Introduction

In this project, I analyzed the relationship between energy usage and gross domestic product with data of 181 countries from 2004 to 2017. With both OLS regression and panel regressions, I found positive relationship between energy consumption and GDP.

The causality relationship between energy consumption and income is a well-studied topic in energy economics. Intuitively speaking, more energy consumption usually indicates more production and economic behavior. However, to testify this relationship, we need to understand the difference between comparison across countries and comparison within countries across time. Take Iceland as an example, due to the harsh environment, Icelanders tend to consume more energy on domestic heating. If we compare the energy usage per capita of Iceland to countries with less difficult climate, such as the United States, we will falsely draw the conclusion that Iceland has higher GDP per capita than the U.S.. In order to avoid this problem, I will use regression with fixed effects to control for variation across different countries and focus on the comparison within one country at different time point.

Data and Results

I collected data on GDP per capita and energy consumption per capita from the World Bank. Both data sets cover 181 countries from 2004 to 2017. Before quantitative analysis, Figure gives us a brief idea of what the data looks like. We can see from the graph that both Ethiopia and China show positive relationship between their GDP per capita and energy consumption per capita. On the other hand, the line of the United States stagnated at the same place during this period. Based on this fact, it is possible that countries during primary development have strong positive correlation between energy consumption and production, while well-developed countries may have different pattern.