
A Snapshot of Economy Wide Material Flow Accounts of Richest Countries in the World

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ABSTRACT

System of Environmental-Economic Accounting is a network connecting environmental statistics and actual statistics. The System of Environmental-Economic Accounting works as an umbrella system to the United Nations System of National Accounts. This statistics enables environmental statistics to be compared with actual statistics as the system boundaries are same after some processing of the input statistics. Flows of material and energy, environmental accounting statistics and stock of resources are the three broad categories of System of Environmental- Economic Accounting. This paper concentrates on the flow of material and energy which depicts the flow of material and energy through the economy. Two major statistics that have been developed with relation to flow of statistics are Economy Wide Material Flow Accounts and Water Flow Accounts. The researcher examines the Economy Wide Material Flow Accounts of top richest countries in the world in consistent with the principles of system boundaries and residence principle of the System of National Accounts.

Key words: *Economy Wide Material Flow Account, environmental accounting, System of Environmental-Economic Accounting, United Nations System of National Accounts.*

INTRODUCTION

Erstwhile ago very few people and corporate were conscious about the economics beyond their jobs and expenses and very few companies thought beyond the economics of their profit and loss statements. John Muir brought the term environmentalism in to the corporate world². The present day business faces a ladder of regulations and manufacturing and technological industries are more concerned about their ecological and social impact. The term environmental accounting or sustainable accounting or social accounting is a business imperative and will contribute to the longevity of the business. Environmental accounting is an element of accounting proper with its target to incorporate both economic and environmental information to its stakeholders. It is implemented in the corporate level or in the national economy with the help of a satellite system called System of Integrated Environmental and Economic Accounting (SEEA).³ this satellite system identifies the resource application, measures and communicates a companies or national economic impact on the environment. The SEEA depends on The United Nations System of National Accounts for the definitions and guidelines which promote comparison between environmental statistics and economic statistics⁴. The SEEA is a satellite system of SNA which consist of several set of accounts. Flow of material and energy, environmental accounting statistics and stock of natural resources are the important accounting subsets. Flow of energy and material account record the flow of material and energy through the economy together with their

emissions to which material and energy flow give rise. Two major statistics to compile with flow of energy and material account are Water Flow Account and Economy-Wide Material Flow Accounts. EW-MFA uses descriptive statistics in physical units such as tonne's per year. EW-MFA is consistent with the principles of system boundaries and residence principle. In principle, the statistics will show which countries are dependent on others for natural resources and which are major exporters of natural resources. The statistics also show if a countries production is sustainable, i.e. whether the economy of a country can produce more products using fewer natural resources.

2.National Association of State Boards of Accountancy.

3. System of National Accounts (2008), European Commission, International Monetary Fund, Organization for Economic Co-operation and Development, United Nations and World Bank.

4. Handbook of National Accounting System of Integrated Environmental and Economic Accounting (2003).

REVIEW OF LITERATURE

Nikos Protogeros et al (2011),advocated a software shell named EnvAcc to integrate environmental accounting services with enterprise resource planning in a flexible and configurable way. The software is developed using open source tools and open architectural standards such a Linux, Personal Home Page (PHP), JavaScript's, MySQL etc.EnvAcc includes the environmental aspects to the business practices in order to complete the business records of an enterprise or an organization with environmental elements. The another novelty of EnvAcc, focuses on capturing and tracing the environmental aspects of an economic activity, across the different organizations that take part in a value-chain and define the life cycle of a product/service provision.

Diaconeasa Aurelia Et Al (2012) studied the disclosure of environmental information to highlight the potential merits of accounting organizations with special reference to Romanian companies listed with Bucharest stock exchange. The research paper provided empirical evidence that the cost incurred by the companies to implement the accounting regulations cannot be assessed , information disclosed in accordance with the environment are taken into account by the investors. The researcher opined that environmental accounting and environmental reporting should be emphasized more as part of environmental accounting convergence.

