Scientific Research Publishing

Theoretical Economics Letters, 2023, 13, 782-790
https://www.scirp.org/journal/tel
ISSN Online: 2162-2086
ISSN Print: 2162-2078

A Wealth-Additive Approach to GDP versus SDG Body Using the Behavioral Relax-Scheduling Policy

Masayuki Matsui[1,2]

[1]The University of Electro-Communications, Tokyo, Japan
[2]Kanagawa University, Yokohama, Japan
Email: mmatsui55@nifty.com

How to cite this paper: Matsui, M. (2023). A Wealth-Additive Approach to GDP versus SDG Body Using the Behavioral Relax-Scheduling Policy. *Theoretical Economics Letters, 13,* 782-790.
https://doi.org/10.4236/tel.2023.134045

Received: June 14, 2023
Accepted: August 4, 2023
Published: August 7, 2023

Abstract

In recent years there have been significant research advancements in the science of man-made vs. natural bodies and their ideal forms and manifestation, towards post-Industrial Revolution. Rather than classical cost orientation, hashing out the possibility of high-order (macro) SDG resulting from behavioral mitigation (motivation) policy in relation to traditional GDP in the recent socio-economic world, we take up the possibility of a wealth-additive approach for a rich man-made body, transcending the age of A. Smith. In this paper, we discuss the sublation of confrontation and contradiction from a nano perspective and take up economic systems by looking at the microcosm of basic ternary/pair-map forms (microcosms) based on artificial image and GDP, particularly from the perspective of eco-entropy in the natural state. Then we focus on the mitigation effects (angles) of sustainable waste, diversity/heterogeneity, and the like, and consider the shape of engine efficiency (dynamism), adopting a behavioral relax-scheduling policy. Furthermore, the utilization that is proportional to the angle/ratio (δ) of economics (price) versus reliability (amount) is noted as the barometer (well-being) of additive wealth in a win-win & sharing world. Lastly, we set out to challenge high-level (macro) man-made vs. natural, input-output modes of materialization, 1) eco-entropy (buffering criteria) perspectives, and 2) input-output mitigation (Matsui's formalization criteria) perspectives from a behavioral mitigation perspective. The latter goal 2) is similar to the so-called dynamic pricing principle.

Keywords

GDP versus SDG, Reward Prediction Error, Look-Ahead Logics, Ternary/Pair-Map, Win-Win & Sharing

1. Introduction

Current negotiations on the SDGs body at the United Nations have reached a deadlock. Thus, a future world where the SDGs are implemented would be much better and more constructive at transforming traditional bodies such as the 3 M & I class (human, material, money, and information) from nano (gene/therblig) towards eco-entropy (marginal value/diversity) on earth. This semi-visible world is traditionally limited to molecular size and is too rough at the practical rig level.

The paper proposes the wealth-additive scheme of managing and maximizing (win-win and sharing) the marginal value (eco-entropy) of artifacts by humanizing the artifact's enterprise and its economics with nature. The wealth-additive approach would be based on a two-center problem, and a subject of clockwork type would be achieved using the base of science of nature versus artifacts and its body at Springer books since 2008 (Matsui, 2009).

The paper inquires as to whether essential research and learning are sufficient to better understand the individual as a product of their accumulated experiences. It also clarifies how research can academically pursue the ideal of such accumulated form and design as a progressive loop type (Matsui, 2022a, 2022b) so that we can design a society that ensures mankind's ultimate happiness. There are alternatives to the accumulated form.

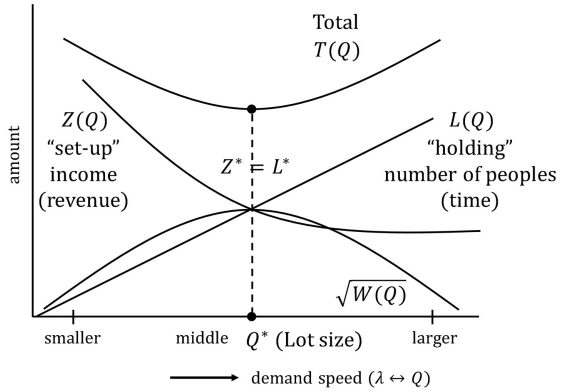
A GDP versus SDG body based on behavioral relax-scheduling (scheduling/ordered) is proposed as follows: 1) eco-entropy and diversity problem of buffer base 2) interindustry-correlational relaxation problem of Matsui's equation ($W = ZL$) base. Then, the utilization that is proportional to the angle/ratio (δ), of economics (price) and reliability (amount) is noted as the barometer (well-being) of additive wealth in a win-win & sharing world.

