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Final Draft

When I began my project, I wanted to examine the relationship between various economic factors, comparing actual data to the relationships that are taught in Macro Economics today. However, I had problems gaining good data over a sufficient number of years to be able to perform any analysis other than for the United States

However, during my data mining, I found very interesting information from the World Bank and other sources on global economic figures as well as global population. It became apparent that a country's population is a poor predictor of the level of GDP that it will produce on an annual basis. India, for example, has a GDP per million person ratio of only 2.6 USD/million people, whereas the United States generates 79.0 USD/million people. When the data was grouped by relative income per capita, differences became clear. Using the World Bank definition of income per capita, it is apparent that those countries with "low" income per capita have a higher percentage of GDP generated by agriculture, whereas those countries with "high" income per capita have very little of their GDP generated by the agricultural sector. The largest percentage of GDP for "high" income per capita countries comes from the service sector, which is composed of wholesale and retail trade (including hotels and restaurants), transport, and government, financial, professional, and personal services such as education, health care, and real estate services, including bank service charges.

This raises a question. If high income countries do not generate GDP from agriculture, who feeds the world? The answer lies in efficiency.

In the 1940's, the GDP mix for the United States was much different that it is today. Agriculture generated more than 12% of the economy, whereas it accounts for less than 1% of 2023's GDP. However, this does not mean that the US grows less food. In fact, food production was three times larger in 2023 than it was in the late 1940's. The difference is the efficiency gains in agriculture. Efficiency gains allow the US to grow more food, but as a lower cost per unit than in the 1940's. The same type of efficiency gains are no doubt behind the lower GDP percentages for Industry and Manufacturing, as well. Efficiency improvements allowed the United States to move from a farm and manufacturing base to a service base, and the service base generates a higher GDP.

For countries all over the world, seeking gains in efficiency would likely cause an increase in GDP and in GDP per capita, since they could produce the same number of goods, but at a lower overall cost. GDP measures the money side of production, not the count of products, so producing the same products more efficiently will result in a

lower GDP. But, as countries can enhance the standard of living of their citizens, they will consume more products, offsetting the lower amount of money generated by gains in efficiency. We have seen that trend with the countries that are in the higher income bracket – a higher standard of living allows for more consumption.

Given the data, Tableau provided better visualizations to allow for the data to tell its own story, and the infographic allowed for the story to be presented in a logical fashion. I chose several charts to show the data. To have an infographic be interesting, it must be able to catch the eye with colorful charts that are easy to understand. The bubble charts were useful to show the relative size of both GDP and population among the world's countries. The choropleth map, which is fairly simple for Tableau to construct, then can show that the countries with the highest ratio of GDP to population are not necessarily those countries with the highest GDP and Population. The scatterplot of GDP and Population clearly showed the three outliers. Stacked bar charts were used to examine differences among the top four economic sectors, using the World Bank's definition of Gross National Income per person. The final chart, showing how US agricultural output has changed over the years, was shown using a mixed bar and line chart. The purpose of this chart is to demonstrate that we actually grow more food now than we did in 1947 - but are just three times as efficient at how we perform that task. That indicates that other countries can do the same in the short term….if the rest of the world can agree to help them. Otherwise, we are looking at the future for many of the world's economies, but in 75 to 100 years from now when they can afford to make the investments by themselves.

Since the data came from trusted sources such as the World Bank and the US Bureau of Agriculture, there are few ethical concerns with the generation or use of the data. The concern comes from the fact that we, as a global community, know how to help. Whether or not each country chooses to help is a matter for its citizens to decide and for history to judge in the future.

Cites:

The World Bank. (2020). *World Bank Group - International Development, Poverty, & Sustainability*. World Bank. https://www.worldbank.org/en/home

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