Emilia Vasile Et Al (2012), suggested that environment cost should be analyzed either from the point of view of environment protection or with the flux of materials and energy. They predicted that the environmental management accounting helps in decision making process. Environmental accounting provides extra information to the management by identifying and quantifying measures such as: obligations associated with significant influence on the environment, the cost of legal stipulation, economic advantages etc. the paper concluded that environmental accounting is important not only for environmental management but also for other routine managerial activities such as planning, allocation and control of cost, capital budgeting etc.

Robin W Robert et al (2015) discussed the essential for quantifying social and environmental accounting (sea). The researched admitted to provide continuous support for

quantifying social and environmental accounting into the mainstream of critical accountancy. The researcher attempted to reduce the gap between elite mainstream accounting and critical accounting community. Social and environmental accounting plays an important role in challenging the main conceptions of corporate social responsibility as a method to answer to the questions of planetary sustainability and social justice.

OBJECTIVES OF THE STUDY

- To study the economy wide material flow account of richest countries in the world.

RESEARCH METHODOLOGY

Generations ago industries were neither clean nor green and gave little importance to the environmental impact of their business. Businesses today are required to consider their larger footprint, and the smartest of those businesses learn how to do it in a way that is not only ecologically and socially responsible, but also economically feasible and financially beneficial. This study is descriptive in nature and studies the Economy Wide Material Flow Accounts of top five richest nations of the world.

Data collection

The researcher employs secondary data collected from the database of Eurostat, the Directorate General of the European Commission which provides statistical information to the institutions of the European Union to promote harmonization of statistical method across the member states.

Sampling design

The researcher attempts to study the flow of material and energy of top five richest nations of the world. As per the data from International Monetary Fund, Global Finance Magazine in February 2017 published list of richest countries in the world. The magazine ranked the world countries according to their GDP based on Purchasing Power Parity⁵. The five countries were selected based on the highest GDP Per Capita. The lists of selected countries are:

5. Business Insider, Global Finance Magazine.

1. Luxemburg – GDP Per Capital \$1,01,936
2. Ireland- GDP Per Capital \$69,374
3. Netherland- GDP Per Capital \$50,846
4. Germany – GDP Per Capital \$48,189
5. France- GDP Per Capital \$42,384

Tools used in the study

- Descriptive statistics
- Regression

Period of the study

The researcher collected and analyzed data from 2006-2017.

ANALYSIS AND INTERPRETATION

To study the economy wide- material flow accounts of the richest nations of the world we compare the material flow account of the selected countries using mean. The material flow account depicts the material input flows in thousand tonne's per year which includes domestic extraction and physical imports and also considers the physical exports of an economy.

Table 1-Mean of material flow account

Name of the country	Mean flow of material from 2007-16 (Thousand Tonne's)
Germany	432938.1178
Ireland	17459.6256
France	123100.3866
Netherland	80836.5262
Luxembourg	2707.7573

Source: computed from Eurostat

The mean values show that German economy had consumed maximum material during the study period where the least consumed economy is Luxembourg. Germany being an export leader manufactures leading automobile categories, machinery parts, electrical machinery and pharmaceuticals etc⁶. the country has its maximum domestic extraction and physical imports of raw materials.

The Domestic Product Output provides detailed material flows from an economy to the environment in a given period. DPO indicates the amounts of solid, liquid and gaseous materials (excluding water and respiratory carbon dioxide) supplied by the national economy and taken up by the natural environment, particularly by the atmosphere.

Table2- Mean of Domestic Product Output

Name of the country	Mean(Thousand Tonne's)
Germany	-
Ireland	2835.98
France	-
Netherland	10423.8372
Luxembourg	485.9864

Source: computed from Eurostat

The mean result reveal that there is no Domestic Product Output (DPO) produced by Germany, which is the maximum consumer of raw materials among the selected countries. When there is no domestic product output in an economy painfully it shows that the physical extraction and physical imports for the producing does not contribute to the health of the nation's environment. The Domestic Product Output shows the discharge of an economy into the environment that can be healthily absorbed by the environment. The mean value of other select countries that marked high material consumption also has very low Domestic Product Output.

