

Objective

To investigate the relationship of globalized economies with energy footprint and greenhouse gas emissions

Methods

Globalization Convergence Index:
Development of Globalization Convergence Index (GCI) to show how much country is globalized.

Indicators of Energy footprint:

- Consumption of primary energy resources
- Greenhouse gas emissions

Main Features of GCI

1. The GCI is an index that measures globalization in multiple domains from politics to economy, social and cultural to technology, and environmental degradation.
2. Index is transformed on a scale of zero to hundred.
3. All domains in the GCI are weighted equally
4. GCI has coverage of more than 100 countries.

Statistical Analysis

The association of globalization and its domains with energy footprint has been found using:

1. Correlation analysis
2. Least square simple linear correlation
3. Multiple linear regression analysis with controlling for GDP per capita

Table 2. Country Ranking in the GCI (out of total 117 countries)

Rank	Top 15	Rank	Middle 15	Rank	Bottom 15
1	Belgium	52	Canada	103	Bangladesh
2	Ireland	53	Belarus	104	Laos
3	Saudi Arabia	54	South Africa	105	Pakistan
4	Jordan	55	Botswana	106	Mozambique
5	Kuwait	56	Honduras	107	Haiti
6	Austria	57	Turkmenistan	108	Benin
7	Switzerland	58	Ukraine	109	Mali
8	Netherlands	59	Japan	110	Togo
9	Malaysia	60	Argentina	111	Guinea
10	United Kingdom	61	Georgia	112	Rwanda
11	Germany	62	Turkey	113	Burundi
12	Denmark	63	Latvia	114	Gabon
13	Estonia	64	Angola	115	Madagascar
14	Sweden	65	Moldova	116	Bolivia
15	Panama	66	Nigeria	117	Papua New Guinea

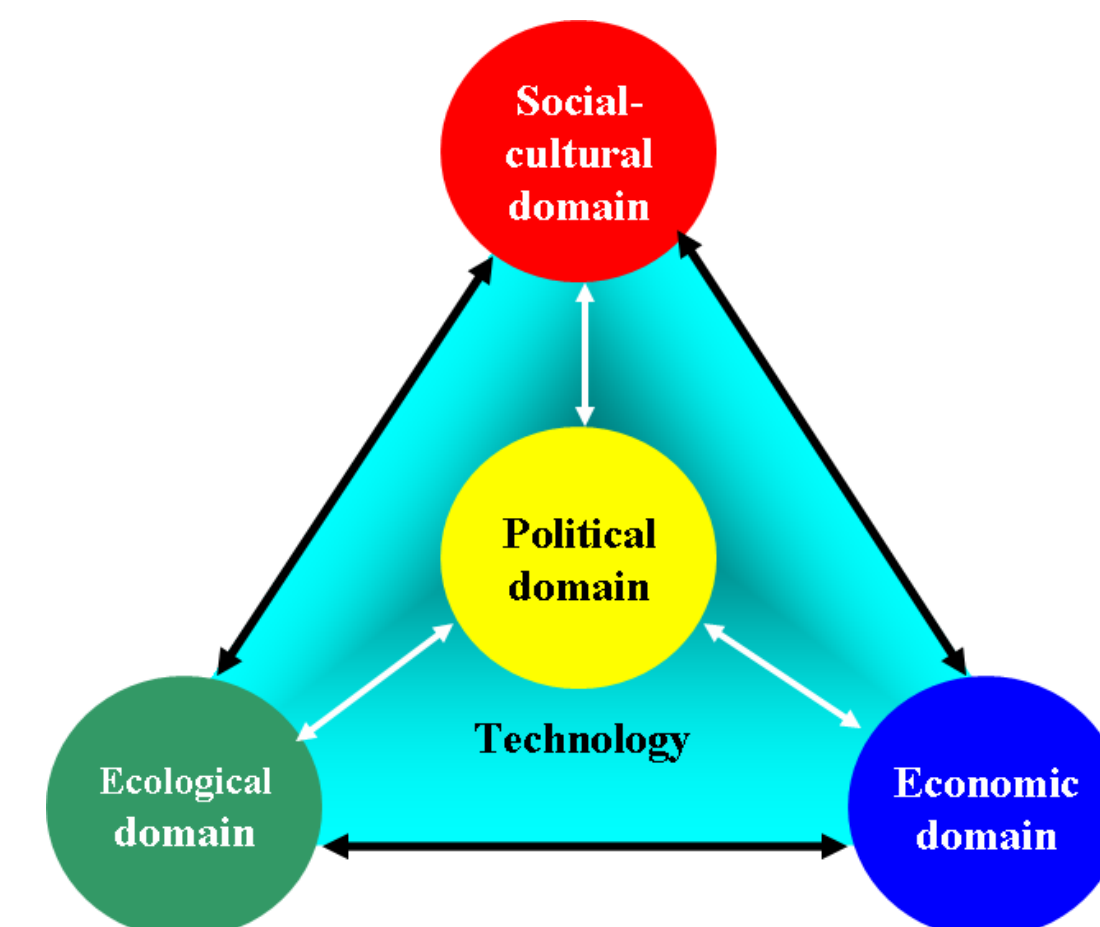


Figure 1. A pluralistic approach to globalization (Rennen and Martens, 2003)

