14.74x Introduction Unit
Homework Assignment

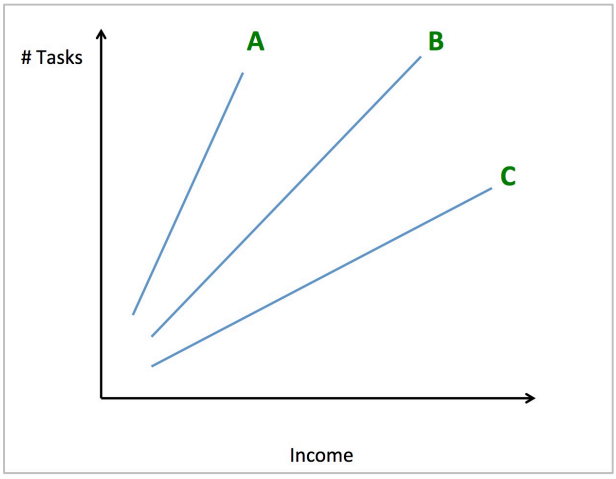
Welcome to your first homework assignment! You will have one week to work through the assignment. We encourage you to get an early start, particularly if this will be your first time using R.

We have provided this PDF copy of the assignment so that you can print and work through the assignment offline. You can also go directly to complete the assignment online. If you choose to work through the assignment using this PDF, please go back to the online platform to submit your answers based on the output produced.

Unit 1: Poverty, Nutrition and Labor Markets

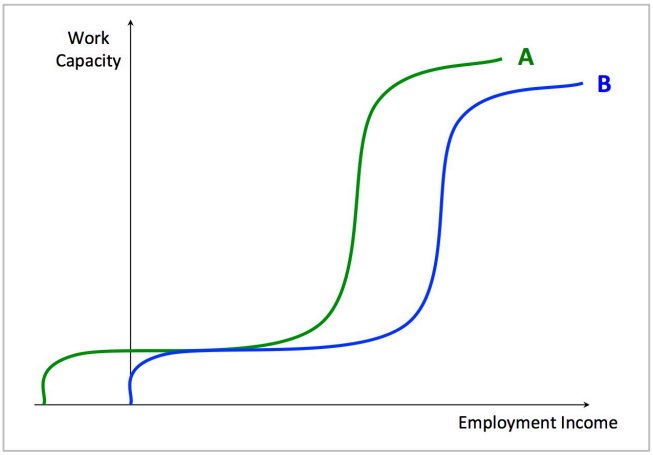
1) Compared to the standard supply and demand model for determining the equilibrium in the labor market, think about some of the differences that arise in the case of poverty, as discussed in class. What happens in the case that demand intersects the supply curve in its flat portion?
    a. Only people with some non-labor income are able to work
    b. Only people with no non-labor income are willing to work
    c. There is involuntary unemployment
    d. In this case, there is no difference from the standard labor supply and demand model, and the market clears

2) Which of the following example piece rates corresponds to the highest amount of money earned per unit of output?



    a. A
    b. B
    c. C

3) Which capacity curve represents the case when people have some non-labor income, such as land?



a. A
b. B

4) Imagine that we have survey data of people's food expenditure and their basic income and demographic characteristics (e.g. age, education, etc.). Assume that you would run the following regression to answer the question of whether people who eat more nutritiously earn more.

$$Income_i = a + b*(nutrition\ intake_i) + c*(age_i) + e_i$$

Can the regression estimate tell us whether eating more nutritiously causes higher income? Why or why not?

a. Yes
b. No

5) Do you predict the coefficient of your regression above to be positive, negative, uncertain, or to show no relationship? Why?

a. Positive
b. Negative
c. Uncertain
d. No relationship

6) If you regress income or nutrition on education, do you expect the coefficients b and d to be positive, negative, uncertain, or to show no relationship?