An importance measure in the material flow account of an economy is its Resource Productivity .This macro-economic indicator is the ratio between Gross Domestic Product and Domestic Material Consumption.

6. International Monetary Fund World Economic Outlook Database.

In other words the term Resource Productivity designates an indicator that reflects the GDP generated per unit of resources used by the economy. The following table shows the mean Resource Productivity of the select countries for the period of 2007-2016.

Table 3- Mean Resource Productivity

Name of country	Mean (Thousand Tonne's)
Germany	2.09639
Ireland	1.79173
France	2.540428
Netherland	3.51645
Luxembourg	3.84721

Source: computed from Eurostat

The mean resource productivity for Luxembourg is high with 3.84721 with a low domestic material consumption of 2707.7573. And the mean resource productivity for Germany which has maximum domestic material consumption is 2.09639 only. This is because even though company with increased domestic material consumption does not contribute to the economy's GDP but result in degradation of its natural environment. The economy's with negligible resource productivity are neither contributing to economic aspect nor helping the environment also.

There are mainly four indicators for resource productivity in an economy. They are domestic extraction, imports in raw material equivalents, exports in raw material equivalents and consumption of raw material. A regression analysis was used to study the relationship between each of the environment indicator and resource productivity. Domestic extraction indicates the amount of natural resources used by the economy from the environment. Raw material input in the amount of material available to the economy for use in production and consumption activities. Raw material consumption indicator is the amount of material required in terms of the raw material equivalents to produce the products consumed in the economy. The relationship between these four indicators and the resource productivity is explained below:

Table 4- Model Summary

Indicators	R-Square	Adj R-Square	Std.Error	F	Sig.F
Domestic Extraction	0.58799	0.52913	0.12464	9.9900	0.015
Imports in Raw Material	0.01717	0.12323	0.1925	0.1223	0.73
Exports in Raw Materials	0.72811	0.68927	0.10125	18.7466	0.00343
Raw Material Consumption	0.54111	0.4755	0.13154	8025435	0.02388

Source: computed from secondary data

The adjusted r-square value shows the relation between the indicators of environment and the dependent variable, resource productivity. Any change in the values of domestic extraction, exports in raw materials, raw material consumption will lead to 52.913%, 68.927%, 47.55% changes in resource productivity. The adjusted r-square value of imports in raw material 12.323% is not statistically significant because the F value is greater than 0.05. The statistical values are significant for all the other indicators since the significant value is less than 0.05.

These environment indicators otherwise called as modeling estimate should be controlled in such a way that it contributes much to resource productivity and less to environment degradation.

CONCLUSION

Financial health and profitability seldom happen by accident, and without proper planning and foresight, navigating environmental legislation and social reporting could drain a business dry. Environmental and social accounting grew out of an imperative to balance a company's financial health with its broader obligations. The richest nations of the world with increasing use of natural resources should take due care to reduce their negative impact on the environment and should plan the domestic extraction in such a manner as to promote resource productivity. Since the businessman cannot live in isolation from the environment, the businessman and the national economy should strive to strike off a balance between their economic and environmental interest. While economists may not know the life span of the businesses they start, they certainly don't plan for imminent extinction. The economics of sustainability, renewable resources, a robust workforce and global opportunity are essential to any national economy that plan for growth. Raw materials are finite, skilled employees are assets, and fines for unsound environmental practices can eat away profit margins in a single audit.

REFERENCES

- i. Diaconcasa Aurelia-Aurora, MargariStanescuSorina, “Perspectives of Environmental Accounting in Romania”, Procedia Social and Behavioral Sciences, 2012.
- iii. Emilia Casile, Mariana Man, “Current Dimensions of Environmental Management Accounting”, Procedia Social and Behavioral Sciences, 2012.
- iv. Robin W Robert, Dana M Wallace, “Sustaining Diversity in Social and Environmentl Research”, Critical Perspectives on Accounting, 2015.
- v. Nikos Protogeros ApostolasVontas, GrigoriousChatzikostas, “ A Software Shell for Environmental Accounting”, Environmental Modeling and Software, Vol.26,Issue 2, 2016