

CS 171: Project II

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Process Book || Spring 2013

Growing Globally

Growing globally is data from primarily OECDG nations regarding GDP, unemployment rates and life expectancy. We chose to pursue these variables because they are strong indicators of growth and development within nations. We are assessing these variables over time, for a period of about 15 years (1995-2010).

We tried to visualize this data in such a way that you can truly appreciate the relationships between common metrics of growth and other similar growth mechanisms. We hope you enjoy our project!

Table of Contents

Introduction

1. Background
 - a. Why are we interested
 - b. Intended users
2. Data
 - a. Obtainment
 - b. Variables
3. Original proposal

Visualization Design

1. Goals
 - a. Design technique
 - b. Data goals
 - c. Baseline
 - d. Lofty
2. Initial Sketches
3. Final choices

Analysis

1. GDP relationships
 - a. Understanding the issue
 - b. Expected value
 - c. Final product
2. Unemployment segmentation comparisons
 - a. Understanding the issue
 - b. Expected value
 - c. Final product

Finished Project

1. Site design
2. Screenshots
3. Logistics
4. Further study

Conclusion

Introduction

Introduction

Background || Why are we interested

Rachna has worked a significant amount with economic data in research. OECD data is very thorough and rich, which would make it feasible for us to create a strong visualization that dynamically allows the user to see the relationship between many growth factors.

We chose OECD data in particular (which included a few developing and lesser developed nations), in order to see the trends within a particular level of developed nation, and then included a few of the developing and lesser developed nations to add additional insights and some comparative data from other nations that were not as homogenous. We hoped to see the more subtle trends in these seemingly homogenous nations as a result.

We both wanted to map something that would have a very tangible relationship, and a very visually appealing type of display. Also, given the recent global economic conditions, this makes the visualization of data from the last 15 years even more pertinent and valuable.

Introduction

Background || Intended Users

People who would likely find this visualization most appealing are those who are interested in learning more about economic trends. Given that we are analyzing a variety of economic contributors, this data (which will provide exact values as well as display general trends), can be easily understood by both the economically savvy and unknowing.

Introduction

Data || Obtainment

We used data from the OECD statistics page. There were a variety of reasons that inspired this choice. First of all, OECD nations have generally been stable and in existence long enough such that the time frame would be appropriate to look at data trends over time.

Second, this data was fairly clean when we obtained it, allowing us to focus on making vivid and memorable visualizations. The data was cleaned via Microsoft Excel, because we were most comfortable with making alterations to the dataset through this method.

Finally, and substantively, OECD nations are amongst those who have seen the most change during the global financial crisis, and for this reason, the relationships in the data we sought were amongst the most interesting to analyze.

Introduction

Data || Variables

The variables that we chose are ones that we hoped would reflect economic growth. We decided to look at GDP, one of the most crucial measures of growth, and then some related variables. The first related variable we thought to look at was life expectancy, which is often a strong indicator of the level of growth of a nation.

We also looked at unemployment, which can be a method of showing the economic stability of a nation. We thought that the relationship between these variables, and some of the segments of such populations (such as gendered segments or age segments) would help further analyze some of these relationships.

Visualization Design

Visualization Design

Goals || Design Technique

Our design technique centered around maximizing functionality (through intuitive visualization) while maintaining a reasonable level of data density. For this reason, with geographic data, we felt the importance of a map-based visualization was there.

We also felt that with a line graph, there was a strong need for graphical integrity. With the world map, relative graphic integrity was important, but not necessarily as valuable as in a line graph, where relative measurement was much easier to understand, as per Tufte's design principles discussed in class. Choosing colors for a map-based visualization was also key, because we discussed in class the pitfalls of choosing confusing color schemes. For this reason, we researched commonly used hex progressions, hoping to find one that was intuitive. We made our hover color very distinct, and made the default color for countries that were non-participatory a color that blended well in that it did not call attention as being a portion of the map (dark grey).

