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Natural Gas

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Abstract

The discovery of natural gas played very important role in economy. It effected the urbanization of different countries and changed the economic status in the world. The discovery of natural gas led to higher immigration, increased mobility between countries which in-turn affected the size of the population. Also, the revenue and wealth of different countries were greatly fluctuated with this discovery. Along with this effects, many vital events, services and support facilities were also improved all over the world.

The data in our study shows different provinces population, wealth and natural gas. We will study whether natural gas has any affect on the growth of the population and total wealth.

Keywords: Algeria; population; total wealth; economic; natural gas

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1. Description of Data

The data file contains economic state, population, total wealth and natural gas.

- Country: The names of 22 different countries were stated.

  Algeria, Argentina, Australia, Austria, Bahrain, Bangladesh, Belgium, Benin, Bolivia, Brazil, Brunei, Darussalam, Canada, Chile, China, Côte d'Ivoire, Denmark, Egypt, Arab, Rep. France, Germany, Greece

- Population: This value indicates the counts of all residents of the corresponding country. This value does not include refugees who are not permanently settled in the country.
- Total Wealth: according to Gelb, Dupuy, and Arezki, this value is calculated as the present value of future consumption that is sustainable**,** discounted at a rate of time preference of 1.5 percent**,** over 25 years"
- Natural Gas: "Natural gas wealth is calculated as present value of rents from extraction of gas, discounted at 4 percent, and over the exhaustion time of the resource" according to World Bank.

2. Data Analysis

2.1. Measures of Central Tendency

Table 1: Measures of Central Tendency

	Population	Total Wealth	Natural Gas
Mean	93,579,580	6,736,521,077,553	13,247,581,286
Median	16413652.5	2.90864E+12	4865611219
Q1	7835223.75	5.3797E+11	1738119601
Q3	58689183.75	8.56097E+12	13546657195
Max	1,204,855,000	39,320,097,358,225	80,032,368,263
Min	294,975	53,822,330,497	0

- The five number summary of population, total wealth and natural gas wealth is given along with mean value.
- From the five number summary of Population, observe that the mean of the population is higher than median which indicates that the population data is highly right-skewed.
- The mean of the total wealth is greater than that of median indicating that total wealth is right-skewed.
- The natural gas wealth is also giving the same conclusion as other variables. The mean is more than median leaving a conclusion of right-skewed distribution. The minimum value is zero.

2.2. Measures of Variability

Table 2: Measures of Variability

	Population	Total Wealth	Natural Gas
Standard Deviation	264965109.2	1.03637E+13	20075902736
Range	1,204,560,025	39,266,275,027,728	80,032,368,263
Variance	7.020651e+16	1.074066e+26	4.030419e+20

- The variation is high in total wealth followed by Natural gas wealth and the variance or standard deviation is low for population data.

2.3. Measure of Correlation

Table 3: Correlation

Correlation between Population and Total Wealth	Correlation between Population and Natural Gas	Correlation between Total Wealth and Natural Gas
0.1796417	0.08664233	0.03304194
The relation is weak	No relation	No relation

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- The correlation between population and total wealth is obtained as 0.1796 which is low. So, there is very weak positive correlation between population and total wealth. That is, the change in total wealth is least affected by the change in the population.
- The correlation between population and natural gas is obtained as approximately zero which indicates that the change in population does not affect any change in the natural gas wealth.
- The correlation between total wealth and natural gas is also obtained as approximately zero. As per the value, this indicates that there is no dependence between these variables.

2.4. Plots

2.4.1. The Pie Chart of Population:

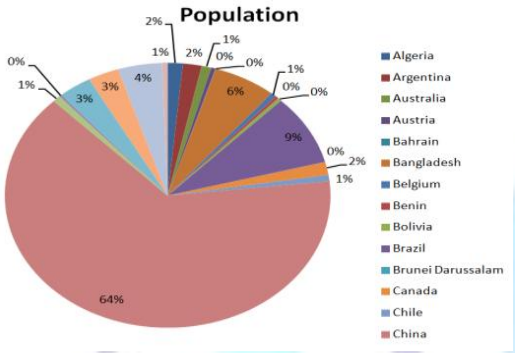

Figure 1: Pie Chart of Population

- According to pie chart, the most populated country is China where 64% of the total world population reside in China and the country with lowest population value is Brunei Dar where only 294,975 people live in.
- The second highest population country in the given list is Brazil with 9% of the total world population.

