Material Productivity as consumption indicator needs interpretation

Analyses of global material consumption patterns have suggested that the main indicator of sustainable consumption used at policy level in Europe and the OECD provides only part of the picture. ‘Material Productivity’ (MP), a commonly used indicator, favours high-income countries, even though these tend to have the highest level of resource use.

Economic development and environmental change are currently driven by global material extraction. 47-59 billion tonnes of resources are estimated to be extracted around the world per year, and this figure is rapidly rising. This trend has raised significant concerns about resource availability, leading to calls for decoupling economic growth from material extraction and consumption.

MP is used to measure how much an economy is decoupled from its physical, material basis, or its ‘dematerialisation’. A country’s MP is defined as GDP per unit material consumed. Higher MP supposedly implies greater sustainability. Studies have shown that MPs in industrialised countries are gradually increasing as their economies grow at a faster rate than their material consumption, and that global MP has been increasing for over a century.

However, the study suggests the indicator is too simplistic and appears to be linked to income, a result which implies that the physical basis of national economies need fundamentally restructuring to achieve dematerialisation.

The study analysed global flow and consumption of materials, focusing on four broad resource categories – biomass (over 33 per cent of total resources extracted), construction materials (also over 33 per cent), fossil fuels (21 per cent) and industrial ores (10 per cent). These were investigated in relation to population, GDP, land area and climate zones. The analysis used domestic material consumption (DMC) as an indicator of consumption, calculated as Domestic Extraction (DE), minus exports and plus imports.

Higher population clearly led directly to higher consumption, although in all categories, material use is distributed unevenly across populations. For example, the lowest 10 per cent of biomass consumers use only 4.8 per cent of global resources, whilst the upper 10 per cent of consumers use 27 per cent of resources.

Fossil fuel and ore consumption appeared to be more closely linked to GDP than population size, i.e. consumption is dominated by rich nations, the top 10 per cent consuming more than 40 per cent of these resources. The lowest 10 per cent consume less than 0.5 per cent. The analysis highlights the potential pitfalls of increasing use of biomass as biofuels, which could strengthen the link between biomass consumption and economic strength, and further increase global inequality.

Trade was found to be linked to economic activity – import levels reflect GDP, although this relationship is less apparent for exports, particularly for ores and fossil fuels. Large, sparsely inhabited areas of land often indicate production of biomass and industrial ores, leading to large domestic extraction figures. However, these materials are frequently processed before export, in much smaller quantities, to rich trading nations, which disguises the inequity in resource consumption.

With global resource scarcity no longer a remote prospect, analysis of material flow indicators is required to understand the physical underpinnings of the global economic system.


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