

INCOME INEQUALITY AND DEBT ARE LINKED TO NATURAL RESOURCE CONSUMPTION: AN EXPLANATION VIA “HARMONEY”, A BIOPHYSICAL AND ECONOMIC GROWTH MODEL

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ABSTRACT

The Human and Resources with Money (HARMONEY) model is a new framework for modeling economic growth enabled by natural resource consumption [1]. HARMONEY is a two industrial sector system dynamic model (sector 1: resource extraction; sector 2: production of capital goods) that enables exploration of interdependencies among resource extraction rate and depletion; the accumulation of population, capital, and debt; and the distribution of money flows within the economy. The post-Keynesian economic framework enables a self-consistent linkage between biophysical and monetary flows. Thus, it overcomes critical limitations in neoclassical theory, and it also provides a way to add important macroeconomic concepts (e.g., wages, debt) to previous system dynamic models, such as World3 used in *The Limits to Growth* studies, that do not explicitly consider the role of credit and money in the modern capitalist economy.

The HARMONEY framework is verified by mimicking trends that are also exhibited in the United States data. Examples are the wage share starts declining and the debt:GDP ratio rapidly increases after the model no longer increases per capita resource extraction rate. ***This model framework is perhaps the first*** that clearly links physical metrics (e.g., natural resources allocation and extraction, net power flows, population) to important socioeconomic indicators (e.g., wages, debt, and gross domestic product). The patterns occur using constant model parameters that govern socioeconomic concepts such as how wages are determined (e.g., “labor/bargaining power”), and thus biophysical principles can improve our explanation of socioeconomic trends (debt, wages, etc.) compare to purely social explanations.

Keywords: economic growth, biophysical economics, ecological economics, income distribution

References:

- [1] King, Carey W. (2020) An Integrated Biophysical and Economic Modeling Framework for Long-Term Sustainability Analysis: the HARMONEY Model, *Ecological Economics*, 169, March 2020, 106464, <https://doi.org/10.1016/j.ecolecon.2019.106464>.