Examining indicators that influence unemployment in recent years

Motivation and goals
Due to the economic situation, in the past years, the subject of unemployment has become more popular than ever before.

We wanted to gain a better understanding of the current unemployment situation in the world by examining factors that affect it.

There are a lot of existing economics theories indicating the unemployment rate and other economic indicators, such as the famous Phillips Curve, which reveals the relationship between the unemployment rate and the inflation. But we would also like to see some other non-economic factors that could bring impacts on the unemployment rate.

Therefore, in this application project, examine several education indicators alongside unemployment rate datasets. Throughout our work, we used Spotfire to visualize them and generate some basic hypotheses about their relationship based on the visualization results.

Sources and description of data
We used the data sources in the World Bank database, available online at the following location: http://data.worldbank.org/topic/education.
The indicators that we examined are the following:

- Children out of school, primary, female
- Children out of school, primary, male
- Literacy rate, youth female (% of females ages 15-24)
- Literacy rate, youth male (% of males ages 15-24)
- Literacy rate, youth total (% of people ages 15-24)
- Mortality rate, under-5 (per 1,000 live births)
- Population ages 0-14 (% of total)
- Population ages 15-64 (% of total)
- Total population
- Public spending on education, total (% of GDP)
- Pupil-teacher ratio, primary
- Ratio of girls to boys in primary and secondary education (%)
- Trained teachers in primary education (% of total teachers)
- Unemployment, female (% of female labor force)
The datasets contain the values for the indicators organized by year over different countries.

**Insights over the data**

**Mortality and Unemployment**

We observed a correlation between youth mortality and the unemployment rate. It is apparent that countries with high mortality rates for children under the age of 5 have low enrollment in primary school, but also have low unemployment rates.

We found the latter part unexpected, so, in trying to understand this phenomenon, we examined the relationship between infant mortality and population percentage under the age of 15, suspecting that high infant mortality rates would lead to low ratios of young population. To our surprise, we discovered that the higher the ratio of children in the population, the higher the mortality rate as well. This suggested that the child mortality rate is determined by high ratios of children. This result also helped us come up with a possible explanation for the relationship between unemployment and infant mortality, which is indirect: both of them are caused by the high ratios of young population, which means a corresponding lower percentage of population that has reached a working age.
Moreover, it looks like the countries with the highest ratios of population under 15 and highest mortality rates are almost all clustered in one geographical part of the world – Central Africa.
**Education in the US**

The following chart presents all of the education indicators of 246 countries over the last 20 years. One of the interesting results we have found from the graph is the US education indicators over the last 20 years.

If we pick United States separately, we find that some of the education indicators have changed dramatically from the year 2000. Such as, the *boys and girls out of primary school* rate, the primary school enrollment rate.

So, we did some research online, and discovered that the change coincides with the approval of the act *No Child Left Behind (NCLB)*, in 2001, by the George W. Bush administration. That might explain why more and more children get enrolled into primary school since the 2000s.

**Cultural Influences over Unemployment**

Besides the US education indicators analysis, we generated a scatter plot and associated map chart to see the relationship between the male/female unemployment. When we take a look at the high female/male unemployment ratio, we find that most of these countries are located in Middle East and Africa, which is in accord with the local culture and religious factors.
In this chart, we also got one surprising finding. When we look at the unemployment ratio of Iraq in 2003 and 2004, the male unemployment rate is much higher than that of women, which is different from our expectation, since usually, women in the Arab world are not relatively encouraged to work outside.

Then, we created an associated line chart to delve into the detail information of the unemployment rate before and after the Iraq war. It turned out that after the war, the unemployment rate has decreased sharply for male, but increased for the female population. In the meanwhile, the overall population has increased by approximately 8%. Previously, both of us were thinking that the Iraq would hinder the economic developing and more people would lose their jobs, because of the war. However the results seem to be opposite based on our information visualization. We guess the reason could be that the reconstruction of the country brought new jobs with it, and the political and economic situation became relatively stable after the war.

**Critique of Spotfire**

Spotfire is a powerful tool, and the usability part is also pretty good. The basic functions are really easy to use.

The filter is pretty good, and it allows us to select different factors at the same time, and generate the results under different dimensions. However, we could not select several indicators in the filter to display different results in one chart/graph. One other thing we found lacking was that we weren’t able to select data from two data tables, and we needed to combine the data table before loading it for analysis and it do require some pre-processing work for the data.

Another thing that could be improved is the export mechanism. Right now, it allows users to export to PowerPoint slides, but the layout of the dashboard as well as the font format will be changed after exporting it. Moreover, the generated PowerPoint slide is not interactive, so it would be great if it could be exported or generated into a web application or flash video.