

The EKC hypothesis in EU27 based upon median income

Dimitra Kaika

School of Applied Arts and Sustainable Design, Hellenic Open University, 26335, Patras, Greece
kaika.dimitra@ac.eap.gr

INTRODUCTION

According to the Environmental Kuznets Curve (EKC) hypothesis, the process of economic growth is expected eventually to limit the environmental degradation created in the early stages of economic development [1]. Under this view, each economy should focus on its economic growth and any environmental problems will be eventually eliminated by the same process of economic growth [1].

The EKC hypothesis has been tested empirically by many authors for many countries (or set of countries) and for various time periods but results are at best mixed since the hypothesis is neither confirmed nor rejected adequately [1]. Especially, in studies that consider CO₂ emissions as an index of environmental degradation (dependent variable), the EKC hypothesis does not fit in describing adequately the proposed CO₂ emissions-income growth relationship [1, 2, 3].

A strong limitation of the EKC hypothesis is that the empirical tests of the EKC hypothesis are based on the use of Gross Domestic Product (GDP) per capita as an index of economic growth which is a quantitative rather a qualitative index [4]. It is calculated by dividing GDP with the population of the country, therefore, it is an average measure. However, the GDP per capita does not consider whether income is distributed equally among residents in a country giving a false interpretation of the actual income that corresponds to the 50% of the population. As Stern (1996) points, the inference from some such EKC estimates that further (economic) growth will reduce environmental degradation is dependent on the assumption that (world) per capita income is normally distributed when, in fact, median income is far below mean income [5].

This work attempts to evaluate the EKC hypothesis by adopting the median income rather than the average income. The study considers the 27 EU member states which face differences in their course of economic growth over time.

METHODOLOGY

Data on GDP per capita (GDPpc) and median income (MI) are derived from Eurostat [6] and

cover years from 2015 up to 2023. GDP per capita is expressed at market prices (euros). Median income is expressed at market prices for the population of the reporting country aged 18 and over.

Data on CO₂ emissions per capita (CO₂pc) are derived from The World Development Indicators (WDI) database provided by the World Bank [7], are expressed in metric tons of oil equivalent and cover the 2015-2023 time period.

The sample includes the 27 EU member states (EU27), that is, Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden. The time period under investigation of this study is limited from 2015 up to 2023 due to the limited data reported by Eurostat concerning median income.

RESULTS

Figure 1 depicts median income in each country of the sample as percentage of the respective average income. In nine out of twenty-seven countries the ratio is above the EU27 ratio. In these countries, income is distributed more equally to citizens compared to the rest eighteen countries for which their ratio is lower compared to EU27 ratio.

In figure 2, scatter plots between MI and CO₂pc for each country in the sample are plotted and are fitted assuming linear relationship.

As a general tendency, it seems that CO₂ emissions per capita decrease for higher levels of median income. However, this trend is not observed to the same extent for all countries. For instance, in Hungary, Lithuania and Romania with more unequal income distribution, increases in median income do not seem to exert a substantial decrease in CO₂ emissions per capita. On the other hand, in Austria, Belgium, Denmark, France, Finland, Germany and Slovenia, with more equal income distribution, increases in median income seem to affect CO₂ emissions per capita to a greater extent.

CONCLUSIONS

The consideration of the economic growth - environmental degradation nexus, needs to take into account qualitative characteristics such as income distribution. The process of economic growth alone can not surpass environmental problems created in the early phases of growth if this growth is not distributed equally to the citizens of a country. In order to test the EKC hypothesis properly, it needs to develop complete series of qualitative variables to be incorporated in relevant empirical estimations.

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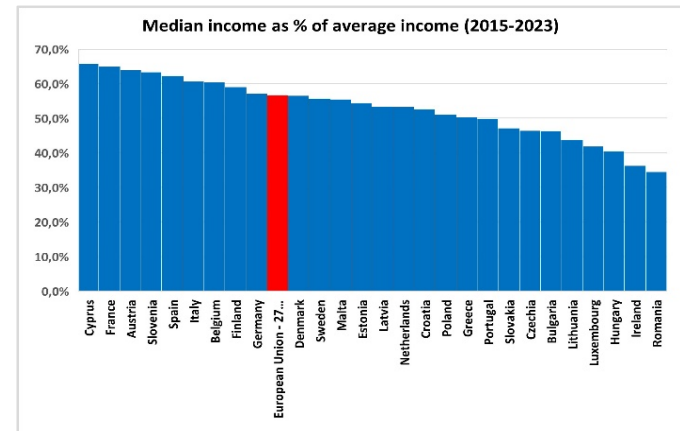


Fig. 1: Median income as % of average income from 2015 up to 2023

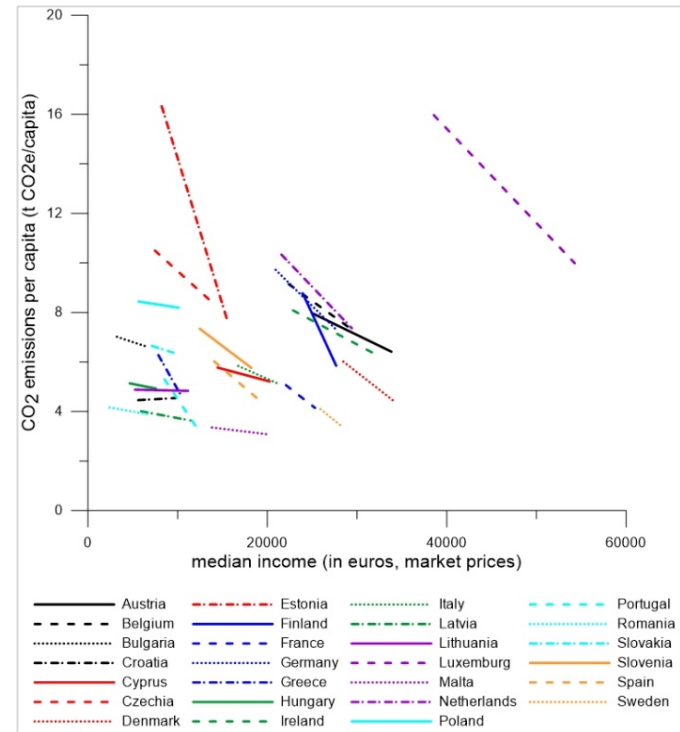


Fig. 2: Linear fitted scatter plots CO₂ emissions per capita/median income from 2015 up to 2023