Recitation 10

Kutner 5.5, 6.26 & Rosner 11.96-99

Kutner §5.5

Consumer finance. The data below show, for a consumer finance company operation in six cities, the number of competing loan companies operating in the city (X) and the number per thousand of the company's loans made in that city that are currently delinquent (Y):

	1	2	3	4	5	6
X	4	1	2	3	3	4
Y	16	5	10	15	13	22

Assume that first-order regression model (2.1) is applicable. Using matrix methods, find:

a) Y^TY
b) X^TX
c) X^TY
d) $\hat{\beta}$

Kutner §6.26

$Y_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \epsilon_i$

For the above regression model, show that the coefficient of simple determination between Y_i and $\hat{Y}_i$ equals the coefficient of multiple determination R^2

Rosner Problems § 11.96-99

Problem Introduction: Cancer and Endocrinology

Obesity is very common in American society and is a risk factor for breast cancer in postmenopausal women. One mechanism explaining why obesity is a risk factor is that it may raise estrogen levels in women. In particular, one biomarker of estrogen, serum estradiol, is a strong risk factor for breast cancer. To better assess these relationships, researchers studied a group of 151 African American and 60 Caucasian premenopausal women. Adiposity was quantified by two different measures: BMI = weight $(kg)/height^2$ (m2) and waisthip ratio (WHR) = waist circumference/hip circumference.BMI is a measure of overall adiposity, whereas WHR is a measure of abdominal adiposity. In addition, a complete hormonal profile was obtained, including serum estradiol (ES_1). Finally, other breast-cancer risk factors were also assessed among these women, including (1) ethnicity (ETHNIC = 1 if African American, = 0 if Caucasian), (2) age (ENTAGE), (3) parity (NUMCHILD = number of children), (4) age at first birth (AGEFBO), (5) any children (ANYKIDS = 1 if yes, = 0 if no), (6) age at menarche (AGEMNRCH = age when menstrual periods began). The data are provided in Data Set ESTRADL.DAT.rdata, recitation folder.

Rosner § 11.96

No

Is there a crude relationship between BMI and WHR, considered seperately (why?), and Estradiol levels?

Rosner § 11.97

No

Are these relationship similar for Caucasian and African American women?

Rosner § 11.98

Are these relationship the same after adjusting for the remaining risk factors (1-6 above)?

Rosner § 11.99

It is well known that African American women have higher levels of obesity than Caucasian women. Are there differences between estradiol levels for African American women and Caucasian women after controlling for obesity?