

## Instructions for Data Analysis

### 1. Excel Files

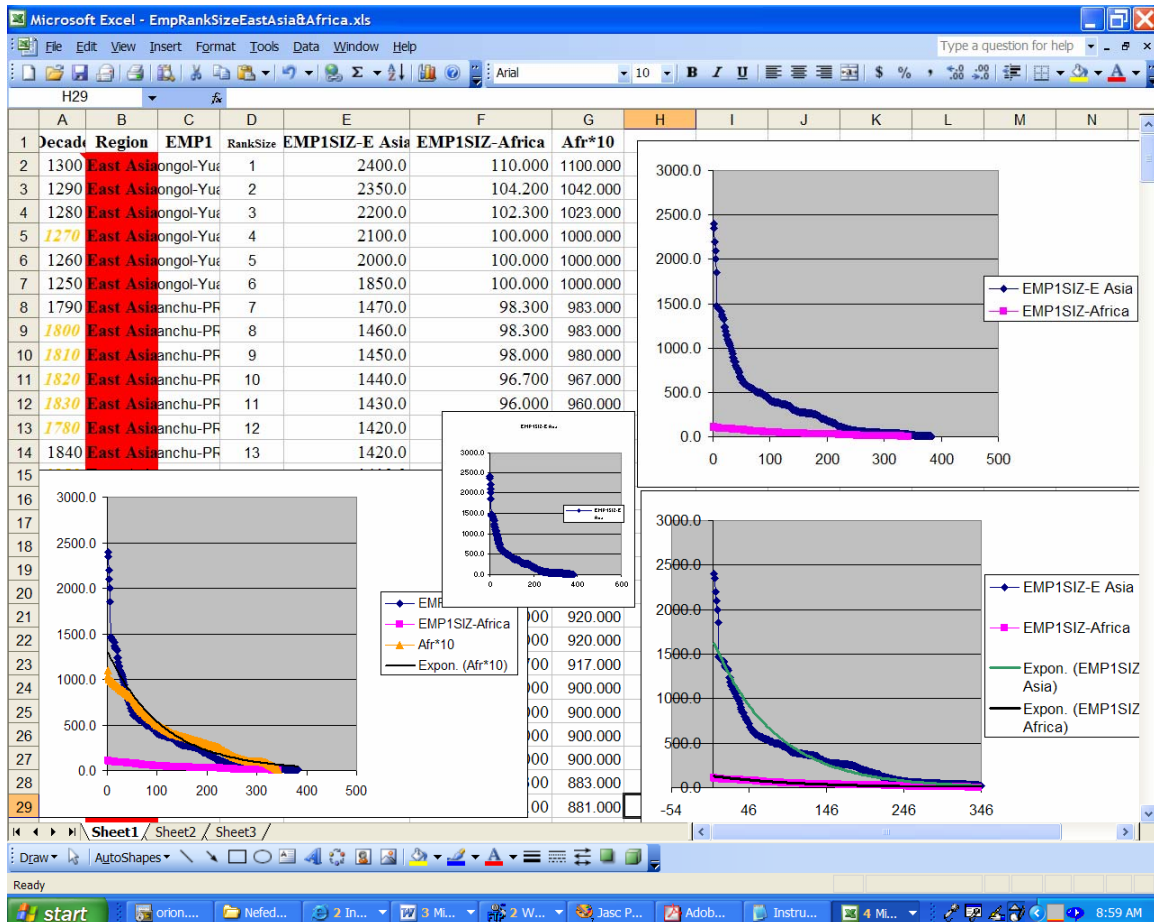
A. Distribution Analysis: Single Quantitative Variable

B. Relationship Graph: Y variables graph against X axis baseline variable

-- Same procedure for each, since in the first case you create an X axis by sorting your variable and assigning a rank size variable (see below). I

