively large and influential. (1) Task Force on Climate-related Financial Disclosures (TCFD), (2) Science-Based Targets (SBT), (3) Renewable Electricity 100 (RE100), and (4) CDP (formerly known as Carbon Disclosure Project) .

Then, it is necessary to investigate further the reasons certain combinations are significant while others are not: knowledge of accounting and management is critical for classifying the reasons behind.

- A-(a) Strategy change: a shift from prioritizing sales and name recognition in the growth phase to emphasizing capital efficiency and ESG in the mature phase.
- A-(b) Tactical change: the introduction of expensive, high-performance, state-of-the-art technologies and equipment based on elevated access to financing in more favourable conditions due to increased scale and name recognition. Also effective are fixed assets' retirement at a certain point for tax saving and introducing more expensive, energy-efficient properties through green bonds and loans for less waste generation.
- B-(a) ELC, AQU and WST: indicators that are easy to initiate through, for example, installing LEDs, motion sensors, wireless switches, and water-saving faucet at offices and factories for less electricity and water consumption, and reducing plastic and paper waste.
- B-(b) Scope 2 $CO_2$ emissions: successful participation in initiatives of the RE 100 and the providers' investment in highly efficient renewable sources.
- B-(c) EPS and RES: investors think highly of EPS for efficiency of investment. Moreover, treasury stocks (RES) contributes to increasing EPS by reducing the number of outstanding stocks. As such, RES can be considered as a background factor for EPS increase. Therefore, significant combinations of EPS–ELC or WST and RES–AQU in the EKC and EPS–SCP2 in the inverted N-shaped curve indicate the providers' uptake of ESG-oriented management on the requests of investors upholding, for example, the principles of PRI.

## Conclusions

It is implied that the emergence of the turning points in Figures 1 and 2 indicates the germination or beginning of the decoupling of growth and environmental impact. Their ESG-oriented management and increasing EPS to the thresholds, that is, $38.84 for ELC and $30.58 for WST in the EKC and $47.68 for SCP2 in the inverted N-shaped curve, could serve as guidelines or benchmarks for potential new entrants and existing digital platform providers for the decoupling. This eventually could contribute to global environmental conservation, given their magnitude of economic influence.

Moreover, if subsequent and further studies support and reinforce the results of the EPS increase and ESG-based approach presented in this presentation under the progress of convergence and refinement of environmental data and standards, any advanced approaches could contribute toward expanding the frontiers of environmental economics and the theory of industrial organization. Therefore, it is recommended that the academic community keep exploring the relationship between growth and environmental conservation.

## References

*Environmental / ESG Reports and Annual Securities Reports / Form 10-Ks* by Amazon, Apple, Google, Facebook (Meta Platforms), Rakuten Inc. and Z-Holdings.