**ISF 110, Lab 6 – Spatial data visualization exercise**

In this lab, you will create (1) a global map showing the distribution of GDP per capita, (2) a US map showing the distribution of unhappiness, and (3) another map showing the association between unhappiness and unemployment across US census divisions.

***1. A Global map showing GDP per capita distribution***

First, download the World Bank country boundaries shapefile [World Country Polygons - Very High Definition](javascript:;). Create a folder, extract the file into this folder, and you will see a bunch of files*.* You will need only the DBF and SHP files. To use this folder as the default file location, type:

*cd* “copy the folder address” //Example: *cd "E:\ISF\ISF 110\Spring 2022\Labs\Lab6"*

Convert the .shp and .dbf files into Stata format by using shp2dta command. For this, you will first need to install this package by typing:

*ssc install shp2dta, replace*

Now, convert the shape files into Stata data format:

*shp2dta using WB\_countries\_Admin0\_10m, database(wb\_data) coord(world\_shp) genid (ID) replace*

Open the wb\_data file and browse the data by typing:

*use wb\_data, clear*

*br*

Note that the World Bank shapefile already has a few variables included as part of the dataset. You will use them to create GDP per capita by typing:

*gen gdp\_pc = (GDP\_MD\_EST / POP\_EST) \* 1000000*  //GDP estimates are given in millions of dollar

To plot a basic map, you will use the spmap command. To install this package, type:

*ssc install spmap, replace*

Then, type to create the map:

*spmap gdp\_pc using world\_shp, id(ID) fcolor(Blues)*

You can use any colors you like (e.g., Oranges, Reds, Greens, etc.). Edit the map by giving it a title and a note on the source of data (e.g., “Data Source: World Bank 2022, <https://datacatalog.worldbank.org/search/dataset/0038272>). Then, save the graph in png format.

*graph save gdp, replace*

*graph export gdp.png, replace*

***2. A US map showing the distribution of unhappiness by Census Division***

Follow the steps below:

\*First, prepare the datasets. You will need a dataset containing unhappiness, housing price, and unemployment data (*usdata*), a dataset containing US shape data (*usdb*), and a dataset containing US coordinate data (*uslabelcoord*). These datasets are already prepared for you. Download them from *bCourses* Lab6 folder, save them to your own folder, and merge them using the following commands:

*set more off*

*clear all*

\*If you have saved the data in a new folder, don’t forget to change the directory by typing: *cd* “copy the folder address” //Example: *cd "E:\ISF\ISF 110\Spring 2022\Labs\Lab6"*

*use usdata, clear*

*ren subreg\_id subreg*

*encode subreg, gen(subreg\_id)*

*keep subreg\_id unhappy housing\_price unemployment*

*merge 1:1 subreg\_id using usdb.dta*

*drop \_merge*

*merge 1:1 subreg\_id using uslabelcoord.dta*

*drop \_merge*

\*Now, use the following commands to create your map and save it in png format:

*spmap unhappy using uscoord.dta, id(subreg\_id) ///*

*label(label(subreg\_id) xcoord(xcoord) ycoord(ycoord)) ///*

*fcolor(Reds) legtitle("Fraction of respondents who were unhappy") ///*

*title("Figure 3: Unhappiness by Census Division, 2012")*

*graph save unhappy, replace*

*graph export unhappy.png, replace*

***3. A map showing the association between unemployment and unhappiness across US Census Division***

\*Use the same dataset (uscord) as in activity #2 above. The steps below show how to show the association between housing price and unhappiness. You will follow the same steps to show the association between unemployment and unhappiness.

*gen Y = housing\_price*

*format Y %4.1f*

*spmap unhappy using uscoord.dta, id(subreg\_id) ///*

*point(x(xcoord) y(ycoord) proportional(Y) fcolor(red) ocolor(white) size(\*3.5)) ///*

*label(label(subreg\_id) xcoord(xcoord) ycoord(ycoord)) ///*

*fcolor(Reds) legtitle("Fraction of respondents who were unhappy") ///*

*title("Figure 3: Housing Price and Unhappiness by Census Division, 2012")*

*graph save housing, replace*

*graph export housing.png, replace*

\*End of Lab 6\*

Post all your maps on *bCourses* with a brief interpretation for each in pdf format.