In the example here, I copied the East Asian cases (Decade, **Region**, EMP1 (name), and EMP1SIZE into a separate file, sorted on EMP1SIZE, inserted a new column, labeled it RankSize, put a 1 in cell D2, set cell D3 to =D2+1 to get the value 2, clicked cell D2, noted the square box that appeared on the lower right of D2, clicked that square box, and dragged it down to fill D2 with computed values.<sup>1</sup>

A. Distribution Analysis: Single Quantitative Variable. Run the mouse over columns D and E to highlight both. Click the GRAPH symbol (three-bar-graph). Click XY(Scatter), and just to the right the two intersecting wavy lines with nodes on them. Click Finish and you will get something like the smallest of the graphs shown below.



<sup>1</sup> (Optional: click column D, used copy command, used Edit>Paste Special>Values (click box Values) and by doing so filled rank size with Values rather than computed values.)

What you really want out of these analyses is a TRENDLINE for the distribution. To get a trendline, go to the bottom of your data column and eliminate (clear or delete) any cells with zeros. They prevent you from getting trendlines that depend on logs or exponents. We'll exemplify a comparison of trendlines for African Empires and Asian Empires.

B. Relationship Graph: Now we'll keep open the same \*.xls spreadsheet with the East Asia data, but we will add a comparison of the Africa data, and then we'll do trendlines for each, compare them, and interpret them. That will give us the three larger graphs in the figure.

Save the current spreadsheet and open a new one. Copy and Paste into this spreadsheet the Africa data. Repeat the same process as above, and get the same kind of graph for the one-case analysis that we got for Asia above. Now, however, paste the column with sorted empire sizes into Column F of the Asia spreadsheet. Rename the spreadsheet (Asia&Africa) and save. Now click THREE columns rather than the two we clicked before to make our first graph, and make a graph just like the other. That will be the big graph on the upper right. Go down the Africa column and eliminate the two ZERO size cases at the bottom.

Now click the new graph that has the Asian and African results. COPY. Position the cursor in the cell below the existing graph. PASTE. Now we will do the trendlines on this graph. Click one of the data series, say the Asian series. Click Add Trendline. Now, in turn, click Power Law, then UNDO, Exponential, then UNDO, Logarithmic, then UNDO. Decide which best fits the data, and redo that one. Now do the same for the other data series. That will give you the second large graph on the right, with fitted distributions. *An exponential distribution is what you expect if all-sized empires tend to grow or to shrink at the same rate. If these were power law distributions large empires would grow or shrink at a faster rate than the smaller ones.*

Notice that the Asia distribution seems to have a crook in it compared to the African distribution. It's hard to compare them, however, since the distribution of the African empire cases are much smaller overall than the Asian. So here I created a new column G, labeled it Afr\*10, and put in its TOP cell G2 the equation =F2\*10, that is, ten times the values in column F. This equation has to be corner-clicked and dragged down to fill column G with these values. Now I made a new graph to compare ALL THREE set of values on our variables. That is the large graph in the lower left. The Orange line are the Afr\*10 values, only I clicked the line (it was originally YELLOW) and reformatted it to the color ORANGE. Then I clicked it again and set the trendline to Exponential. Now we can see that compared to this line, LARGE ASIAN EMPIRES have a tendency to grow faster than smaller ones while LARGE AFRICAN EMPIRES have a tendency to grow slower than smaller ones. That's the interpretation. End of Exercise.

More generally, for Relationship Graphs, any variable (not just constructed ranks) can be taken as the X variable, not just rank variables. Exponential and power-law distributions have similar interpretations.

## **2. GIS – Geographic Information Systems**

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**[http://webfiles.uci.edu/tsoeller/uci/gis/Digital%20Books/What\\_is\\_ArcGIS.pdf](http://webfiles.uci.edu/tsoeller/uci/gis/Digital%20Books/What_is_ArcGIS.pdf)**

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Instructions for Data Analysis

Clickable links:

### **1. Excel Files**

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