

A SIMPLE INDICATOR TO MEASURE WELFARE

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Abstract

This paper proposes a welfare index derived from the welfare function by accommodating the people's happiness index as the adjustment factor. This treatment makes the proposed welfare index different from the known welfare indicator. Other than that, the simplicity of the formula and calculation process remains the same.

Keywords: welfare indicator, happiness, GDP

Abstrak

Dalam paper ini peneliti mengusulkan suatu indeks kesejahteraan yang diturunkan dari fungsi kesejahteraan dengan mengakomodir tingkat kebahagiaan masyarakat sebagai faktor adjustment. Hal tersebutlah yang membedakannya dengan indikator kesejahteraan disamping kesederhanaan dalam formulasi dan proses penghitungannya.

Kata Kunci: indikator kesejahteraan, kebahagiaan, PDB

1. Introduction

Gross domestic product (GDP) is an added value produced by all business units in a particular country and over a certain period. GDP is also viewed as the national income, so the bigger the GDP, the bigger the people's income, and the more prosperous a country is. So, it is reasonable to use GDP as an economic welfare measurement tool (Jacobs & Slaus, 2010). However, GDP has some disadvantages. They are: (1) GDP or GDP per capita could not represent the real condition when there is a big inequality in the people's income distribution; (2) it does not calculate the untradeable goods in the market such as government services, volunteer work, and voluntary activities at home (e.g., cleaning, taking care of a sick child, etc.); (3) an accurate calculation of the value of goods based on their quality is difficult to do; and (4) the GDP calculation does not consider the pollution and environmental consequences caused by economic activities.

Therefore, a better indicator to measure economic welfare is needed. The alternative indicator should be SMART (simple, measurable, attributed, reliable, and timely). This paper argues that a welfare indicator should be derived from the welfare function while still maintaining the GDP element so that the indicator obtained is

credible. Sen (1976b) proposed a welfare function that could be used as an indicator, as follows:

$$W(x) = \mu(1 - G), \quad (1)$$

μ is the average income (x), and G is the Gini ratio from the income distribution. Then, Atkinson (1987) inputs the poverty index into Eq.(1). Atkinson (1987) and Sen (1976b) built an indicator based on the welfare function. However, the indicator does not represent the people's happiness. Thus, this paper proposes an alternative welfare indicator by inserting the happiness index into the indicator that Sen (1976b) and Atkinson (1987) have reconstructed. The indicator details will be discussed in the next section.

2. Methods

The welfare function is expressed as follows:

$$W(x) = V(x_1, x_2, \dots, x_n), \quad (2)$$

where x is income or expenditure, and x_n is income or expenditure of the n -th unit. The inequality measurement component should be included in the function; thus, the welfare function represents the people's reluctance to accept income inequality. Suppose that Eq.(2) is a homogenous equation with degree 1, so Eq.(2) could be factored by the average income (μ) into:

$$W(x) = \mu V(x_1/\mu, x_2/\mu, \dots, x_n/\mu). \quad (3)$$

If $V(\cdot)$ is normalized so that it becomes $V(1, \dots, 1) = 1$, then the implication of the normalized inequality function $V(\cdot)$ reaches the maximum value at 1, and $W(x)$ cannot be greater than μ . Based on this argument, the welfare function could be reformulated as follows Eq.(4):

$$W(x) = \mu(1 - I), \quad (4)$$

where I is the inequality index for income or expenditure (expenditure as the income proxy). Based on Eq.(4), Eq.(1) uses the Gini ratio as the chosen inequality index. Other inequality indexes could also be used as a replacement for the Gini ratio, such as the Theil index and the Atkinson index. The Eq.(4) could be interpreted as saying that welfare is the average income corrected by the cost of inequality. Then, Eq. (4) is constructed to include the poverty element by adopting Atkinson (1987) that is formulated into (Lubrano, 2010):

$$W^*(x) = \mu(1 - I - P) = \mu - \mu I - \mu P, \quad (5)$$

where P is the poverty index, such as Sen index (Sen, 1976a), FGT 1.0 index (Foster et al., 1984), Watts index (Watts, 1968), CHU index (Clark et al., 1981), Chakravarty index (Chakravarty, 1983), and SST index (Shorrocks, 1995).

This paper proposes to include the people's happiness index into Eq.(5) as a complement of welfare from the nonmaterial and replace the people's average income (μ) with real GDP (gross domestic product) per capita (Y) to represent economic activities, as follows:

$$W^{**}(x) = (Y(1 - I - P))K, \quad (6)$$

K is a happiness index with a value range of 0 to 1. The difference between Eqs.(5) and (6) besides the existence of K , among others: Eq.(5) calculates μ , I , and P from income (x), while Eq.(6) does not use the average of income but from real GDP per capita because Green GDP (GDP adjusted for environmental degradation) is not yet available at the provincial level, then calculates I and P from income (x) not from real GDP per capita. In Eq.(6), this study uses the Gini ratio to represent inequality and the poverty depth index (Atkinson, 1987; Foster et al., 1984) to represent poverty.

3. Result and Discussion

This paper uses the Human Development Index (HDI), real GRDP (Gross Regional Domestic Product) per capita, gini ratio (average gini ratio from Semi-annuals 1 and 2), poverty depth index (average poverty depth index from Semi-annuals 1 and 2), and happiness index year 2014 by province taken from Statistics Indonesia-Badan Pusat Statistik for calculating the welfare indicator (6). The calculation result of the welfare indicator based on Eq. (6) can be seen in Table 1.

