Application 3

For this application use data set birth\_data.xlsx. This data comes from the natality files and contains a random sample of births in Pennsylvania in 1993

Objective 1: Estimate Regression

Estimate the following model: $birthweight=ß\_{0}+ß\_{1}\left(gestation\right)+u$

1. What is the value for $\hat{ß}\_{0}$
2. What is the value for $\hat{ß}\_{1}$
3. Interpret $\hat{ß}\_{0}$
4. Interpret $\hat{ß}\_{1}$
5. Do weeks of gestation have an impact on birthweight? Explain. [your answer should include statistical significance]
6. Create a scatter plot [scatter] to show the relationship. Include it below.

Question: Is there a difference in birthweight between the gender of the baby?

1. Fill in the following table to answer this question.

|  |  |  |  |
| --- | --- | --- | --- |
|  | girl | boy | p-value of the difference in mean |
| Mean birthweight in grams |  |  |  |

1. Use the table above to answer the question. [your answer should include statistical significance]
2. Create a single variable regression model that will answer the question. Write down your model below.
3. Use your model to answer the question. [your answer should include statistical significance]

Objective 2. Create Tables for regression estimates

1. Estimate the following model and report the results in a table.

$$birthweight=ß\_{0}+ß\_{1}\left(feb\right)+ß\_{2}\left(mar\right)+ß\_{3}\left(apr\right)+ß\_{4}\left(may\right)+ß\_{5}\left(jun\right)+ß\_{6}\left(jul\right)+ß\_{7}\left(aug\right)+ß\_{8}\left(sep\right)+ß\_{9}\left(oct\right)+ß\_{10}\left(nov\right)+ß\_{11}\left(dec\right)+u $$

1. What can you say about the relationship between month of birth and birthweight?

Consider the following models that look at the outcome of birthweight and the variable of interest of a binary variable of whether the mother smoked during pregnancy

1. $birthweight=ß\_{0}+ß\_{1}\left(smoke\right)+u$
2. $birthweight=ß\_{0}+ß\_{1}\left(smoke\right)+ß\_{2}\left(gestation\right)+u$
3. $birthweight=ß\_{0}+ß\_{1}\left(smoke\right)+ß\_{2}\left(gestation\right)+ß\_{3}\left(weight gain\right)+u$
4. $birthweight=ß\_{0}+ß\_{1}\left(smoke\right)+ß\_{2}\left(gestation\right)+ß\_{3}\left(weight gain\right)+ß\_{4}\left(married\right)+u$
5. $birthweight=ß\_{0}+ß\_{1}\left(smoke\right)+ß\_{2}\left(gestation\right)+ß\_{3}\left(weight gain\right)+ß\_{4}\left(married\right)+λ+u$

Where $λ$ is a fixed effect for month of birth.

1. Create a single table where the estimates of each model are displayed.
2. What can you say about the relationship between smoking and birthweight?