2.4.2. The Line plot of total wealth:

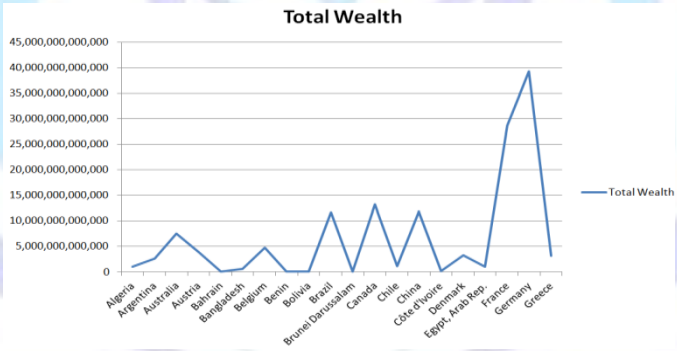

Figure 2: Line Graph of Total Wealth

- The amount of wealth varies from region to region and the highest fluctuation occurred at Germany has the highest level of wealth.
- The Benin country has lowest total wealth where the second country with highest total wealth is France (28,648,711,020,198)

2.4.3. The Bar chart of Natural Gas:

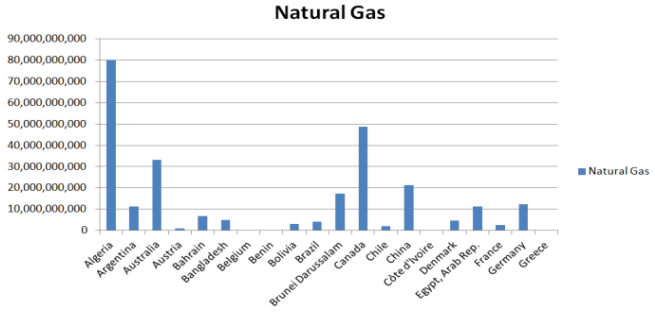

Figure 3: Bar Graph of Natural Gas

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The bar graph of natural gas varies from area to area. According to the chart, Algeria has the most natural gas wealth and the country with lowest natural gas wealth is Benin with zero. (No natural gas wealth in this country)

2.4.4. The comparison of population with total wealth:

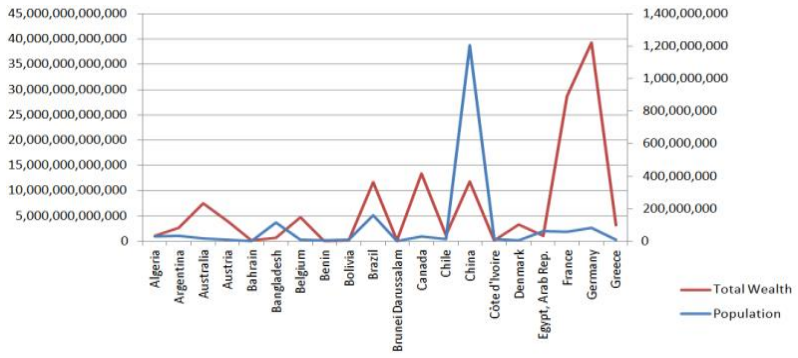

Figure 4: Compares Total Wealth With Population

- The lines compare the population of areas with their corresponding total wealth. The nature of the population line is almost constant for all listed countries with the highest peak at China country.
- The highest peak in total wealth line graph occurred at country Germany. The next highest peaks occur at Brazil, Canada and China countries.

2.4.5. The comparison of total wealth with natural gas wealth:

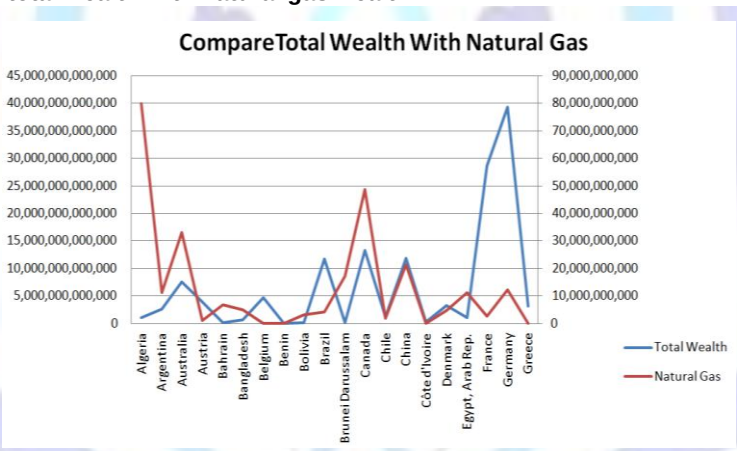

Figure 5: Compares Total Wealth With Natural Gas

The line graph compares the amount of wealth in the states with the distribution of natural gas the corresponding states. The natural gas wealth is highest at Algeria country and the Germany has the highest total wealth among all listed countries.

