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## Re-examining the Urban Civilization Using the Minimum Wage Level as an Alternative Value-Evaluation Basis

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### Abstract

In recent decades, as the rapid economic development proceeds worldwide, more and more regions are making attempts to increase the growth level mainly considering the mainstream economic indicators, e.g., per capita income or gross domestic production (GDP). Nevertheless, as the environmental economists from the perspective of environmental Kuznets curve argued, the aforementioned economic indicators would omit the real value of the human life quality and the environmental/ecological systems. Therefore, a large body of literature are trying to establish integrated indicator systems to diagnose the current civilization progresses, e.g., the Kuznets curve and sustainability indicators. Although a variety of adjustments have been made to diagnose the current civilization, e.g., the Purchasing Power Parity (PPP), the data of PPP is of highly uncertainty. Instead of PPP, this study makes an attempt to utilize the minimum wage level as a conversion basis to adjust the mainstream economic indicator. The ratios among economic indicators and an environmental indicator, the per capita municipal solid waste (MSW) collection representing the civilization progresses are diagnosed and compared in several megacities in East Asia, including Tokyo, Osaka, Seoul, Beijing, Shanghai, Guangzhou, Taipei and Hong Kong. Based on the results, the current mainstream value of civilization can be re-examined from an alternative perspective and concrete proposals can be made toward real sustainable development.

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## 1. Introduction

Gross domestic production (GDP) has been regarded as an indicator on economic development with a long history. Indeed, GDP was an efficient indicator for conventional economic development that considers only internal monetary values in the markets. Nevertheless, in recent decades, with regard to critical perspectives of social ecological progresses, e.g., environmental externality, social progress, life quality, social welfare and ecological sustainability, GDP could not serve as a representative indicator for public policy making.

As the environmental economists from the perspective of environmental Kuznets curve argued, the aforementioned economic indicators would omit the real value of the human life quality and the environmental/ecological systems. Therefore, a large body of literature are trying to establish integrated indicator systems to diagnose the current civilization progresses, e.g., the Kuznets curve and sustainability indicators [1-6]. Although a variety of adjustments have been applied to diagnose the current civilization, e.g., the Purchasing Power Parity (PPP) and a variety of composite indicator systems [1-6].

Regarding the international trade records, the Purchase Power Parties (PPP) was proposed to modify the deficiency of the exchanging rate for reflecting the genuine worldwide market conditions [7]. The concept is useful and insightful, but, still, some critical problems exist in the construction of database. Firstly, the investigation across countries might be difficult to perform under a consistent standard, and the estimation methods are still not on a robust level. Therefore, the existing PPP database might exist high uncertainty for practical policy making.

Meanwhile, not only considering macroeconomic indices but also social/environmental externality, in order to develop an adequate indicator replacing GDP, a variety of substitutive indicators or composite indicator systems have been established at regional and international levels [1-6]. Regarding the development of integrated environmental evaluation, e.g., the Energy analysis, the life-cycle assessment and the ecological footprint as well as the related indicators, i.e., the visual water, carbon footprints, has been developed since the 1950s [8]. Also, for large-scale composite indicators, many insightful indicators, e.g., the Human Development Indicators (HDI), the Better Life Index (BLI), the Social Progress Index (SPI), the Genuine Progress Indicators have been constructed for decades [1-6]. In principle, the concepts of the aforementioned indicators are actually of great importance to facilitate the biased monetary values for considering the genuine quality of life and social/environmental/ecological issues for specific purposes. Therefore, a variety of indices would be covered in these composite indicators with regard to internal and external impacts. Still, some technical problems could be found from the literature:

- Precise data: For large-scale indicators, it is quite difficult to obtain consistent database for a large number of indices on a specific basis. Data missing is a general problem in the establishment of worldwide database. Theoretically, the benefit-transfer method should be applied for precise estimation.
- Scaling factor: Another major methodological problem for the above indicators is that the scaling issue is difficult to be reflected with the unit coefficient method, particularly for quantifying social/environmental externality.
- Deciding the weight of sub-indicator: When summarizing the scores from several levels of sub-indicators, it is quite tricky to decide the weight for each sub-indicator, leading to high uncertainty on the evaluation outcomes. In this regard, using the simplified mathematical manipulations and plausible database, it is very difficult to judge the credibility of the outcomes, even for its policy implications for the real world.

The abovementioned problems might bring about highly uncertain results of the evaluation. As most substitutive indicators attempt to take account for the social/environmental externality, the data availability and its credibility must be one of the main challenges for the manipulations on the aforementioned indicators. Therefore, the results of the aforementioned indicators are highly uncertain, even for applying the methodologies to spatial and temporal evaluations as done comprehensively. For composite indicator systems, it is critical task to deal with the abovementioned technical problems. If not, the results might be of very little scientific value for practical policy design with rational risks.

Instead of using plausible input data, using well prepared indices in the official statistics, in [8], a composite indicator system was established with regard to a variety of social, economic, environmental and ecological indices, with a particular focus on the climate change adaptation. An important contribution of the work is that a conceptual framework linking the indices on the basis of ecological network, as shown in Fig. 1. Actually, the framework is also quite consistent with the aforementioned composite indicators.

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