$$Income_i = a + b*(education_i) + e_i$$
$$Nutrition_i = c + d*(education_i) + m_i$$

a. Positive
b. Negative
c. Uncertain
d. No relationship

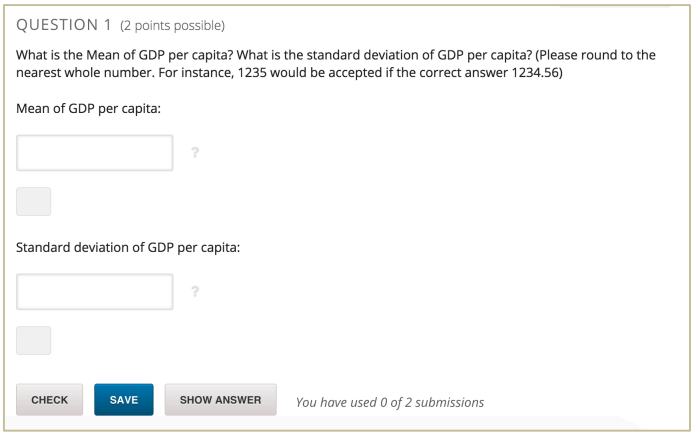
7) How might the results from question 6 affect the interpretation of the regression from question 4?

a. No impact, since we included age controls in the regression in question 4
b. The estimate of the impact of nutrition on income (in question 4) would likely be overestimated
c. The estimate of the impact of nutrition on income (in question 4) would be underestimated
d. The estimates for the impact of education on income are likely more accurate than the estimates for the impact of nutrition on income

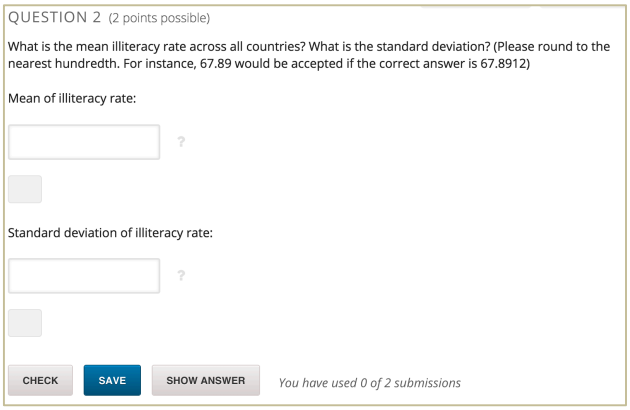
Unit 2: World Bank Development Indicators Data

The point of this exercise is first to help you understand the faces of poverty, and second to help you get familiar with R. You will need to download the .csv file wb_dev_ind.csv from the course webpage. This dataset contains data from 2004 to 2014 from the World Bank Development Indicators.

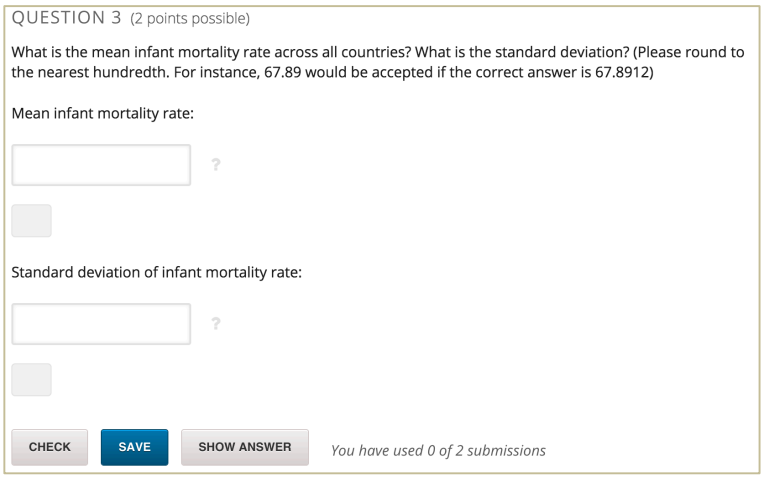
1. What is the mean **GDP per capita** across all countries? What is the standard deviation of GDP per capita across all countries? (Please round to the nearest whole number. For instance, 1235 would be accepted if the correct answer 1234.56)



