Contents lists available at ScienceDirect

Economic Analysis and Policy

journal homepage: www.elsevier.com/locate/eap

Full length article The multi-layer nature of Inclusive Wealth data and their dynamic interpretation

George Halkos^a, Shunsuke Managi^{b,*}, Kyriaki Tsilika^a

^a Laboratory of Operations Research, Department of Economics University of Thessaly, Greece

^b Urban Institute & Department of Urban and Environmental Engineering, School of Engineering, Kyushu University, Japan

ARTICLE INFO

Article history: Received 28 March 2018 Received in revised form 7 May 2018 Accepted 23 June 2018 Available online 5 July 2018

Keywords: Wealth creation Natural capital Visual analytics Visual interfaces

ABSTRACT

This paper explores inclusive wealth (IW) index using visual interfaces, which provide better economic interpretation. Two views are provided for the visual representation: a cluster view and a timeline view. Among all variables of IW data we focus on three: natural capital, inclusive wealth and air pollution. Our IW data exploration starts with the task of illustrating the distribution of air pollution and wealth among different geographical regions and among regions of different economic growth over the 25-year period 1990– 2014. Furthermore, we aim at the assessment of variation of natural capital across the years of study. We use different data visualization techniques to capture the multi-layer nature of IW data, to represent parts of the global multi-region multi-country dataset.

© 2018 Economic Society of Australia, Queensland. Published by Elsevier B.V. All rights reserved.

1. Introduction

The policy and business community increasingly rely on comprehensive datasets and indicators which assist in monitoring progress towards green growth (Giljum et al., 2015). The first level of situation awareness is about perceiving the status, attributes and dynamics of relevant elements in the research context (Kohlhammer et al., 2009).

Visual modeling is a straight and unbiased way to explore data which provide clear economic interpretation. Policies that promote green growth and resource efficiency need to be based on a deep understanding of the multidimensional parts of data. To seek for possibilities influencing resource use and resource efficiency, the data requires a sound knowledge of the information hidden in the data.

For policy monitoring and design, datasets need to be complemented with causal relations, dynamic evolution of variables and spatial analysis of influential parameters. The ordering of plots, the selection of variables used in graphical analysis, the way the axes are arranged in a graph, can impact the way the reader understands the data. The assessment of variation of capital assets and air pollution for regions and income levels across the years of study can uncover correlations and patterns. It can help to quickly identify relevant variables, trends and relationships. This way there is less need to rely on guesses or intuition.

Visual analytics results support policy interpretation and conclusions for decision making (Savikhin et al., 2008; Kohlhammer et al., 2009; Giljum et al., 2015). There are several important messages that can be conveyed with decision centered visualization (Kohlhammer et al., 2009). Recent economic policy issues to achieve sustainable development goals are presented in Aurangzeb and Stengos (2012), Halkos and Zisiadou (2017), Halkos and Managi (2017), Halkos et al. (2017)

* Corresponding author.

E-mail addresses: halkos@econ.uth.gr (G. Halkos), managi.s@gmail.com (S. Managi), ktsilika@econ.uth.gr (K. Tsilika).

https://doi.org/10.1016/j.eap.2018.06.005

0313-5926/© 2018 Economic Society of Australia, Queensland. Published by Elsevier B.V. All rights reserved.











and Managi and Halkos (2015). Inclusive wealth plays key role in understanding status of sustainable development goals for society (Dasgupta et al., 2015).

Our global multi-country multi-region dataset comprises four clusters of economic development and 19 geographical regions. To represent and integrate data for countries, regions and income levels, we employ solely open source technologies. Our visual analytics approach is organized in three sections. In Section 2 we conduct a dynamic analysis for capital assets, comparing different geographical regions and regions of different degree of economic integration. The graphic evaluation reveals a positive trend between inclusive wealth and time passing. In Section 3, visualization and reporting the natural assets' spatial distribution makes obvious that high and upper-middle income countries absorb the lion's share of natural assets. The question in what proportions is the global natural capital partitioned in regions and income levels, is also answered. In Section 4 some results concerning pollution and wealth inequalities could guide environmental policy. Our analysis concerns total values of GDP, inclusive wealth (IW),¹ natural capital (NC), human capital (HC) and produced capital (PC), in all figures and comments. Per capita values are included in the Inclusive Wealth Report 2018 (Managi and Kumar, 2018) and their analysis would be a future perspective of the present work.

2. Dataset and variation of wealth

The global dataset covers 4 income categories and 19 geographical regions for all countries worldwide (see Fig. 1) and reports annual time series from 1990 to 2014. Countries of inclusive wealth database used in this study are clustered in four income categories (i.e. high, upper middle, lower middle, low) and in 19 geographical regions (i.e. South-Central Asia, South-Eastern Asia, Western Asia, Eastern Asia, South America, Northern America, Central America, Australia–New Zealand, Western Europe, Eastern Europe, Southern Europe, Northern Europe, Eastern Africa, Western Africa, Southern Africa, Newatern Africa, Caribbean, Melanesia).

2.1. Temporal variation of wealth: The evolution between clusters

In this section we handle time-oriented data. Temporal patterns help us understand the key trend for different income levels.

¹ Hereafter, the following abbreviations stand for: IW inclusive wealth, NC natural capital, HC human capital and PC produced capital.

² Mauri et al. (2017).

Download English Version:

https://daneshyari.com/en/article/7346447

Download Persian Version:

https://daneshyari.com/article/7346447

Daneshyari.com