Nominal Gross Domestic Product and Economic Freedom

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Abstract

A country's nominal gross domestic product (NGDP) can help discern the economic health of a country in a given year. Along with that health, the freedom of a country's citizens comes into play with how much benefit they see in their country's NGDP. The main question that this report answers is whether there is a statistically significant correlation between a country's nominal GDP and its ranking on the economic freedom index (EFI). By performing a linear regression T-test on the data and plotting the data via a scatter plot, it was found that there is a statistically significant relationship between a country's nominal GDP and its score on the EFI with an coefficient of correlation value of .4568 and a t-test statistic of 6.434. The findings of this report could serve as a jumping off point for how a country's nominal GDP affects the types of economic policies that are in place or how well certain social programs would work.

Keywords: nominal gross domestic product, economic freedom index

There are many metrics that one may measure a country by; one of those metrics is a country's gross domestic product, or GDP for short. There are multiple types of gross domestic product, however; each one has a specific measure. This paper is concerned with the nominal gross domestic product, which is a measure of a country's GDP using current prices without adjusting for inflation. By itself, GDP measures the monetary value of goods and services purchased by the end user produced in a country given a specific time period (IMF). Not all work is included in the calculation of a country's GDP, some examples of this include black market activity and volunteer work.

The economic freedom index is a yearly ranking created by the right-wing think tank Heritage Foundation and the index measures countries based on four broad attributes: rule of law, government size, regulatory efficiency, and open markets. A score that a country can receive in this ranking is between 0 and 100. Within each attribute, there are three sub attributes that a country is evaluated on, and then a country's overall score is calculated by averaging all twelve economic freedoms. The freedoms in question are property rights, judicial effectiveness, and government integrity grouped under rule of law. Under government size, there is government spending, tax burden, and fiscal health. Under regulatory efficiency, there is business freedom, labor freedom, and monetary freedom. Finally, under open markets there is trade freedom, investment freedom, and financial freedom (Heritage).

The purpose of this research paper is to determine whether there is a relationship between a country's nominal gross domestic product and its ranking on the economic freedom index. My hypothesis is that there will be a positive relationship between the two variables: the higher the country's nominal gross domestic product, the higher their score on the economic freedom index.

Methodology

I collected this data from two sources: the Heritage Foundation website where the economic freedom index is hosted and the World Population Review website where I retrieved the data for the gross domestic product. Both of the figures used in this report cite data from 2019.

Assessments and Measures

I downloaded both the NGDP and the EFI data as comma separated values and put them into excel as separate files. I then took both figures for the NGDP and EFI and put them into one master document and made that the place for my analysis to take place. In one column was the country, the column next to it being the 2019 NGDP, and the final column being the EFI score. After accounting for missing and incomplete entries of data and deleting them from the dataset, I ended up with 149 pairs of data.

The linear equation came out to be y= 2.81E-11+57.19665. My correlation coefficient r was .4568 and my coefficient of determination was .2087. 20.87% of the variation in the EFI score can be explained by the relationship between the Nominal GDP and the EFI score. However, the remaining 79.13% is unexplained due to other factors such as lurking variables, coincidence, etc…

The kind of test I needed to perform was a linear regression t-test. My null and alternative hypothesis are as follows:

Null hypothesis: $\rho = 0$

Alternative hypothesis $\rho \neq 0$

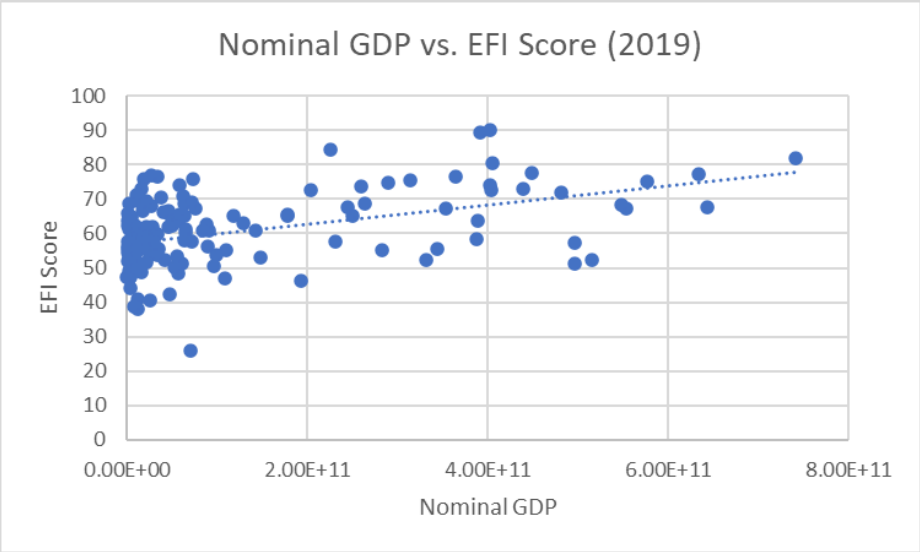
I let my alpha equal .01 and I am using both the rejection region method and the pearson correlation table.

Starting with the rejection region first, with an alpha of .01 and 147 degrees of freedom, my t critical values are 2.626 and -2.626. After performing the necessary calculation, I ended up with a t test statistic of 6.434 which lies well within the rejection region.

Now for the Pearson table, with my 147 degrees of freedom and my alpha of .01, my population correlation coefficient came out to .2083. When I calculated r, the value came out to .4568. Since the absolute value of .4568 is greater than .2083, the population correlation coefficient, there is enough evidence to support a significant linear correlation between the two variables.

Results

In both cases, we reject the null hypothesis in favor of the alternative. There is enough evidence at the 1% significance level to conclude that there is a moderate positive linear relationship between a country's nominal gross domestic product and its ranking on the economic freedom index.



Conclusion

It seems as if my hypothesis was true to some extent, although the r value was not as strong as I thought it would be. I would imagine that organizations that wish to make life better for people around the world and how economic policies impact a country like the OECD and the IMF could benefit greatly from these findings since organizations such as those seek to improve the lives of people around the world. Some further studies that could be conducted from this is how much certain economic policies impact the material well being of a country, such as a guaranteed universal income or if there is a correlation between government expenditure on healthcare and life expectancy.

Problems or Challenges

Thankfully I did not come across any glaring difficulties carrying out this report. The only hard part was figuring out how I was going to account for missing values in the data that I downloaded, but even that was fairly simple to figure out since I simply removed an entry entierly if it was missing either its nominal GDP or its rating on the economic freedom index.

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