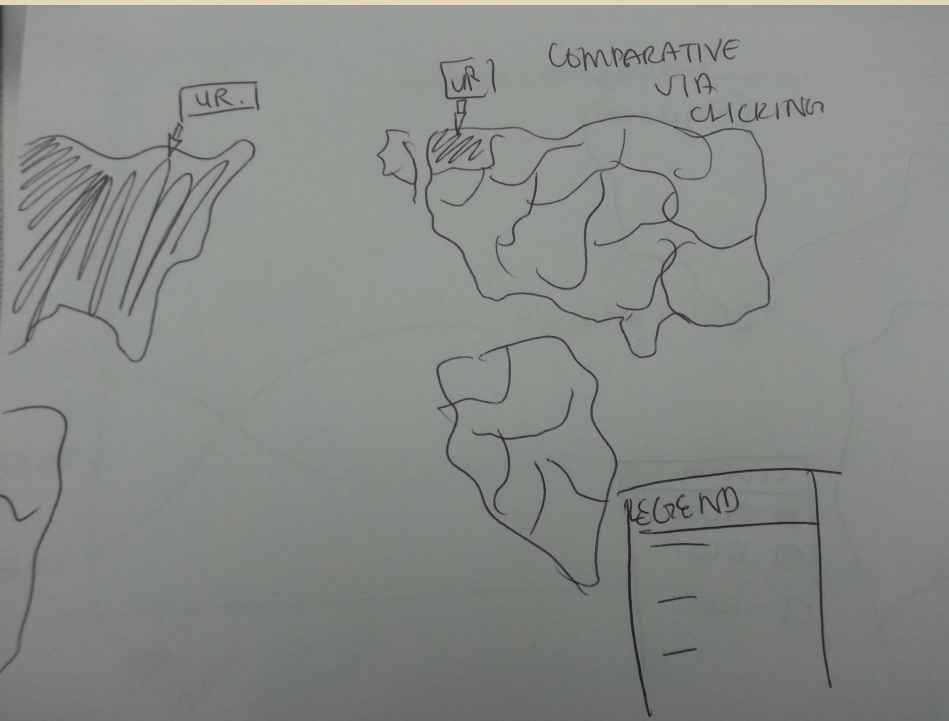
Visualization Design

Goals || Data Goals

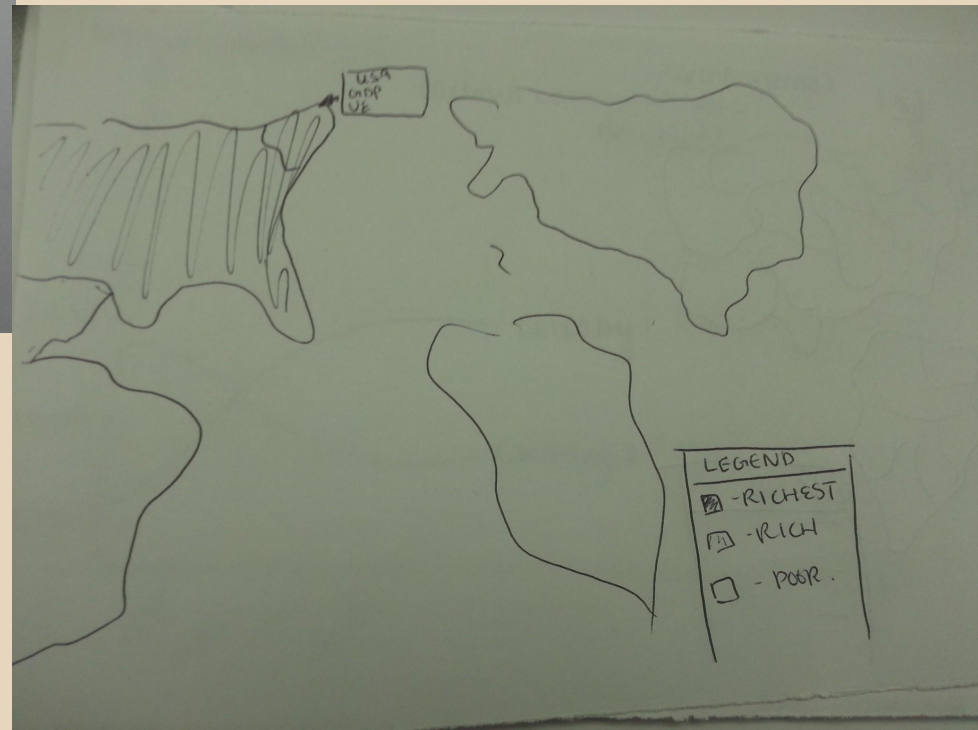
We hope to be able to portray the data in terms of relatable visualizations that display growth. We are primarily interested in trends over time, and as GDP is such a strong indicator of growth, we hope to analyze it in conjunction with other growth factors, as mentioned earlier. We hope to display this with a clear geographic tie, so that perhaps indirectly our viewers can also see geographic trends, despite the fact that we don't have explicit geographic data outside of the list of countries.