2. A Wealth-Additive Approach to GDP versus SDG Body

2.1. Accumulated Form of Wealth-Additive Approach

In manufacturing, lot-sizing evolution from mass-flow production of abundance to high-variety, low-volume production, ordered-accumulation forms by ordered-entry array, and input/output issues related to traditional GDP are all well-known. The wealth-additive approach, while different, presents a possibility of overtaking the theory of A. Smith.

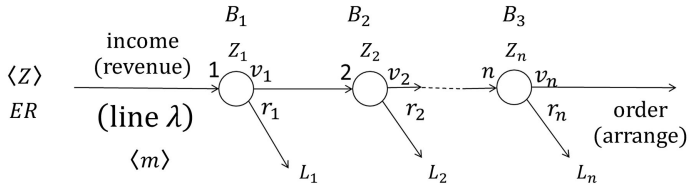
The so-called accumulated form in this paper can be considered a wealth-additive scheme seen in a world with ordered entry-like ordering and look-ahead policies (Matsui, 1981, 2005). We previously highlighted the win-win & sharing principles as a wealth-additive approach in 2017 (Matsui, 2018). This is the win-win situation of the single item in **Figure 1** 1) (a) income Z (income) = number of people L (time) maximizing wealth, and from **Figure 1** 2), $Z = L$ as the former Nash equilibrium solution for a middle-income society in lot-sizing of multiple items.



(a) Principal graph for EOQ, lot-sizing versus problem

line	lot	*ikko-nagashi*
(mass production)	(middle class)	(gap-wider)
$Q \to \infty$	EOQ	$Q \to 1$
$(Z > L)$	$(Z = L)$	$(Z < L)$

(b) Nash's equilibrium (2-class) at the middle class of society



(c) Sharing of balance at 3-class(Q<1), busy rate: $B_1 = B_2 = B_3$

Figure 1. Outline of lot-sizing principle on GDP.

In addition, we know that 3) the formation of vertical plane (sharing) = horizontal plane (balancing) of the OE system is a condition of shared balancing (Matsui, 2018). **Figure 1(c)** shows a system (non-independent) that satisfies both (a) and (b) for three or more parties, which is useful for examining operational balance (Matsui, 2018).

2.2. Behavioral Economic Approaches and Mitigation

Recently, GDP (efficiency) alone has proven insufficient to measure the richness of life in relation to the SDGs, with attention focused on indicators of "happiness" and "satisfaction," which were thought to be useless (Nomura Research Institute, 2022). This kind of index is also based on behavioral science (motivational) knowledge, and the identification of the relationship between motivation for work, waste, and productivity. More recently, our research into the science and modality of artificial bodies has empirically supported this efficiency vs. waste criterion of 0.6 vs. 0.4.

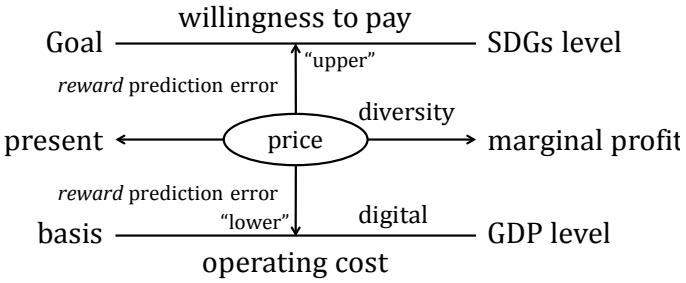


Figure 2. Wealth-additive image: Motivation view from GDP towards SDGs.

Recently, there has been an interdisciplinary focus on Science ZERO (NHK)'s "Science of Emotions" (May 2022). In a world where the body and mind are connected, "happiness is the maximum value of 'empathy' (systematic empathy)." In other words, humans have a simulation link between their brains (external) and bodies (internal) called the "insular cortex" in the prefrontal cortex, which depends on interoceptive sensitivity (IS).

