**CHAPTER 13: CONTROLLING FOR A THIRD VARIABLE:**

**MULTIPLE OLS REGRESSION**

**PRACTICE PROBLEMS**

1. Here are some data on four variables:

1. Country
2. The Crime Rate of the Country per 100,000
3. The amount of Welfare Spending per capita in the country
4. A Democracy Score that measures how democratic the country is where a high score means more democracy in the country.

 Crime Welfare Democracy

Country Rate Spending Score

Poland 678.00 145.00 3

US 345.00 244.00 10

UK 644.00 422.00 8

France 823.00 480.00 8

Italy 456.00 465.00 6

Japan 756.00 220.00 5

Russia 333.00 755.00 2

China 567.00 300.00 0

Germany 345.00 657.00 8

Spain 567.00 622.00 5

Sweeden 158.00 688.00 10

Ireland 834.00 155.00 6

Norway 432.00 595.00 9

Belgium 226.00 836.00 8

Portugal 532.00 328.00 4

With this data, answer the following questions.

1. What is the level of analysis or unit of observation?
2. Graph the relationship between a country’s crime rate and its amount of welfare expenditures and its democracy score. Does it look like there is a linear relationship?
3. What is the correlation between the crime rate in a country and its welfare expenditures? Interpret this value.
4. What is the correlation between the crime rate in a country and its democracy score? Interpret this value.
5. Estimate a regression equation with crime rate as the dependent variable and welfare expenditures as the independent variable. Interpret the y intercept, the slope coefficient, the t-test for the slope, and the amount of variance explained.
6. Estimate a regression equation with crime rate as the dependent variable and the country’s democracy score as the independent variable. Interpret the y intercept, the slope coefficient, the t-test for the slope, and the amount of variance explained.
7. Here are the results of the multivariate regression equation when both welfare expenditures and democracy score are in the regression equation. Provide a full interpretation of the results.

| **Coefficientsa** |
| --- |
| Model | Unstandardized Coefficients | Standardized Coefficients | t | Sig. |
| B | Std. Error | Beta |
| 1 | (Constant) | 855.325 | 117.272 |  | 7.29 | .000 |
| DemocracyScore | -9.520 | 14.966 | -.135 | -.64 | .537 |
| Welfarepercapita | -.616 | .198 | -.659 | -3.11 | .009 |
| a. Dependent Variable: CrimeRate |

R2 = .50