Table 1. Domains and variables of GCI

Political domain	
Embassies	Absolute number of in-country embassies and high commissions
UN Voting Response	Response of countries on resolutions presented in General Assembly meetings
Military Expenditure	Military Expenditure as a share of GDP
Economy	
Trade	Sum of imports and exports as a share of GDP
FDI	Gross Foreign Direct Stocks as a share of GDP
GDP Growth	Annual percentage growth rate
Remittance	Personal remittances as a share of GDP
Social & Culture	
Tourism	International arrival + departure per 100 inhabitant
Migrants	Those who change their country of usual residence per 100 inhabitant
International	International students studying abroad as a
Technology	
Cellular Subscribers	Number of cellular as a share of population
Internet Users	Internet users as a share of population
Ecology	
Ecological Footprint	Ecological deficit in global hectare

Results

Results of statistical analysis performed show that energy footprint is positively correlated with the level of globalization.

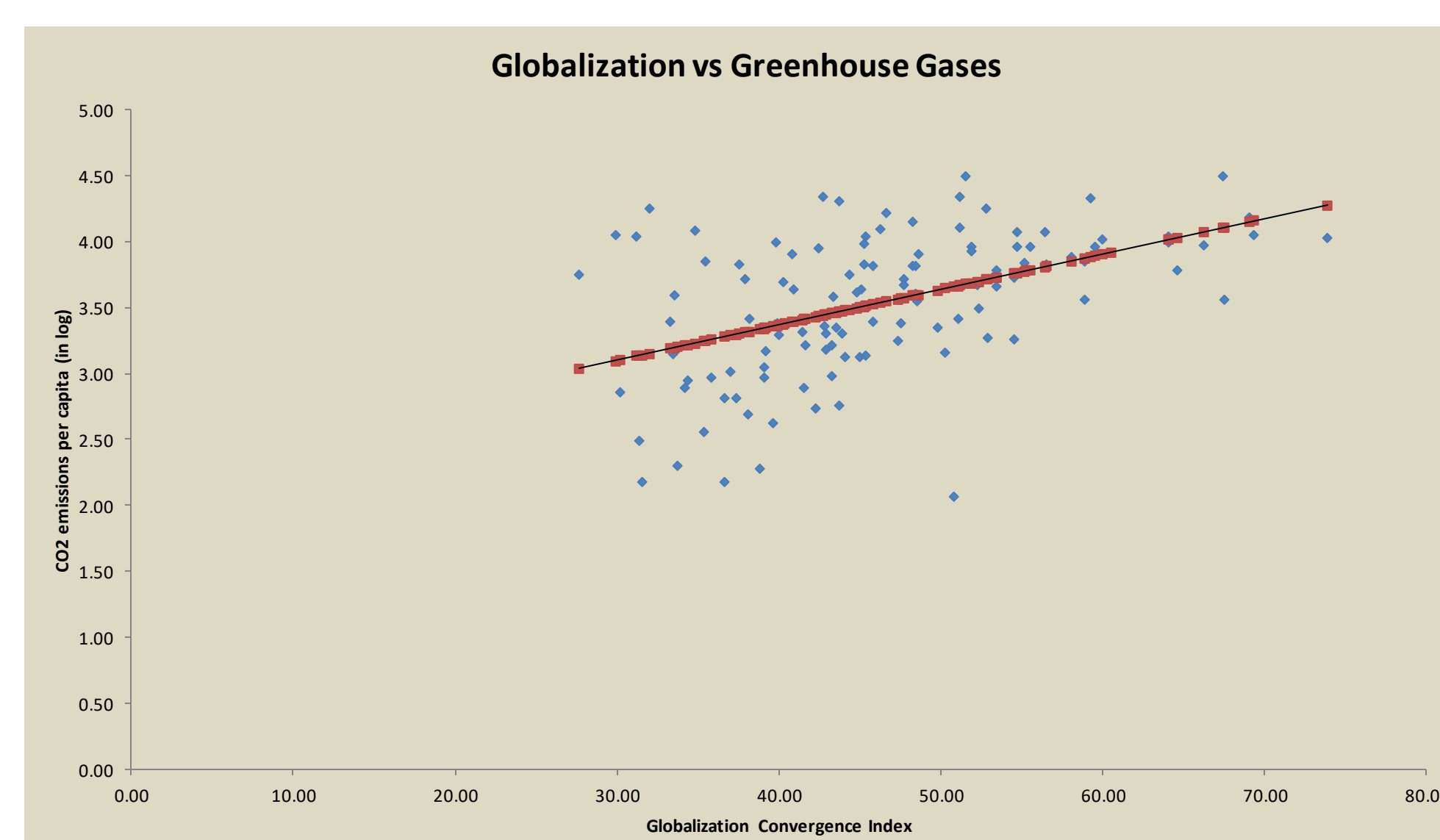
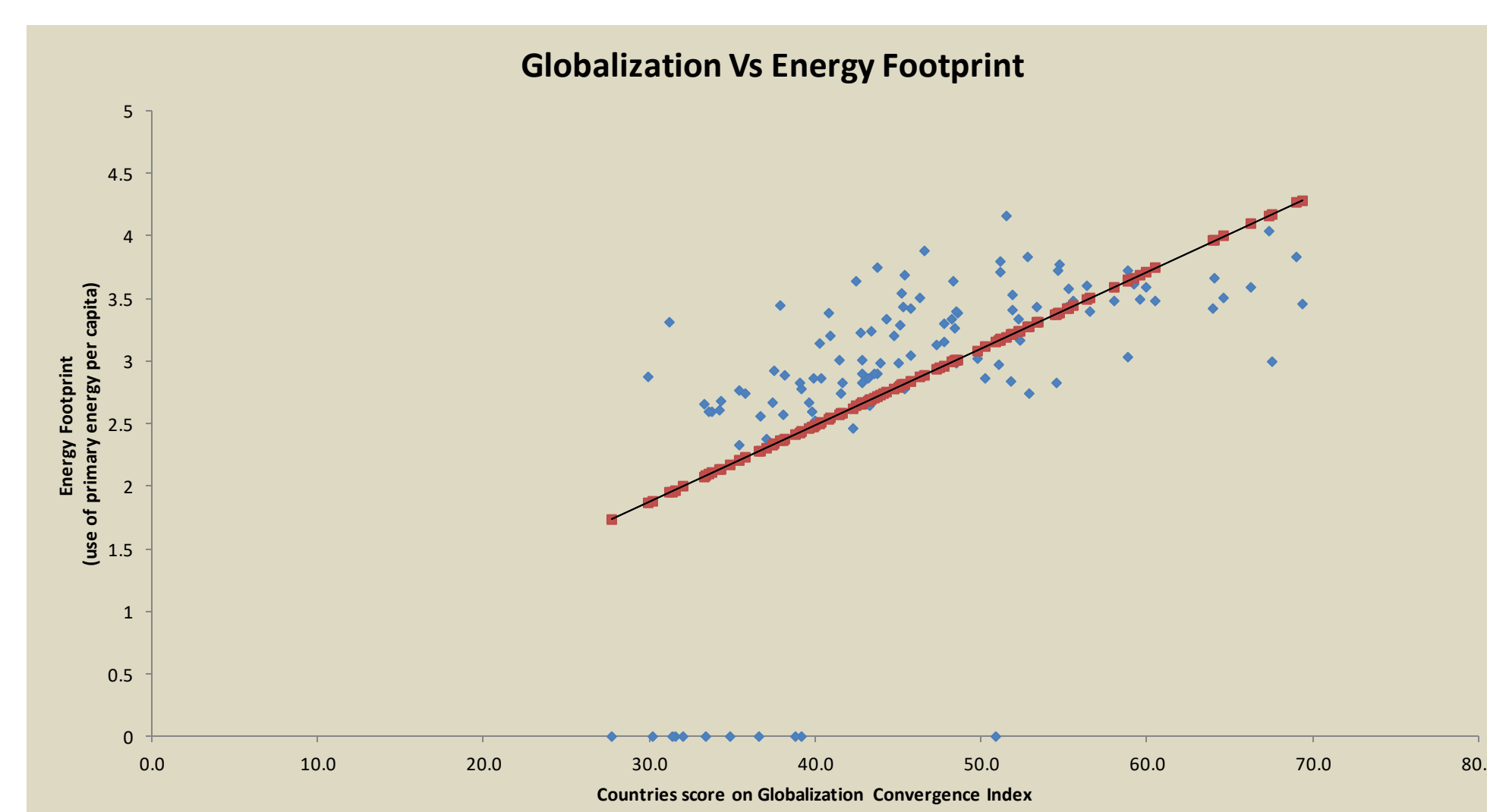