This phenomenon has also recently been attracting attention from a behavioral science perspective. The Nomura Research Institute (NRI), a research organization, has introduced "consumer finance" as a new study of affluence (Matsui, 2020). This is the degree to which consumers perceive a benefit ("dopamine" reward prediction error, RPE), **Figure 2**, which is the amount consumers are willing to pay for goods and services minus the actual price. In last year's survey, the NRI combined GDP and consumer finance to explain and analyze "life satisfaction."

For this mechanism, we are familiar with look-ahead logics "(error (delay)" minimization) (Matsui, 2005) known from research on conveyor systems (CSPS). The former points out that recent digitalization contributes to life satisfaction, seeking out the correlation between wealth and happiness and just what constitutes DX. With this behavioral science (motivation) approach, we will focus on mitigation issues (angles) such as waste and diversity from an eco-entropy perspective, using traditional inter-industry issues related to GDP as examples.

Note that the effect of mitigation belongs to a linear relation of delay (error) and overflow (lost) of "look-ahead" price (LAP) type (Matsui, 1981).

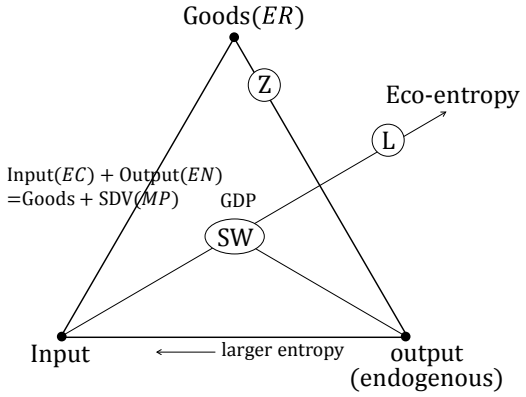
3. Eco-Entropy and Sustainable Value

3.1. Ternary SW Approach and Pair-Map Strategy

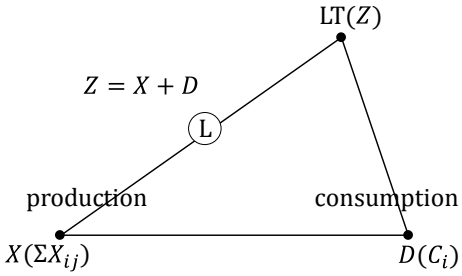
The concept of eco-entropy in man-made bodies has already been discussed along with Ternary SW (Matsui, 2023). For example, the profit formula is as follows.

$$EC(\text{input}) + EN(\text{output}) = ER(\text{goods}) \tag{1}$$

The relaxation type in this case is a kind of flow number management formula with the sustainable development value given as SDV. It is expressed from **Figure 3** as



(b) upper level of economic body



(a) lower level of economic body

Figure 3. Ternary SW: Type of economic body and sustainable value, SDV.

$$EC(\text{input}) + EN(\text{output}) = ER(\text{goods}) + MP(\text{SDV}) \tag{2}$$

Here, EN (output) corresponds to the value at the end of the previous period and is considered different from Gross Domestic Product (GDP).

In the wealth-additive approach of the flow number management formula, a mitigation formula is recommended for SDP (MP). As such, since $MP > 0$ can be assumed, relaxation can generally be expressed using the following formula.

$$EC + EN < ER + MP(> 0). \tag{3}$$

3.2. Diversity/Heterogeneity and Its Eco-Entropy

Eco-entropy currently calls for the pursuit of sustainability (lowering) of the individual entropy of man-made bodies. Here, individual entropy is used as an individual value and restraint application, which considers various expressions such as constraint, redundancy, complexity, diversity, and contradiction.

While it serves as a measure of sustainability, schemes that pursue a certain entropy mass (state), particularly eco-entropy, are pursued with a certain marginal utility in **Figure 4**. Regarding entropy, while the rules for expanding this are generally known, together with restrictions (redundancy/waste), and diversity, entropy enables the individual to flourish, consuming high energy resources such as solar power and fossil fuels. Moreover, in an open system (an environment where heat is exchanged with the outside), this can be lowered by buffers,

food load, and the like.

However, in a two-variable system, variables X and Y generally share information $T(X,Y)>0$ (non-independent), and are expressed as:

$$H(X)+H(Y)=H(X,Y)+T(X,Y) \tag{4}$$

However, where this is independent, it is expressed as $T(X,Y)=0$, $H(X)+H(Y)=H(X,Y)$ (Attneave, 1959). In section 3.1, this case was considered as $X \to EC, Y \to EN$. Note that in traditional cost accounting, this cost and profit are standardized and treated as independent.