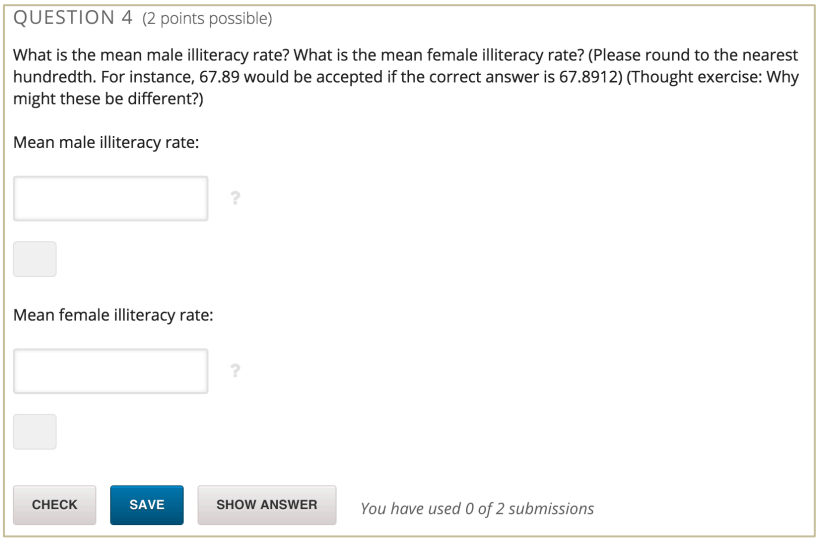
2. What is the mean **illiteracy rate** across all countries? What is the standard deviation? (Please round to the nearest hundredth. For instance, 67.89 would be accepted if the correct answer is 67.8912)



3. What is the mean **infant mortality rate** across all countries? What is the standard deviation? (Please round to the nearest hundredth. For instance, 67.89 would be accepted if the correct answer is 67.8912)

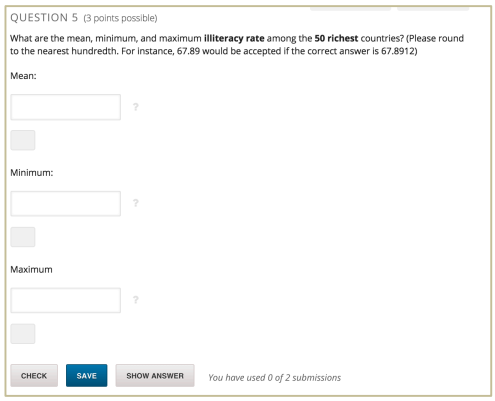


4. What is the mean **male illiteracy rate**? What is the mean **female illiteracy rate**? (Please round to the nearest hundredth. For instance, 67.89 would be accepted if the correct answer is 67.8912) (Thought exercise: Why might these be different?)

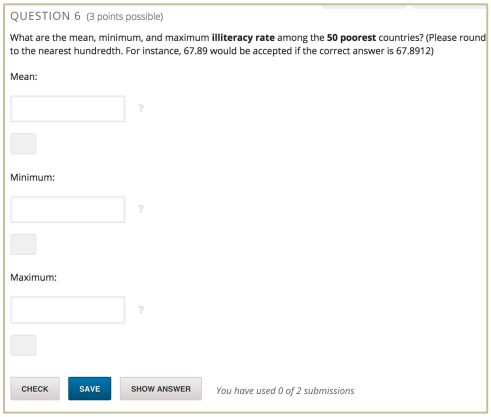


For questions 5 to 8, restrict your dataset to countries for which we have GDP per capita information.

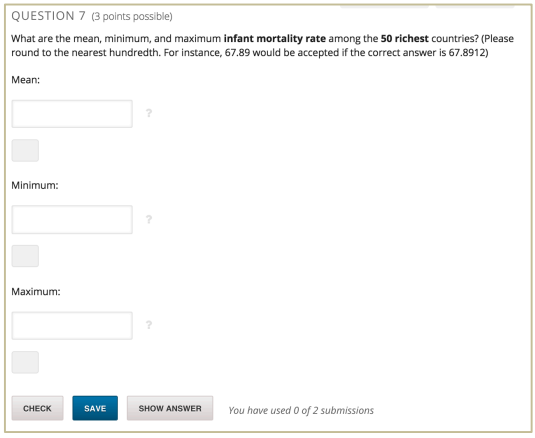
5. What are the mean, minimum, and maximum illiteracy rate among the 50 **richest** countries? (Please round to the nearest hundredth. For instance, 67.89 would be accepted if the correct answer is 67.8912)



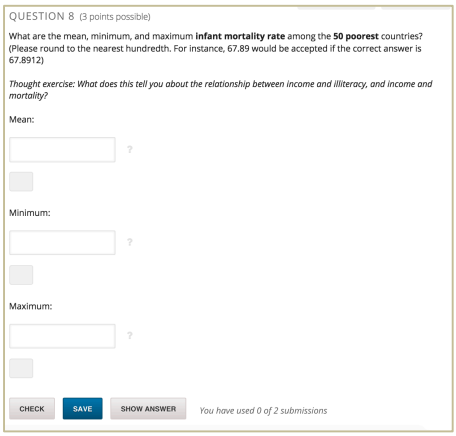
6. What are the mean, minimum, and maximum illiteracy rate among the 50 **poorest** countries? (Please round to the nearest hundredth. For instance, 67.89 would be accepted if the correct answer is 67.8912)