Visualization Design

Initial Sketches || Map

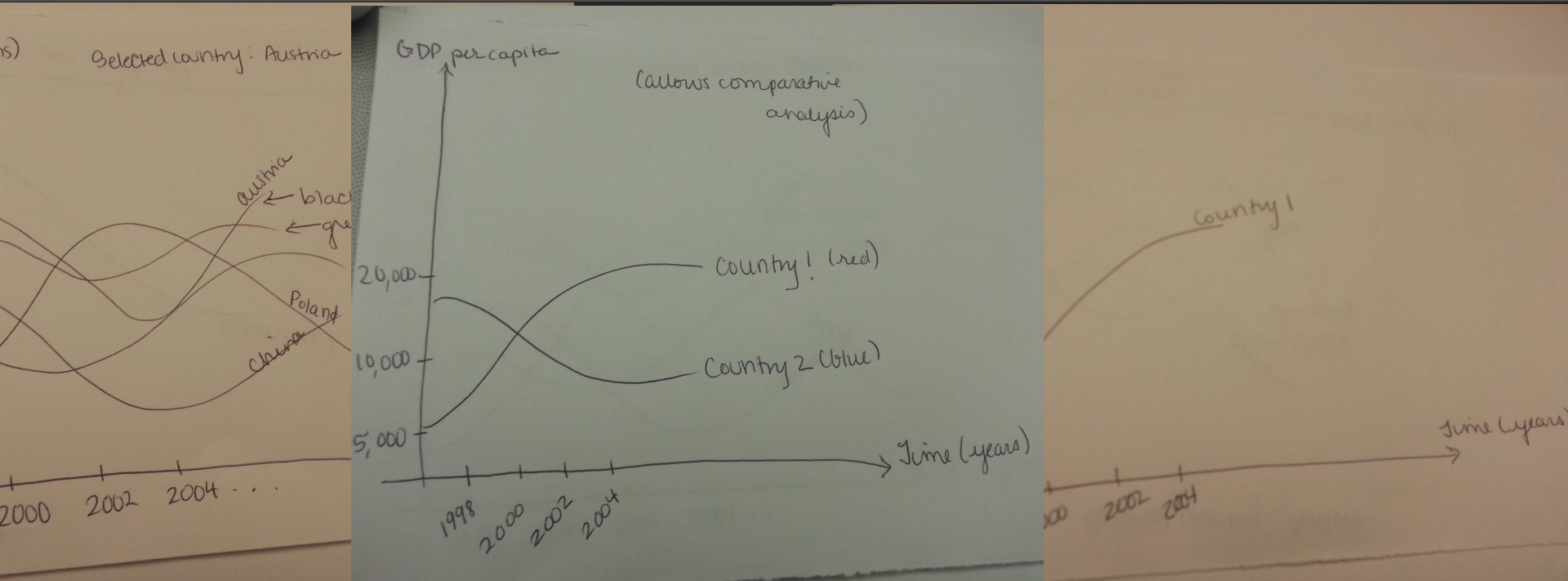


We were deciding between allowing comparative analysis or just working with having one country as a hover option



Visualization Design

Initial Sketches || Graph



Here we offered a variety of options, either with a single country, comparative, or all countries. All countries was visually overwhelming, and the comparative seemed to be a valuable inclusion, so we chose to keep that option.

Analysis

International GDP Trends Over Time

1. **Understanding the issue:** As stated previously, GDP per capita has a strong tie to economic indicators, and we hope to display its change over time to reflect the changes in the world economy (especially with interesting results around the 2008 financial crisis). We think this might show an interesting relationship with other economic indicators such as employment level and life expectancy, which show the fiscal and physical health of a nation, both of which are tied to the economic stability and strength of the people within it. This is why we chose this type of data as our focus.
2. **Expected value:** The value we would like to create is the ability to visually see trends without having to understand the specific numbers. We feel that there are strong economic links between the variables we are looking to study, and we'd like to display them in an efficient and visually intuitive manner.