4. Input-Output Mitigation Approach

4.1. Top GDP vs. SDG Considerations

Another possible wealth-additive approach that this paper addresses involves eco-entropy 1) versus mitigation of interindustry relations and 2) involving traditional input-output issues, with this section seeking a high-level (macro) approach to GDP vs. SDG. This paper focuses on and provides insights regarding traditional input-output mitigation approaches, especially from the perspective of the latter SDGs.

Figure 5 presents and compares two methods, 1) the buffering criterion and 2) Matsui's formulation criterion. The former is expressed as endogenous + exogenous = goods, and in this case, production = distribution corresponds to the so-called GDP, which is already practical and can be reduced to the pair map problem. The latter involves geometrically maximizing the area of a square. In the next section, we consider some numerical examples.

4.2. Numerical Example of Figure 5(b) According to Figure 1

Figure 6 shows a numerical example of Figure 5(b). From Figure 6, it is

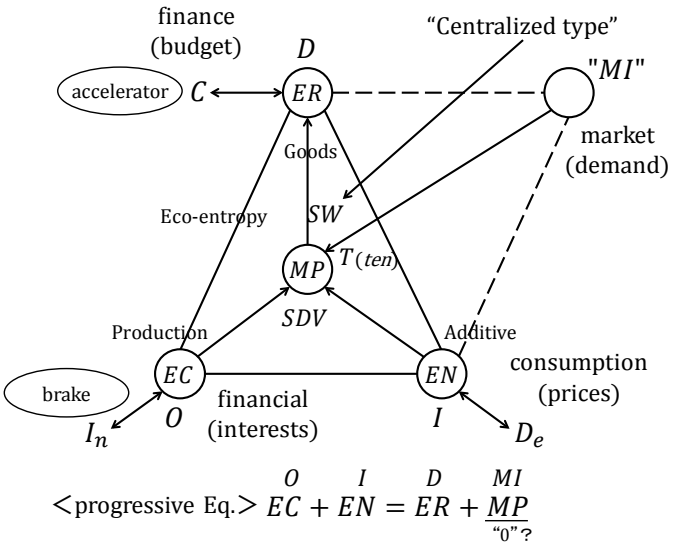


Figure 4. Ternary/pair-map type at economics.

$\Sigma c_i p_i$ ("production" GDP) $\leq \Sigma v_i x_i$ ("distribution" GDP)

$i, j = 1 \sim n$

$$\begin{pmatrix} x_i - \Sigma a_{ij} x_j = c_i \text{ <基本>} \\ p_j - \Sigma a_{ij} p_i = v_j \text{ <双対>} \end{pmatrix}$$

p: price, c_i: end demand, x: intermadiate demand, v: added value

(a) Case of GDP (a: input factor)

$$W(= ZL): \Sigma x_i p_j < max$$

$i, j = 1 \sim n$

$$\begin{pmatrix} Z: p_j = \Sigma a_{ij} p_i + v_j \\ L: x_i = \Sigma a_{ij} x_j + c_i \end{pmatrix}$$

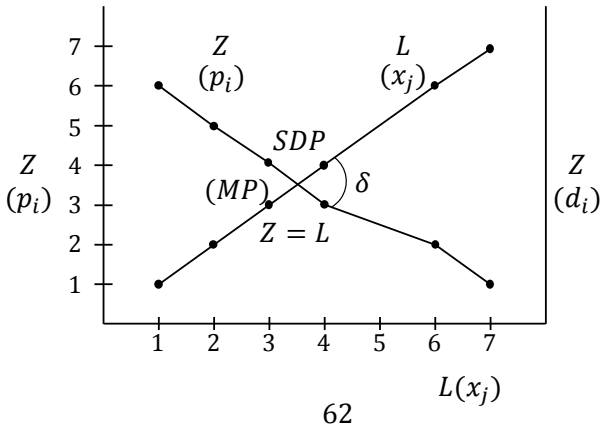
p: price, c_i: end demand, x: intermadiate demand, v: added value

(b) Case of SDGs (a: input factor)

Figure 5. GDG vs SDGs: input-output analysis approach.

i, j	1	2	3	4	5	6
p_i	7	6	4	3	2	1
x_j	1	2	3	4	6	7

Σ(sharing) $\leftrightarrow$ Σ(balancing)



62

$\bar{W}(= Z\bar{L}): \Sigma p_i x_j \rightarrow max$ (wealth)?

