Environmental Performance and GDP: A Cross Section Analysis for Developed Countries and A Granger Causality Test for 130 countries

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ABSTRACT

The purpose of present paper is to estimate and evaluate the relationship between EPI and GDP. In this paper I have estimated a model for considering the relationship between EPI and GDP for Developed Countries in 2010 based on cross section analysis. Also I have tested Granger Causality Tests for 130 countries for considering Causality between EPI and GDP. Results indicate that the EPI does Granger Cause GDP and GDP does not Granger Cause EPI, and the EPI has a positive effect on GDP in developed countries.

Key words: EPI, GDP, Developed Countries, Granger Causality Test.

Introduction

Environmental sustainability has emerged as a critical policy focus across the world. While a great deal of attention has recently been focused on climate change, other issues including water quality and availability, air, pollution, deforestation and land use changes, biodiversity, and the sustainability of agriculture and fisheries have also gained prominence on the public agenda.[6].

Governments are increasingly being asked to explain their performance on a range of pollution control and natural resource management challenges with reference to quantitative metrics. The move toward a more data-driven empirical approach to environmental protection promises to better enable policymakers to spot problems, track trends, highlight policy successes and failures, identify best practices, and optimize the gains from investments in environmental protection.[6].

The Environmental Performance Index (EPI) is a new and strongly performance-oriented composite index. It builds on the Pilot Environmental Performance Index that was published in 2002 and is designed to be a powerful supplement to the environmental targets set forth in the U.N. Millennium Development Goals [2]. The EPI measures progress toward a set of targets of desirable environmental outcomes, taking into account a country's current policies.

It is anticipated to be of particular value to decision makers because of its strict input-output framework and short term to medium-term time horizon, which promotes accountability and performance evaluation at the policy level.[1,3].

The EPI offers a composite index of current national environmental protection results (Pilot 2006 and 2008 Environmental Performance Index). It highlights peer-reviews on a cross-country basis to evaluate the current performances of countries. It mainly tracks performance changes over time with respect to clearly identified, achievable targets.[5, 6].

[4] evaluate the relationship between...
Environmental Performance and economic growth in the OIC countries during 2006-2008. To do so, they used overall EPI and its elements data from the Yale Center for Environmental Law & Policy and economic growth from World Bank data that reported in 2010. They analyze the EPI and its components in the OIC countries and compare them performance. Then using Econometrics methods, they study the relationship between EPI and economics growth in the OIC countries. The results of their paper represent that the EPI performance levels are not satisfactory in the OIC countries but they appear to have performed quite satisfactorily in terms of the Productive Natural Resources category. In addition, Malaysia, showed better performance and enjoy top ranking as compared to the other OIC Member Countries in 2006 and 2008. In addition, the results of their paper indicate that the relationship between environmental performance and economic growth in the OIC countries is positive and significance during 2006-2008. Also dividing the OIC countries into three income groups they found that the positive impact is higher for countries with higher income level. In addition when they used the share of industry as well as manufacturing sectors in GDP as the new dependent variables they found the higher EPI corresponds with lower share of Industry as well as Manufacturing in GDP which is expected due to higher pollution related to these sectors.

In this paper I have estimated a model for considering the relationship between EPI and GDP for Developed Countries in 2010 based on cross section analysis. Also I have tested Granger Causality Tests for 130 countries for considering Causality between EPI and GDP.

Model Specification:

I have used the following model for considering the effect of EPI on Gross Domestic Product (GDP) in some Developed Countries based on panel data:

\[ GDP_i = \alpha + \beta EPI_i + \epsilon_i \quad (1) \]

where \( i \) is symbol country for 163 countries in 2010 year.

I have the Yale Center for Environmental Law & Policy data base for these countries.

Results:

Table 2 shows that the EPI has a positive effect on GDP in developed countries.

Policy Conclusion:

• Environmental decision making can be made more fact-based and empirical. A data-driven approach to policymaking promises to make decision making more analytically rigorous and yield systematically better results.
• While the 2010 EPI demonstrates the potential for better metrics and more refined policy analysis, it also highlights the fact that significant data gaps and methodological limitations hamper movement in this direction.
• Policymakers should move to establish better data collection, methodologically consistent reporting, mechanisms for verification, and a commitment to environmental data transparency.
• Policymakers need to set clear policy targets and shift toward more analytically rigorous environmental protection efforts at the global, regional, national, state/provincial, local, and corporate scales.
• Wealth correlates highly with EPI scores. In particular, wealth has a strong association with environmental health results. But at every level of development, some countries fail to keep up with their income-group peers while others achieve outstanding results. Statistical analysis suggests that in many cases good governance contributes to better environmental outcomes.
• Environmental challenges come in several forms, varying with wealth and development. Some issues arise from the resource and pollution impacts of industrialization including greenhouse gas emissions and rising levels of waste – and largely affect developed countries. Other challenges, such as access to safe drinking water and basic sanitation, derive from poverty and under-investment in basic environmental amenities and primarily affect developing nations. Limited endowments in water and forest resources constrain choices but need not necessarily impair performance.[6]

Conclusion:

The Environmental Performance Index (EPI) is a new and strongly performance-oriented composite index. In this paper I have estimated a model for considering the relationship between EPI and GDP for Developed Countries in 2010 based on cross section analysis. Also I have tested Granger Causality Tests for 130 countries for considering Causality between EPI and GDP. Results indicate that the EPI does Granger Cause GDP and GDP does not Granger Cause EPI.

Table 2 shows that the EPI has a positive effect on GDP in developed countries.
Table 1: Granger Causality Tests for 100 countries

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Obs</th>
<th>F-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPI does not Granger Cause GDP</td>
<td>67</td>
<td>5.06019</td>
<td>0.0092</td>
</tr>
<tr>
<td>GDP does not Granger Cause EPI</td>
<td>0.07015</td>
<td>0.9323</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Estimates Results for developed countries.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-805135.1</td>
<td>423543.2</td>
<td>-1.900952</td>
<td>0.0734</td>
</tr>
<tr>
<td>EPI</td>
<td>12318.99</td>
<td>5849.435</td>
<td>2.106014</td>
<td>0.0495</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.197693</td>
<td>Mean dependent var</td>
<td>79923.00</td>
<td></td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.153120</td>
<td>S.D. dependent var</td>
<td>256068.1</td>
<td></td>
</tr>
<tr>
<td>S.E. of regression</td>
<td>235649.4</td>
<td>Akaike info criterion</td>
<td>27.67272</td>
<td></td>
</tr>
<tr>
<td>Sum squared resid</td>
<td>1.00E+12</td>
<td>Schwarz criterion</td>
<td>27.7729</td>
<td></td>
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<tr>
<td>Log likelihood</td>
<td>-274.7272</td>
<td>Hannan-Quinn criter.</td>
<td>27.69216</td>
<td></td>
</tr>
<tr>
<td>F-statistic</td>
<td>4.435296</td>
<td>Durbin-Watson stat</td>
<td>1.038223</td>
<td></td>
</tr>
<tr>
<td>Prob(F-statistic)</td>
<td>0.049503</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

References

6. Yale Center for Environmental Law & Policy, 2010. Pilot Environmental Performance Index (EPI) report (2010), is available online at www.yale.edu/epi.