7. What are the mean, minimum, and maximum infant mortality rate among the 50 **richest** countries? (Please round to the nearest hundredth. For instance, 67.89 would be accepted if the correct answer is 67.8912)

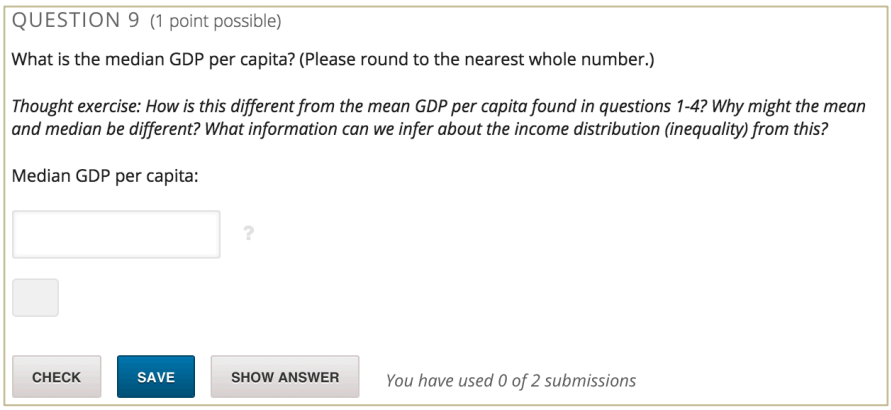


8. What are the mean, minimum, and maximum infant mortality rate among the 50 **poorest** countries? (Please round to the nearest hundredth. For instance, 67.89 would be accepted if the correct answer is 67.8912)
   Thought exercise: What does this tell you about the relationship between income and illiteracy, and income and mortality?



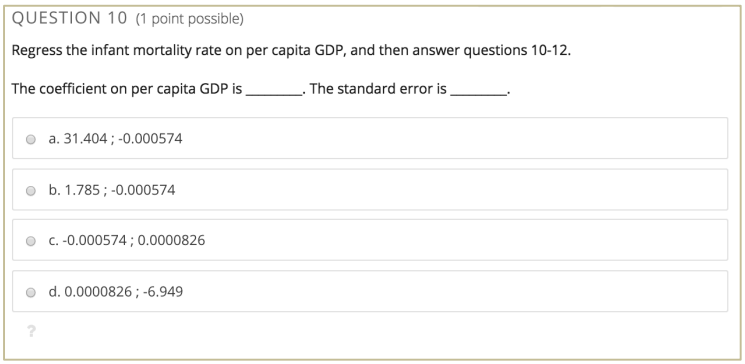
For questions 9-18, return to using the original (unrestricted) data set.

9. What is the **median** GDP per capita?
   *Thought exercise: How is this different from the **mean** GDP per capita found in questions 1-4? Why might the mean and median be different? What information can we infer about the income distribution (inequality) from this?*

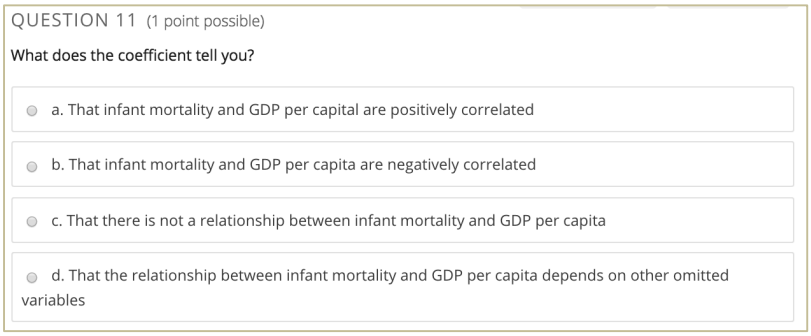


Regress the infant mortality rate on per capita GDP, and then answer questions 10-12.