$\rightarrow$ AI-digital Engine

Figure 6. Numerical example for **Figure 5(b)** and AI-digital engine.

noteworthy that the axes of monotonically decreasing economy Z and monotonically increasing reliability L intersect, and that heterogeneity, not homogeneity, maximizes richness (dynamic pricing principle). This crossing point *SDP* is considered to be corresponding to the (sustainable) marginal point ($Z = L$), *SMP*, in **Figure 6**.

In the future, with the wealth-additive approach from **Figure 1**, an ideal equilibrium point ($Z = L$) that maximizes (perpendicularly) the product of economy (LAP, Z), and reliability (RPE, L) is anticipated on eco-entropy. This means that the intersection angle δ in **Figure 6** should be hetero (diversity) and maximize orthogonality. In addition, although **Figure 5** and **Figure 6** in this section lack the low-order (microscopic) approach (equivalent to nano), (**Figure 5**), effective development from Nomura Research Institute (2022) to dynamic 3D integrated design including supply and demand speed system (d, m) is expected.

5. Conclusion and Areas for Future Research

In this paper, we considered wealth-additive schemes (assuming an OE system) using a behavioral relaxation approach involving diversity/heterogeneity in individuals that can continuously add richness to the SDGs. Early efforts (Matsui, 2014, 2018, 2022a, 2022b) resulted in a successful wealth-additive trial with a manufacturing-sales integration approach. The current efforts also showed that it is possible to present sustainable values (SDV) for the SDGs in place of traditional GDP.

However, we believe that it is possible to create an affluent society using the flow number management formula method, which is also useful for its intentions. To build on the findings of the present research, future studies should consider using scientific, large-scale empirical verification to create an affluent wealth-additive society.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

References

Attneave, F. (1959). *Applications of Information Theory to Psychology.* Holt, Rinehart and Winston, Inc.

Matsui, M. (1981). *A Study on Optimal Operating Policies in Conveyor-Serviced Production System.* Ph.D. Thesis, Tokyo Institute of Technology. (In Japanese)

Matsui, M. (2005). CSPS Model: Look-Ahead Controls and Physics. *International Journal of Production Research, 43,* 2002-2025. https://doi.org/10.1080/00207540412331331416

Matsui, M. (2009). Stochastic Management Approach. In: *Manufacturing and Service Enterprise with Risks. International Series in Operations Research & Management Science* (Vol. 125, pp. 11-18). Springer. https://doi.org/10.1007/978-0-387-84804-4_2

Matsui, M. (2014). Manufacturing and Service Enterprise with Risks: The Physics and Economics of Management. In *International Series in Operations Research & Management Science (ISOR)* (Vol. 202). Springer. https://doi.org/10.1007/978-4-431-54619-1

Matsui, M. (2018). A Theory of Modern Economic Growth toward Sharing Society. *Theoretical Economics Letters, 8,* 675-684. https://doi.org/10.4236/tel.2018.84045

Matsui, M. (2020). A Chameleon's Harmonic Correlation, Criteria, and Diversity for a

Win-Win and Sharing World. *Theoretical Economics Letters, 10,* 735-744. https://doi.org/10.4236/tel.2020.104045

Matsui, M. (2022a). Virtual GDP Engine: The Loop-Conveyor Problem in Sustainable Economics, and a Method for Formalizing Carnot-like Dynamism and Win-Win & Sharing. *Theoretical Economics Letters, 12,* 761-769. https://doi.org/10.4236/tel.2022.123042

Matsui, M. (2022b). AI-Digital Engine of Artificial Economic and Knowledge Type by a Matsui's Progressive Approach. *Theoretical Economics Letters, 12,* 1288-1296. https://doi.org/10.4236/tel.2022.125069

Matsui, M. (2023). A DX-Like Ternary/Pair-Map, Its Eco-Entropy Scheme, and Managerial Diversity of Nature versus Artifacts Type on Sandwich Theory. *Theoretical Economics Letters, 13,* 109-118. https://doi.org/10.4236/tel.2023.131006

Nomura Research Institute (2022). *Digital Growth Revolution.* Toyo Keizai Inc. (In Japanese)