Figure 2 Linear regression of GCI with Energy Footprint and Greenhouse Gases

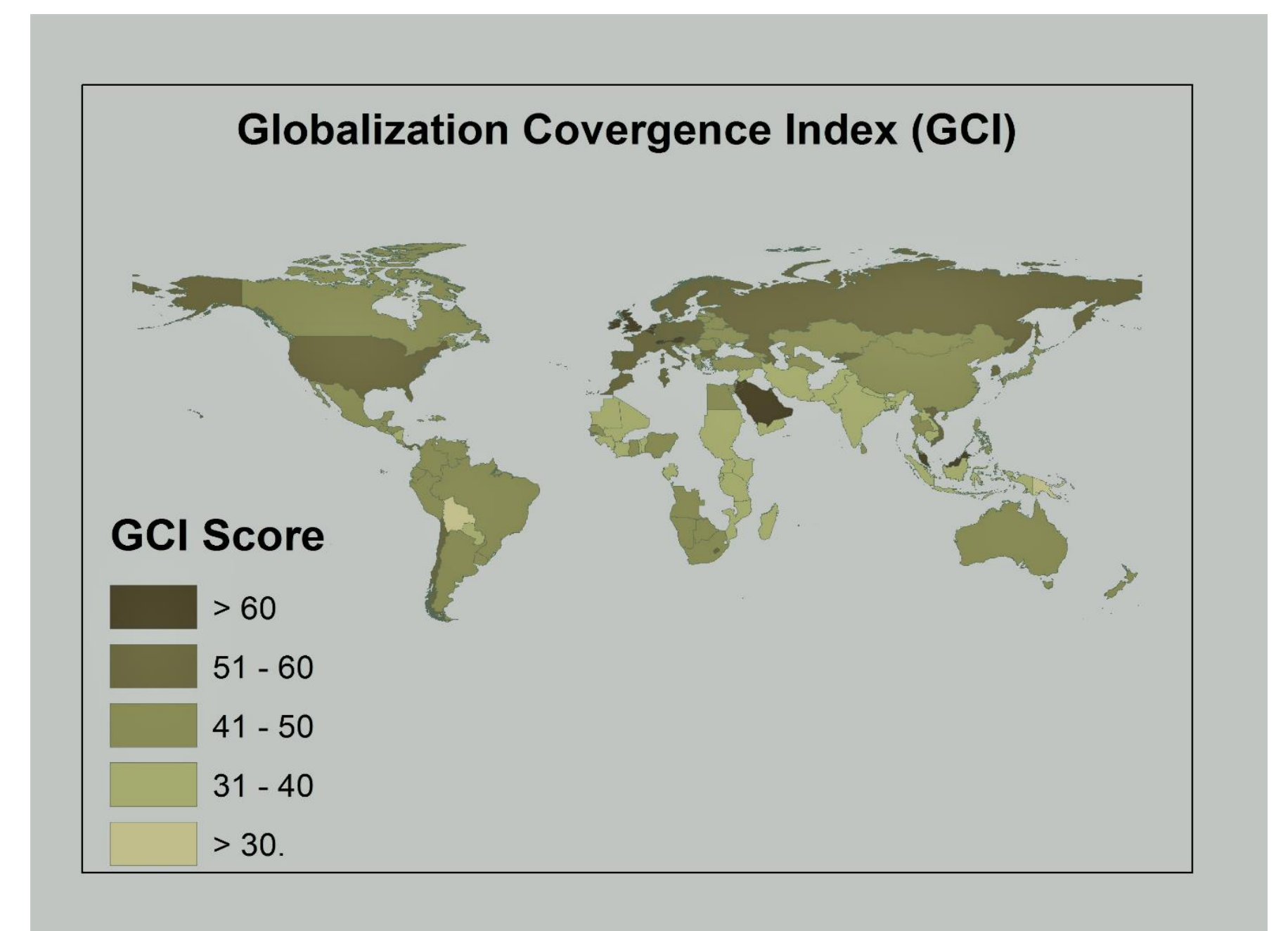


Figure 3. Globalization Convergence Index. (Higher values denote more globalization)

Conclusions

High living standard in the developed economies have more ecological value attached which require high energy footprint.

The emerging economies have to take precautionary measures in the early phase of their development to avoid negative impacts on the environment.

