Fox Module 13: Dummy variable regression HW

(The attached PDF file has better formatting.)

Homework assignment: auto insurance rating territories

An insurer examines claim frequencies for 15 territories: 5 urban, 5 suburban, and 5 rural.

Urban		*Sub-urban*		*Rural*	
Territory	*Claim Frequency*	*Territory*	*Claim Frequency*	*Territory*	*Claim Frequency*
1	14.30%	6	10.88%	11	9.59%
2	11.00%	7	16.58%	12	8.54%
3	20.90%	8	12.72%	13	10.32%
4	16.85%	9	9.40%	14	10.01%
5	12.85%	10	12.92%	15	9.24%

A. How many dummy variables does this regression use?
B. What are the values of the dummy variables for urban, sub-urban, and rural? Assume rural is the base territory, with dummy variables equal to zero.
C. Use Excel or other statistical software to run the regression. What are the values of α, β_1, and β_2? (Fox uses γ_1 and γ_2 instead of β_1 and β_2 for dummy variables.) Explain what each of the coefficients means.

Jacob: Fox uses both γ_1 and γ_2 as well as β_1 and β_2.

Rachel: We do this is the territory number has a quantitative value. But the territory numbers here are just indicators; they have no quantitative meaning. The regression equation is

$$\text{Frequency} = \alpha + \beta_1 \times D_1 + \beta_2 \times D_2$$

In Fox's notation, this is $\text{Frequency} = \alpha + \gamma_1 \times D_1 + \gamma_2 \times D_2$