International GDP Trends Over Time

- 3. Final Product:** We can see from the data on our map that nations that are considered economic powerhouses today got their start in the late 90s, as the United States and many northwestern European countries began pulling away from otherwise economically similar nations. Some nations, such as Australia, saw a quick jump in GDP per capita a few years later, while nations such as China and Russia took much longer to begin the economic climb. All the Asian, African, and South American nations for which we have data seem to be on a much slower developmental path.

Given that many of these nations shared in an instable government or were former colonies until the past few decades, this trend is in keeping with what one would predict given economic models to forecast developmental growth. It is clear that because of the global economic crisis that some nations, such as Russia and some European nations, suffering under the weight of international economic instability, actually regressed economically.

Intranational GDP Trends Over Time

1. **Understanding the issue:** GDP per capita economically relates quite directly with time and can be justified by political or social events of the time. Being able to see if the relationship trend exists in the form of a graph over time would be an interesting way to allow the viewer to open up contextual questions as to what the other influences and variables in the relationship are. Our goal is to truly allow the user to get a better gauge for the relationship between time and GDP per capita.
2. **Expected value:** Because we are not attempting to establish causality, the value of this graph is to be able to easily see trendlines over time. We chose to utilize a line map in this instance because the relationship we wanted to highlight was that of time versus GDP per capita, and not so much the geographic influence. We believe that this intentional visualization choice will allow viewers (especially those with an economics background) to be piqued by the relationships we display.

Intranational GDP Trends Over Time

3. **Final Product:** These graphs allow us to further understand the relationships of nations over time, but internally instead of focusing on trans-national trends. This is vital because it calls to attention individual country development instead of focusing on neighborhood trends, as our other graph does. Removing the map element and focusing on a traditional line graph allows the data to clearly and intuitively state our purpose, and allow the users to determine strong, and more quantitative trends.

Linked Graphs

We chose to link our graphs with the year to create a visual prominence highlighting the year that the individual has chosen to analyze. This link means that when an individual selects a year in the map, it renders a line through the year in the secondary graph, allow the user to focus on the relationship between the two nations at that particular year. We feel this helps emphasizes the link between the international and intranational data.

Finished Project

Finished Project

Screenshots || Overall

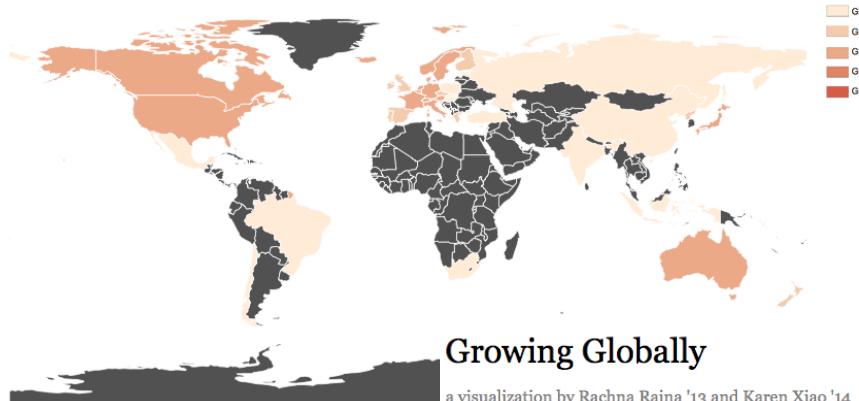
Growing Globally

a visualization by Rachna Raina '13 and Karen Xiao '14

Display visualization for year: 1995

Global GDP per capita and Unemployment

This map is a visualization of global GDP trends over time. We hoped to be able to observed, primarily within OECD nations, the trend of GDP concentrations over the 15 years from 1995 - 2010. The value of this trend understanding comes from being able to see which nations have developed more rapidly comparatively, and if there are concentrations of development amongst any of these nations. The color progression visually highlights the progression, from the lightest (lowest GDP per capita), to darkest (highest GDP per capita).



