

The Impact of Global Warming on Economic Growth: An Analytical Review

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Abstract

In this study, we analyze data from a subset of OPEC nations, spanning 1971–2002, to determine the correlations between carbon emissions, income, energy consumption, and total employment. The correlation between financial success and “energy use is our primary research interest. We use the autoregressive distributed lag (ARDL) method, and discover that the variables are cointegrated solely inside Saudi Arabia. It is concluded that employment and energy prices are the long-term driving factors for Saudi Arabia's revenue. Cointegration between income and energy prices does not exist in Indonesia, Algeria, Nigeria, or Venezuela. Second, we raise doubts about the Granger causation in the long term between carbon emissions, energy consumption, and GDP. According to our findings, lowering nations' emission levels does not require any of them to slow their economic development. Energy conservation might help Indonesia and Nigeria reduce emissions without slowing economic development in the long term.

Keywords: Autoregressive distributed lag OPEC Cointegration Energy CO₂, The global economic gains from complying with the Paris Climate Accord are shown to be substantial

Introduction

Greenhouse gas (GHG) emissions are the primary cause of climate change, and energy production and consumption are the primary causes of GHG emissions. As a result, cutting down on energy use will also reduce emissions. The fact that energy use may have substantial influence on economic development makes it anything but a straightforward issue to implement energy conservation strategies. Reducing carbon dioxide (CO₂) emissions to the Kyoto objectives is thought to slow economic development because of the assumed connections between GHG, energy consumption, and GDP expansion. Specifically, if there is a causal link between energy consumption, CO₂ emissions, and real income, then reducing emissions will need energy conservation, which would impede economic development. For this reason, many nations are unwilling to continue with Kyoto objectives. However, many empirical research from a variety of disciplines and locations suggest that the correlation between these three factors—income, energy use, and carbon dioxide emissions—may not be unique. Therefore, it may be required to examine the temporal link between energy consumption, CO₂ emissions, and national GDP on a country-by-country basis. Stern and Cleveland's study is a fantastic summary of past and present research on the correlation between energy use and GDP growth. Some works that do this, like Stern, use time series methods that are more advanced than those used in previous studies. are applications of cutting-edge research methods like time series

analysis and panel data analysis. This short list already demonstrates how well researched the issue of how wealth affects energy use really is. However, there is still no consensus on the nature of the connection between energy consumption and income, despite the large number of research that have been conducted using a wide variety of methods, time periods, and control variables in a wide variety of nations. The conflicting findings may suggest that the link is multifaceted and/or culturally nuanced. However, there are at least two ways in which our knowledge was enhanced by the current findings. To begin, it's possible that omitted factors bias is causing erroneous causality test findings to emerge from the empirical investigations. Therefore, it is recommended to use a multivariate method rather than a bivariate one. Second, the causality between energy consumption and national GDP may vary from one country to the next. In addition, other nations' policymakers may have varying choices to choose from based on the nature of the relationship at issue. It may be required, therefore, to conduct separate studies of different nations. Numerous empirical analyses have been conducted to examine the relationship between environmental deterioration and economic development, as predicted by the environmental Kuznets curve (EKC; see here for a summary). The hypothesis predicts that increased economic growth initially correlates with more pollution, but that when a certain threshold of wealth is achieved, increased economic growth is related with less pollution. theory suggests that over time, economic development may become a solution to environmental issues without the need for immediate state intervention. There is, however, a stylised fact that seems to have emerged, particularly among recent research. If we account for greenhouse gas emissions and per capita income, EKC no longer seems to hold. Carbon emissions and economic expansion have been linked in the minds of some, who see a steady correlation between the two. In fact, this would imply that wealthy and emerging nations alike should forego economic expansion in favor of cutting emissions. Results are inconsistent when using a panel-data cointegration approach to analyze data with two independent variables. It seems, however, that there is a need for a technique that permits a dynamic partnership. Both for methodological reasons (i.e. avoiding omitted variables bias) and for the goal of exploring various policy alternatives and their effects, it seems that the two bodies of knowledge need to be combined. Recently, researchers have been exploring the multivariate Granger causality link between energy use, production, and emissions. In light of these recommendations, we first look at the long-term connection between energy use, income, and employment in a few OPEC nations. Second, we broaden our investigation of how CO₂ emissions relate to other factors, such as energy use and GDP growth. This research therefore departs from the majority of others in the academic literature by examining the link between the environment, energy consumption, and GDP in the oil-producing nations that make up the OPEC group. There has not been a lot of research on the correlation between OPEC countries' wealth, energy usage, and environmental impact. These nations' oil subsidies may lead to increased wastage and pollution. 2 Policies proposed in light of the discovered link between the environment, income, and energy use in these major oil production nations might be useful in the fight against global warming. Several studies have looked at the correlation between OPEC countries' energy use and their GDP. Using a panel time series design, this article examines the connection between GDP and energy use in the United Arab Emirates. utilizes data from all OPEC nations

(excluding Algeria's) to look at the correlation between power use and GDP growth, both directly and indirectly. The link between energy consumption and economic development in 11 developing nations, including seven OPEC countries, is studied using a panel time series approach. We wrap up by exploring a similar connection. How the globe reacts to rising emissions will determine the global climate change's cumulative impacts. Evidence suggests that climate change is already causing severe weather events and sea level rises (SLRs), posing further hazards to agricultural productivity in many regions of the globe (United Nations, 2018; World Bank,). While early predictions suggested only moderate implications on the global economy, more recent projections have shown far more severe consequences. Although some of these attitudes have changed through time, the total amount of harm has remained quite low over the vast majority of temperature ranges. Economists, scientists, and policymakers have all cautioned that our existing economic models may vastly underestimate the costs of possibly catastrophic climate change and have stressed the need for a new generation of models that offer a more realistic picture of damages. In particular, has highlighted two major flaws in the current class of economic models: (1) their limited spatial coverage, including averaged impacts across countries and regions; and (2) their unreasonable assumptions on the discount rate, which translate into a relative lack of forward-looking behavior in economic forecasts and, thus, negative effects on future generations.