2.4.6. The plots of per capita wealth:

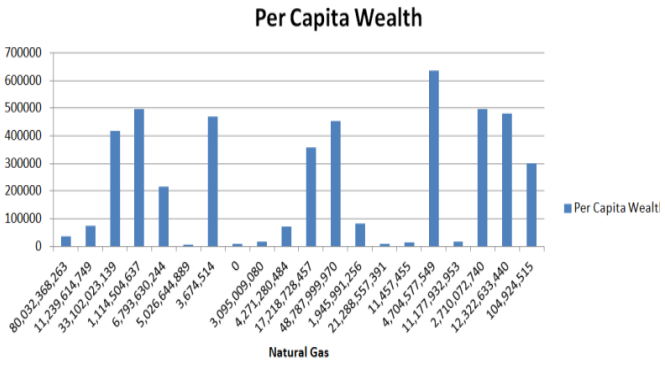

Figure 6.1: Per Capita Wealth

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The per capita wealth is calculated as the ratio of wealth to the total population. From the bar graph, observe that the per capita is approximately equally distributed over the population among all countries.

$$\text{Per Capita Wealth} = \frac{\text{Total Wealth}}{\text{Total Population}} \qquad (1)$$

2.4.7. The comparison of different countries natural gas levels by using their population and total wealth:

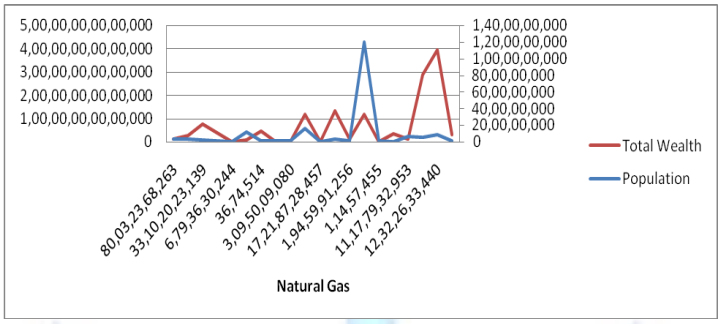

Figure 7: The line chart compares different countries natural gas levels by using their population and total wealth

This chart shows that the amount of natural gas does not have an effect on the total wealth and population of a region. The population is approximately constant and has no effect on the total wealth.

2.4.8. Stem-and-Leaf Plots:

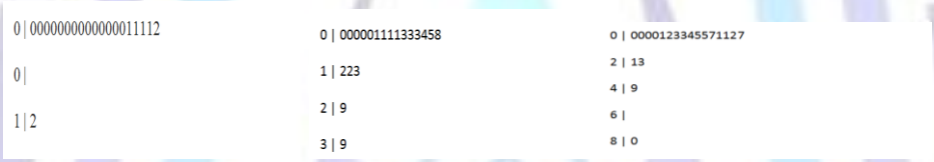

Figure 8: Stem -and- Leaf of Population, Total Wealth and Neutral Gas Respectively

2.4.9. Box Plot :

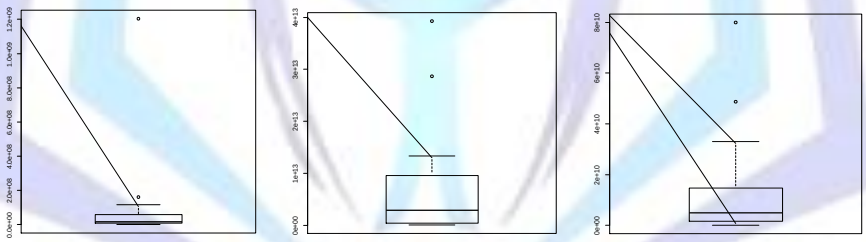

Figure 9: Box Plot of Population, Total Wealth and Neutral Gas Respectively

- All box plot are skewed to the right.
- The box plot of population is highly skewed to right with extreme outliers. The box plot of total wealth and Natural gas wealth also shows right-skewed nature and all the box plots have outliers. The minimum value for population and total wealth are very close to the corresponding first quartile.

