Information Visualization: Application Project Report

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We have conducted visual analysis using Health Nutrition and Population Statistics data set found on The World Bank web page. The data set provides key health, nutrition and population statistics gathered from more than 100 countries and more than 255 data items, covering from 1960 to 2009. Among all the data, we decided to look into relationship between countries' health expenditure with various items.

Pay more to live longer... or not?

fig.1 Overview of health expenditure per capita (US$) and survival to age 65 (Male) (Per 1,000)

Health is an important issue to everyone. However, from economic and political
reasons, each country has different amount of health expenditure, which would result in health gap between countries. We decided to investigate this gap and hypothesized that people in countries that spend more on health expenditure are healthier. However, in low-health-expenditure countries, that is not always true.

On fig.1, “Health expenditure per capita” and “Survival to age 65 (Male)” were interpolated as colored circles on a world map. Here, health expenditure includes both private and public spending. Size of the circles represents Health expenditure per capita and color of the circles represents Survival to age 65 (Male).

As we hypothesized, fig.1 indicates that countries with high health expenditure (those in North America, Western Europe, and some in Asia/Oceania) have higher survival rate. However, countries with relatively small amount of health expenditure per capita shows figures a little counter intuitive. Blue circles shown on Asian and South American countries indicate their high survival rate. However, even though countries in Africa spend equivalent health expenditure, they have much smaller survival rate.

There are several possible reasons we can think of: AIDS/HIV, Malaria, and frequent civil conflict. Those factors that are unique to African countries could have demolished young generation, resulting low survival rate over 65. On the other hand, other countries with low health expenditure may have high survival rate because of good nutrition.

**US health expenditure is inefficient.**

![Graph: Relations between Health expenditure (% of GDP and per capita) and Life expectancy](image)

Each country’s health expenditure in the world is very various according to the countries’ situation. In many cases, people would agree that more health expenditure promises the higher life expectancy. In fact, fig.2 shows that countries with high heath expenditures have the tendency of high life expectancy. Nevertheless, the U.S. is outstanding compared to other
countries.

In fig.2, let’s look at the countries that the life expectancy is around 80 years. Those countries often have higher health expenditure than other countries. It’s understandable because the older person tend to need more health care. However, even among those countries the U.S.’s health expenditure is exceptionally high. Although the life expectancy of the U.S. is not higher than the other high life expectancy countries, but with regard to the percent to GDP, the health expenditure of the U.S. is larger than the other countries conspicuously.

From fig.3, we can easily recognize that the U.S. spend more money for health care than the other countries. The deeper red color means high health expenditure rate in GDP. In this figure, the color of US is obviously deep red.
fig.4 Life expectancy and population aged 80 and older (2007)

The figure 4 shows that life expectancy of each country and the rate of the population aged 80 and older of each country. From fig.4, the life expectancy and the rate of US are not prominently higher than the other’s.
In Eastern Europe, female lives loooonger than male

Everybody knows that women often live longer than men and the fig.5 proves it. In most of countries, the female population aged 80 and older is larger than the male. But there is a remarkable thing in the figure. The tendency is intensified in Eastern European countries. For examples, Estonia, Latvia, and, Kazakhstan. By mapping data on a world map (fig.6), the phenomenon becomes clearer. The deeper blue color means the higher female population rate in population aged 80 and older. In countries of the Baltic states and former Soviet Republic, the female population rate in population aged 80 and older is almost 80%.
We expect one of reasons is that the countries' political and cultural sense are similar. (ex. food, habit, weather and etc.). Another reason is that there were several wars, heavy revolutions and intense political change in the regions for recent decades.

**Comment on Tableau’s usability**

We used Tableau as a visual analytic tool. The software offered strong functionalities and was capable of generating various types of data visualizations. In general, it was a pleasure to use Tableau. We were especially pleased with the following features and characteristics:

- Data loading is quick and easy. As Tableau starts up, it well navigates users to import data sets that users want to use.
- Once users import data sets, they can generate visualization by drag-and-dropping data from left menu bar to main fields. Consistency of the interface makes users to quickly learn how to handle data.
- ShowMe! feature is helpful in terms of learning-by-example and short cut for advanced users.

Although we think Tableau is a great software, we had some difficulties coping with some of its functionalities:

- Once data is imported, data manipulation is hard, or impossible. Thus, users need a preprocessed data on MS Excel.
• Unhelpful error handling when loading data from a file. For example, when error occurs while importing a data set, Tableau does not lead to where the problems are.

Reference