Review of literature

(Andrianary & Antoine, 2019) studied “the impact of global warming on rural-urban migrations” have discovered, and This research uses a dataset at the 56km 56km grid cell level, with global coverage at 10-year frequency from 1970 to 2000, to analyze the effect of temperature fluctuations on rural-urban migration. We find that in low-income nations, higher temperatures lead to less rural-to-urban migration, but in middle-income countries, the opposite is true. Such asymmetric migration responses are in line with a basic model in which wage gaps between rural and urban areas and liquidity limitations interact to shape rural-to-urban migration patterns. By aggregating data from individual grid cells, we are able to create country-level observations that corroborate these temperature impacts. We predict that future warming will speed up urban transition in high-income countries like Argentina, but slow it down in low-income nations like Malawi and Niger.

(Sari & Soytaş, 2019) studied “Are global warming and economic growth compatible? Evidence from five OPEC countries” have discovered, and In this study, we analyze data from a subset of OPEC nations, spanning 1971–2002, to determine the correlations between carbon emissions, income, energy consumption, and total employment. The correlation between financial success and energy use is our primary research interest. We use the autoregressive distributed lag (ARDL) method, and discover that the variables are cointegrated solely inside Saudi Arabia. It is concluded that employment and energy prices are the long-term driving factors for Saudi Arabia's revenue. Cointegration between income and energy prices does not exist in Indonesia, Algeria, Nigeria, or Venezuela. Second, we raise doubts about the Granger causation in the long term between carbon emissions, energy consumption, and GDP. According to our findings, lowering nations' emission levels does not require any of them to

slow their economic development. Energy conservation might help Indonesia and Nigeria reduce emissions without slowing economic development in the long term.

(Kompas et al., 2018) studied “The Effects of Climate Change on GDP by Country and the Global Economic Gains From Complying With the Paris Climate Accord” revealed that and CGE models are widely used for analyzing policies and making economic growth projections. Unfortunately, many CGE models are dimensionally small due to computational constraints, aggregating countries into an often limited set of regions or making assumptions like static price-level expectations, where the price in the next period is conditional only on the price in the current period or in the past. This is a problem for climate change projections since we require information on the impacts of global warming on individual countries as part of a fully disaggregated global trade model, and we need to factor in the known future impacts of global warming on pricing and profit projections. This research builds on previous work that used a large-scale, intertemporal CGE trade model to predict the impact of climate change on GDP growth and levels in 139 countries over the course of a decade, taking into account the fact that producers must plan ahead by adjusting their price expectations and capital stocks to account for the uncertain future. Potential economic advantages from adhering to the Paris Accord are also calculated, and they are shown to be significant even when considering just a subset of potential costs from global warming. Globally, meeting the 2°C goal (Representative Concentration Pathway 4.5) would result in annual benefits of around US\$17,489 billion, based on the comparison scenario of Representative Concentration Pathway 8.5 (4°C) (year 2100). Sub-Saharan Africa, India, and Southeast Asia suffer relatively more in all temperature ranges from noncompliance.

(Máté et al., 2021) studied “The Impact of Sustainability Goals on Productivity Growth: The Moderating Role of Global Warming have discovered, and The purpose of this research was to provide fresh understanding of the interconnected nature of the Sustainable Development Goals (SDGs) and its impact on productivity (GDP/capita) growth. We used dynamic panel regressions to analyze data from 138 countries between 2000 and 2017 and discovered that increasing temperatures have a negative effect on economic development and reduce the impact of other SDGs on economic growth. Life expectancy has a negative effect on growth (which is reduced favorably by increasing temperatures), but food security has a favorable effect. We also observed that CO₂ emissions have a U-shaped association with growth (negatively moderated by rising temperatures). This research sheds insight on the challenge of implementing SDGs at the same time as illuminating new research ideas and strategies to mitigate climate change's detrimental effects on societal, economic”, and ecological well-being.

Conclusion

In this research, we looked at how key SDGs (sustainable development objectives) influence one another and ultimately, economic expansion. We examined the relationship between rising temperature and life expectancy and food security, as well as the consequences of global warming and CO₂ emissions on productivity growth. Arellano and Bond's dynamic panel regression model is used to estimate longitudinal multidimensional data. This technique avoids

the need for adding later times for the dependent variable, which would otherwise reduce the available sample size. In contrast to other studies, we took into account the moderating impacts of global warming, which is vital for delving into the underappreciated connections between societal and ecological threats. We find that rising temperatures have a dampening effect on GDP growth per capita. There is a U-shaped link between CO₂ output and economic growth. Besides having a negative impact on its own, global warming also reduces the growth benefits of other SDGs. “A detrimental effect of life expectancy on growth is mitigated by climate change (H5a). Growth is boosted by food security, but is tempered by warmer temperatures. Rising temperatures have a negative influence on people's quality of life, thus it's imperative that governments take action to address climate change and its catastrophic effects. Hasegawa et al. argue that vulnerable areas like sub-Saharan Africa and South” Asia will be hit worse by the implementation of rigorous climate mitigation measures than by the direct detrimental consequences of climate change.

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