Based on the results in Table 1, it can be displayed that there are two provinces with the highest welfare indicator values: East Kalimantan and DKI Jakarta. It is reasonable since the two provinces have the highest GRDP and a low poverty gap compared to the other provinces. Meanwhile, the two provinces with the lowest welfare indicators are East Nusa Tenggara and Maluku. Having the lowest happiness index and the highest poverty depth index does not make Papua a province with the lowest welfare compared to East Nusa Tenggara and Maluku. It is because Papua has a higher real GDP per capita than the other two provinces. The existence of PT. Freeport Indonesia is a significant factor in contributing to the economy of Papua Province from the mining and quarrying sector, which contributed 34.56% to the GRDP in 2014. Based on Fig.1, it can be seen that the scatter plot between W^{**} and HDI follows a nonlinear

pattern. Indicator W^{**} could be applied to social economy analysis with additional information, such as HDI, pollution level, economic growth, Etc.

Table 1. The Calculation of The Welfare Indicator based on Eq. (6) by 33 Provinces of Indonesia in 2014

Province	W^{**} (in thousand Rupiah per capita)	Province	W^{**} (in thousand Rupiah per capita)
ACEH	9,969.2754	WEST NUSA TENGGARA	6,267.5861
NORTH SUMATRA	13,785.0195	EAST NUSA TENGGARA	4,353.8570
WEST SUMATRA	11,428.4320	WEST KALIMANTAN	9,143.8020
RIAU	31,048.5263	CENTRAL KALIMANTAN	13,409.9850
JAMBI	16,674.1683	SOUTH KALIMANTAN	12,425.6779
SOUTH SUMATRA	12,179.3854	EAST KALIMANTAN	60,491.5198
BENGKULU	8,156.9591	NORTH SULAWESI	10,974.5508
LAMPUNG	10,252.6835	CENTRAL SULAWESI	10,601.4605
BANGKA BELITUNG	15,617.6143	SOUTH SULAWESI	10,626.8732
RIAU ISLANDS	31,617.9425	SOUTHEAST SULAWESI	11,024.7131
DKI JAKARTA	52,977.6212	GORONTALO	6,907.5308
WEST JAVA	9,796.8503	WEST SULAWESI	8,066.7422
CENTRAL JAVA	9,226.9508	MALUKU	6,357.7050
DI YOGYAKARTA	8,516.3948	NORTH MALUKU	7,916.8421
EAST JAVA	13,378.1115	WEST PAPUA	21,557.9649
BANTEN	11,861.9430	PAPUA	11,976.8214
BALI	11,477.9320		

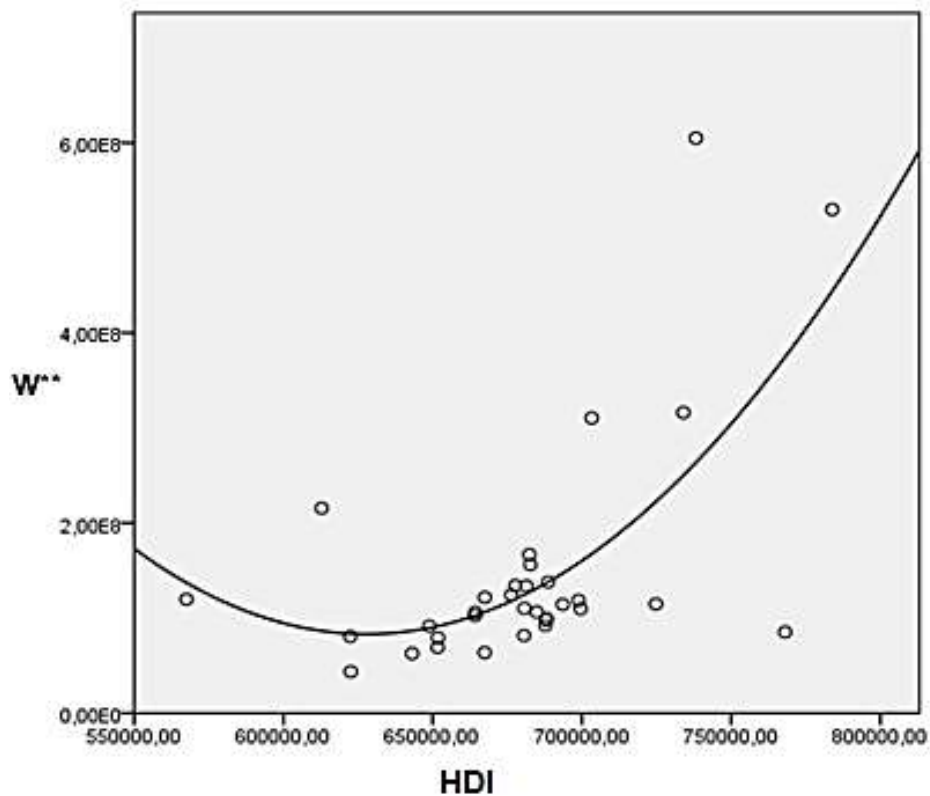


Figure 1. Scatter plot between HDI and The Welfare Indicator (W^{**})

4. Conclusion

The new indicator used to measure the economic welfare of the community, as presented in Eq.(6), is adjusted on $W^*(x)$ by K . What is crucial is the determination of which gap index and poverty index to use in the indicator, because there are various variants of the gap index and poverty index. A trial and error experiment is still a step that can be used to overcome this problem. However, this method must still be validated with the conditions of the phenomenon, real data, and its relationship with other related variables.

In this case, W^{**} and HDI have a positive relationship. This finding means that in provinces with a high level of economic welfare, the level of human development also tends to be high. The welfare indicator W^{**} constructed in this study is relevantly and logically able to capture socio-economic phenomena naturally accepted by the general perspectives.

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