2.4.10. Histograms:

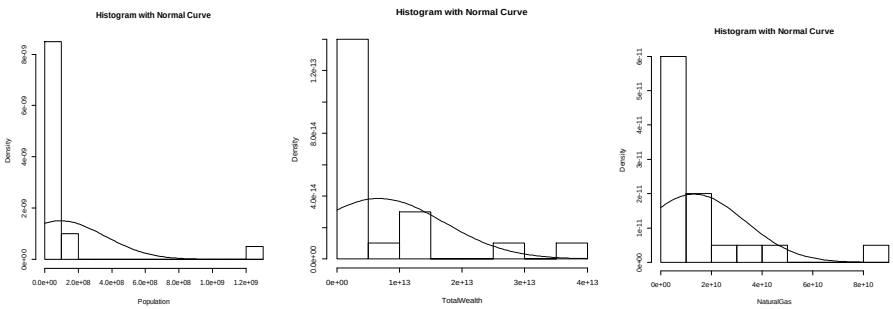

Figure 10: Histograms with Normal Curves of Population, Total Wealth and Neutral Gas Respectively

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All the histogram with normal curve display a positively skewed distribution with the presence of outliers. All the histograms show peak value at the left extreme position and the data seem to be spread towards the right side which indicates that the all the distributions are right-skewed.

2.4.11. Q-Q Plots:

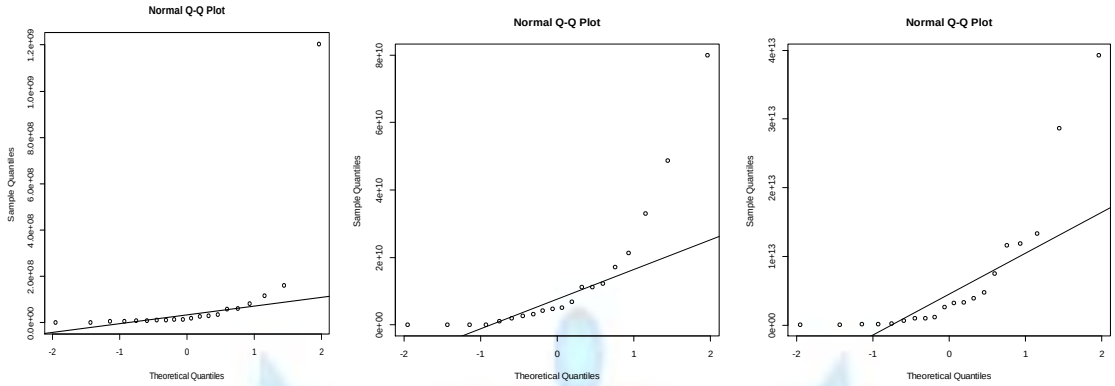

Figure 11: Normal Q–Q plot of Population, Total Wealth and Neutral Gas Respectively

- The Normal Q–Q plot in all cases show the presence of outliers. Majority of the points in the normal Q-Q plot of population are very close to straight line with few points away from straight line.
- The Q-Q plot of total wealth has more points towards the upper side of straight line and extreme outliers are observed in the diagram
- The Q-Q plot of Natural gas wealth has very few data points close to straight line. Almost all points are away from the straight line and outliers are also observed in the diagram.

3. Methodology

I used the statistical analysis programs, R and Excel, to summarize and calculate the data. The plots displaying the data were also generated using Excel and R.

My approaches to the data analysis are as follows:

- Compare the population with the total wealth
- Compare the total wealth with the amount of natural gas
- Consider the correlation between population and total wealth, between population and natural gas and between total wealth and natural gas
- Compare the wealth per capita with the amount of natural gas in a Country

4. Results

- First, we compared the number of people in given areas with the total wealth in the same respective areas. Figure 5 shows Germany as one of the richest countries in the data set, despite a relatively small population. Conversely, China's population is very high but the country is not considered wealthy. Therefore, it can be concluded that population and wealth do not correlate.
- Next, we looked for the possibility of a relationship between the total wealth of the areas in the data set and natural gas levels. Figure 4 shows the highest proportions of natural gas are present in Algeria and Canada, while small level was found in Benin. Germany was richest country, despite the small amount of natural gas. Thus, the conclusion can be made that the total wealth do not relate to the distribution of natural gas.
- Also, we consider the correlation between the population and the total wealth. Table 2 shows that the relation is very weak and there is no correlation between population and natural gas like as between total wealth and natural gas.
- Basing on the per capita wealth, it seems that the per capita wealth is approximately same in all countries.
- All the distributions are seem to be right-skewed with high extreme outliers.

5. Conclusion

- By comparing the total wealth with the corresponding population line plot, it is observed that the population and the total wealth are least correlated and the natural gas wealth and total wealth are almost not related to each other.

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- That is, the amount of natural gas resources does not affect the country's economy as expected.
- All distributions are right-skewed.
- In the end, the states' economies do not depend on the population, natural gas level, and total wealth.
- It is interesting to find that natural gas does not affect population growth and wealth.

References

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2. Gelb, A., Arnaud, D., & Rabah, A. (2012). Optimal Public Investment and Redistribution: The Role of Total Factor Productivity and Administrative Capacity. Washington: World Bank.