Answer to the letter to the editor on "Environmental Phillips Curve: OECD and Asian NICs Perspective"

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Abstract: This manuscript contains our detailed responses to three queries on our paper entitled "Environmental Phillips Curve: OECD and Asian NICs Perspective" published in Environmental Science and Pollution Research (2020) 27:31153–31170. We have convincingly justified why 'energy use' variable has not been included in CO_2 emissions analysis, and confirmed that our used model does not suffer from omitted variable bias. Secondly, we have argued that the question raised about the normal distribution of data is not correct. In fact, there is no much sense to test for the normality for error terms in the case of panel data. Thirdly, we have shown the negative relationship between environmental degradation and unemployment based on our empirical findings. Therefore, our results and conclusion are not misleading at all. Finally, we have indicated future research directions.

Keywords: Environmental Phillips curve (EPC); CO2 emissions; Unemployment; Panel data; OECD.

1st query: Inclusion of energy as an independent variable in CO_2 emissions analysis

Our response:

A. Since energy consumption level and income level are highly correlated, if one variable is used, use of another variable is unnecessary. Please see the below references.

References

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Aqeel, A. and M.S. Butt (2001). "The relationship between energy consumption and economic growth in Pakistan", Asia-Pacific Development Journal, vol. 8, No. 2, pp. 101-110.

Cheng, B.S. (1999). "Causality between energy consumption and economic growth in India: an application of co-integration and error-correction modeling", Indian Economic Review, vol. 34, No. 1, pp. 39-49.

Cheng, B.S. and T.W. Lai (1997). "An investigation of co-integration and causality between energy consumption and economic activity in Taiwan", Energy Economics, vol. 19, No. 4, pp. 435-444.

B. Simultaneous use of energy consumption and income will lead to the functional form over specified. It will decrease degrees of freedom and inflate R-squared unnecessarily, since R-squared is a non-decreasing function of number of explanatory variables. Ultimately, the result will be misleading.

C. Further, use of energy consumption as an explanatory variable in the specification of CO2 emissions may be theoretically correct. However, as discussed in details in Jaforullah and King (2017), inter alia, since data for CO2 emissions are not directly observed/actual one, in practice it is calculated using energy consumption. Hence, use of energy consumption in the specification is problematic. Therefore, energy is excluded from the specification and the model is run. See Jaforullah and King (2017) for further details. Hence, omitted variable bias argument raised by Istihak Rayhan is not correct. Further, Error term captures all other factors, as one cannot include all factors in a single equation / model.

References

Jaforullah, M., King, A., 2017. "The econometric con sequences of an energy consumption variable in a model of CO2 emissions". Energy Economics, Vol. 63, pp. 84-91.

2nd query: Normal distribution of data

Our response:

Table 1 reports summary statistics of variables. Therefore, the question of Mr Rayhan is wrong. OLS never assumes that data of the explanatory variables are normally distributed. Therefore, here normality is not necessary. OLS only assumes that error terms and sample estimators of coefficients of explanatory variables are normally distributed. Thus, this is an invalid question.

Now in case of panel data, normality assumption of error terms is bit relaxed. The need for normality test in statistics is to determine whether a data set is modeled for normal distribution and it is needed mostly in time series analysis rather than in panel analysis, because the number of series is related to both time (T) and cross sectional unit (N). Thus, there is no much sense to test for the normality for error terms in the case of panel data. That's why, in most of the cases panel data based papers do not report the normality test. Perhaps, this is the reason that anonymous reviewers have ignored the absence of normality assumption test results in our paper.

3rd query: Negative relationship between environmental degradation and unemployment

Our response:

It will still hold, as in reality full employment does not exist in any country even in the long-run. Empirical study deals with data, which is a reflection of real situation prevailing in countries. The graphical representations of the relationship between these two variables are found negative in most of the countries, if not ALL countries in our paper. Therefore, our results and conclusion are not misleading at all.

Our paper can lead a researcher to number of new research works. Long-run full employment pattern is one of them. Besides, what does happen to the slope of the Environmental Phillips Curve in short or in long-run? How do monetary and fiscal policies effect the slope of the Environmental Phillips Curve? Does exchange rate or interest rate or Tax-GDP ratio has symmetric or asymmetric impact on the slope of the Environmental Phillips Curve? Our published paper has invented a new concept in Environmental Economics. It can open a window of new research issues for the interested researchers. If anybody is interested in the issue, he/she can go ahead with such aims.