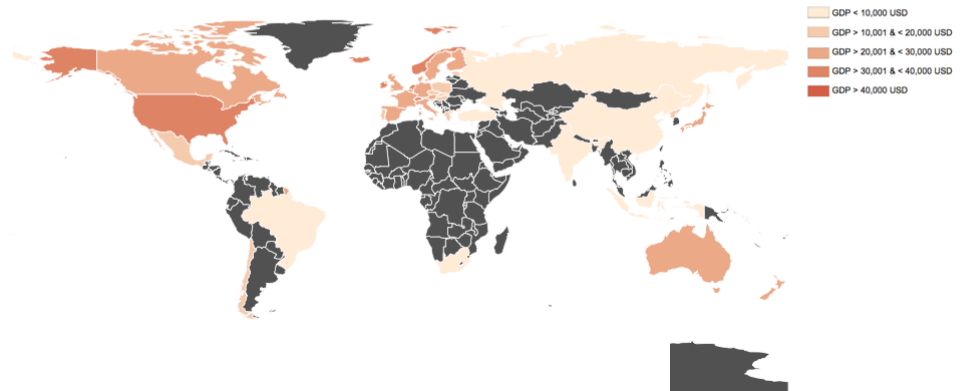
Growing Globally

a visualization by Rachna Raina '13 and Karen Xiao '14

Display visualization for year: 2001

Global GDP per capita and Unemployment Data: 2001

This map is a visualization of global GDP trends over time. We hoped to be able to observed, primarily within OECD nations, the trend of GDP concentrations over the 15 years from 1995 - 2010. The value of this trend understanding comes from being able to see which nations have developed more rapidly comparatively, and if there are concentrations of development amongst any of these nations. The color progression visually highlights the progression, from the lightest (lowest GDP per capita), to darkest (highest GDP per capita).



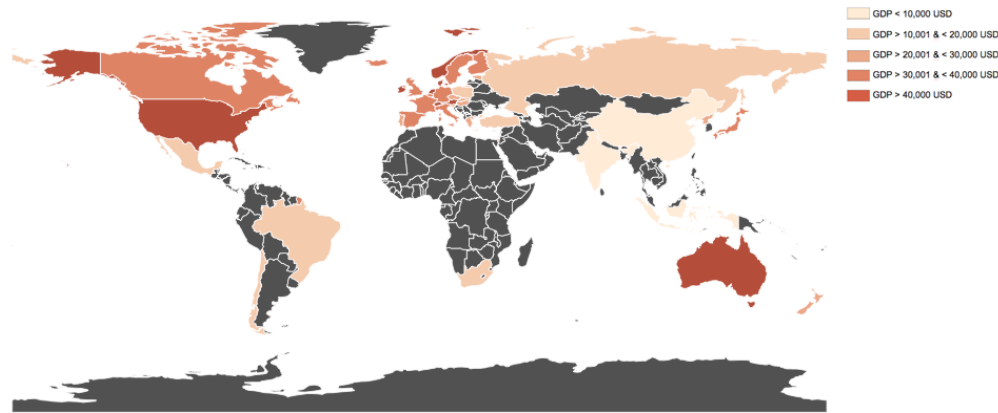
Growing Globally

a visualization by Rachna Raina '13 and Karen Xiao '14

Display visualization for year: 2010

Global GDP per capita and Unemployment Data: 2010

This map is a visualization of global GDP trends over time. We hoped to be able to observed, primarily within OECD nations, the trend of GDP concentrations over the 15 years from 1995 - 2010. The value of this trend understanding comes from being able to see which nations have developed more rapidly comparatively, and if there are concentrations of development amongst any of these nations. The color progression visually highlights the progression, from the lightest (lowest GDP per capita), to darkest (highest GDP per capita).