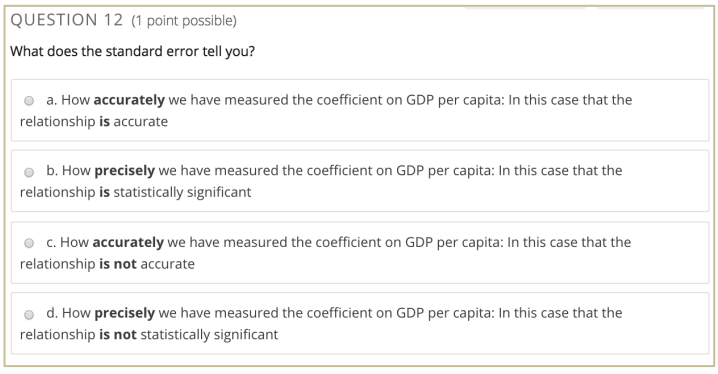
10. The coefficient on per capita GDP is _____. The standard error is _____.
    a. 31.404 ; -0.000574
    b. 1.785 ; -0.000574
    c. -0.000574 ; 0.0000826
    d. 0.0000826 ; -6.949



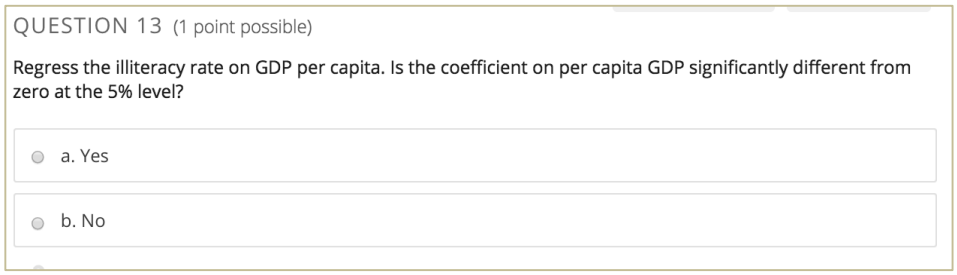
11. What does the coefficient tell you?
    a. That infant mortality and GDP per capital are positively correlated
    b. That infant mortality and GDP per capita are negatively correlated
    c. That there is not a relationship between infant mortality and GDP per capita
    d. That the relationship between infant mortality and GDP per capita depends on other omitted variables



12. What does the standard error tell you?
    a. How **accurately** we have measured the coefficient on GDP per capita: In this case that the relationship **is** accurate
    b. How **precisely** we have measured the coefficient on GDP per capita: In this case that the relationship **is** statistically significant
    c. How **accurately** we have measured the coefficient on GDP per capita: In this case that the relationship **is not** accurate
    d. How **precisely** we have measured the coefficient on GDP per capita: In this case that the relationship **is not** statistically significant

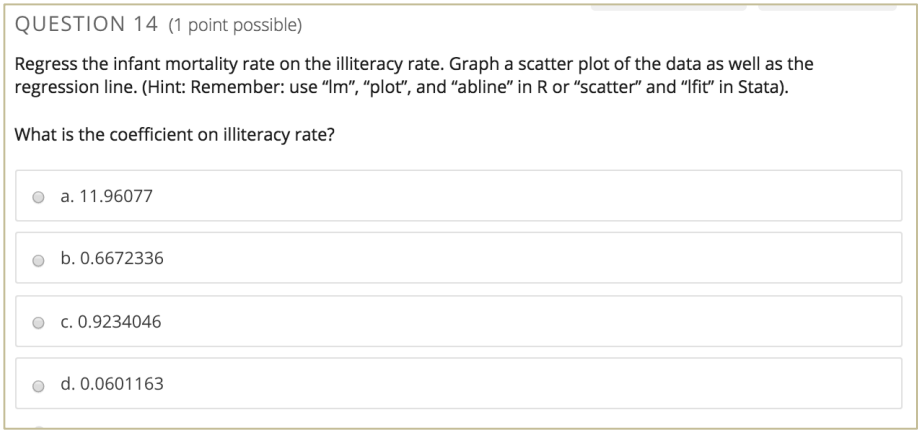


13. Regress the illiteracy rate on GDP per capita. Is the coefficient on per capita GDP significantly different from zero at the 5% level?
    a. Yes
    b. No



14. Regress the infant mortality rate on the illiteracy rate. Graph a scatter plot of the data as well as the regression line. (Hint: Remember: use “lm”, “plot”, and “abline” in R).

    What is the coefficient on illiteracy rate?
    a. 11.96077
    b. .6672336
    c. .9234046
    d. .0601163



15. Using the results from questions 10 to 14, can we say that there is a causal relationship between illiteracy, infant mortality, and income (GDP)?
    a. Yes
    b. No