The existing inventory of greenhouse gases only shows emissions that are within boundaries, while, indirect emissions i.e. carbon intensive products that are produced somewhere else from consumer's country are not added in the national inventory. So, existing GHG database is not true representative of energy consumption of any country. There is a need to produce GHG inventory that include both direct and indirect emissions.

Recommendations

- Production of carbon intensive products should be compensated through restorative and preventive measures like reforestation in the countries where manufacturing units are established.
- Carbon tax on products having high carbon value.
- Promotion of sustainable practices like car free day as observed in Beijing, or odd/even cars experiment in India.

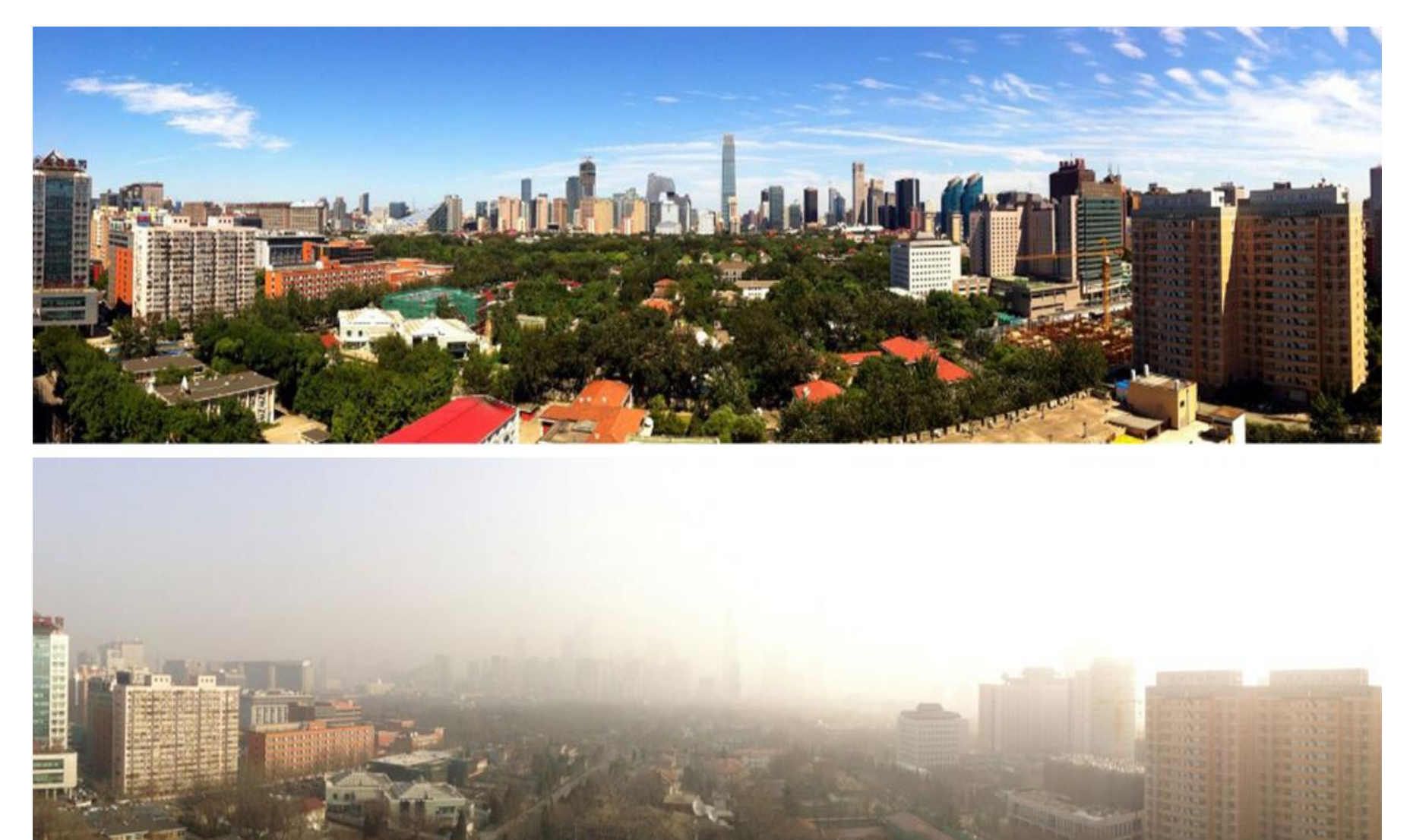


Figure 4. Comparison of two views of Beijing city with and without cars.

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Reference

Raza, M., Elahi, M.A., and Khan, T.M.A. (2017) "Using the indicator based approach to determine the impacts of globalization on climate change" Climate and Development (under review)