Finished Project

Screenshots || Hover Feature



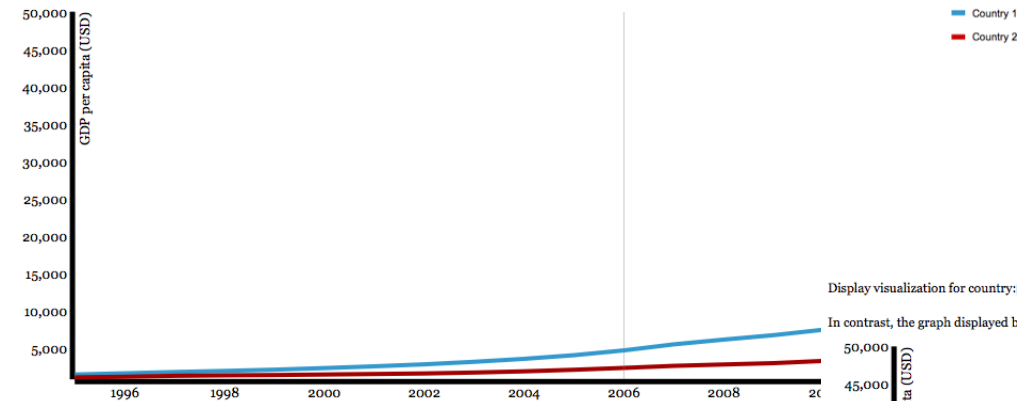
Finished Project

Screenshots || Graph

Display visualization for country:

GDP per capita: China, India

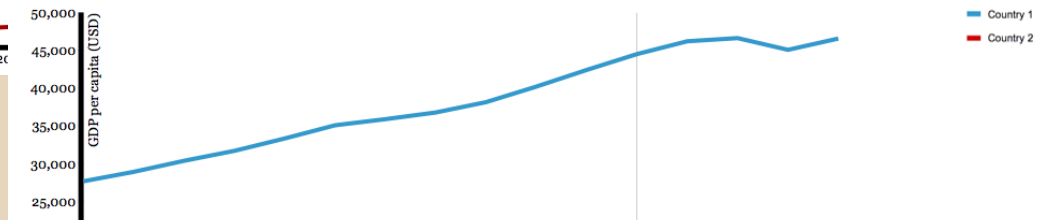
In contrast, the graph displayed below is intended to allow for comparisons within a particular nation of GDP per capita trends over a period of time (from 1995-2010).



Display visualization for country:

GDP per capita: United States, India

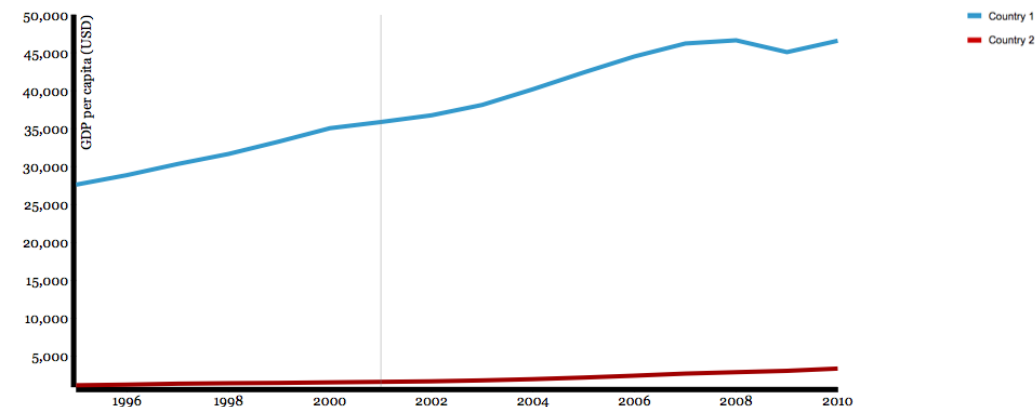
In contrast, the graph displayed below is intended to allow for comparisons within a particular nation of GDP per capita trends over a period of time (from 1995-2010).



Display visualization for country:

GDP per capita: United States, India

In contrast, the graph displayed below is intended to allow for comparisons within a particular nation of GDP per capita trends over a period of time (from 1995-2010).



2000 2002 2004 2006 2008 2010

Finished Project

Logistics and Further Study

We worked together quite handily on this project -- each focusing on our strengths. For Rachna this primarily consisted of design and decision-making on the data, as well as documenting and constructing the process. Karen focused more heavily on implementation via D3 and implementation design, as this is where our strengths lie.

In future expansion of this project, it would be interesting to include more variables, perhaps with a less direct relationship, to see if there are any interesting underlying trends to be determined through interesting visualization representation.

Conclusion

Conclusion

Our purpose in this project was to show two main trends in data with relation to GDP per capita - that within the nation, and that amongst nations. We thought that the value of geographic preservation was important for displaying the relationships amongst nations, along with unemployment rate supplementation, while within a nation the relative magnitudes were more crucial to see the upward and downward trends. This dictated the visualizations we chose to pursue, and we certainly enjoyed looking at this data more closely while learning more about D3 visualizations.