Recently, a social researcher undertook a study to examine whether any demographic characteristics of US counties were significant predictors of property, violent, and total crime in 2012. In undertaking this study, the researcher used the Simpson index of diversity \((1-\Sigma p^2)\) to measure the degree of heterogeneity with respect to race, age, marital status, education, and other demographic characteristics of county residents and their ability to predict property crime (e.g., burglary, larceny, etc.) and violent crime (e.g., aggravated assault, forcible rape, murder, etc). To assess the level of crime within each selected county, the researcher obtained the total number of property and violent crimes that were recorded in 2012. To obtain the total number of crimes that occurred in each selected county, the researcher summed the total number of property and violent crimes that were recorded. The researcher conducted three separate analyses using the same set of predictors as summarized in the table below.

### Results for property, violent, and total crimes in selected US counties in 2012

<table>
<thead>
<tr>
<th>Model</th>
<th>Property Crime Standardized Beta</th>
<th>Violent Crime Standardized Beta</th>
<th>Total Crime Standardized Beta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-5.274 *</td>
<td>-0.561</td>
<td>-8.991 ***</td>
</tr>
<tr>
<td>Age</td>
<td>.340 **</td>
<td>-0.007</td>
<td>.478 ***</td>
</tr>
<tr>
<td>Education</td>
<td>-0.304 *</td>
<td>0.040</td>
<td>-0.090</td>
</tr>
<tr>
<td>Race</td>
<td>0.002</td>
<td>.312 **</td>
<td>0.160</td>
</tr>
<tr>
<td>Household</td>
<td>-0.007</td>
<td>-0.145</td>
<td>0.003</td>
</tr>
<tr>
<td>Marital status</td>
<td>-0.182</td>
<td>1.456 **</td>
<td>-0.148</td>
</tr>
<tr>
<td>Ancestry</td>
<td>-0.12</td>
<td>0.029</td>
<td>0.021</td>
</tr>
<tr>
<td>Labor force</td>
<td>-0.188</td>
<td>0.227</td>
<td>-0.129</td>
</tr>
<tr>
<td>Income</td>
<td>0.042</td>
<td>-0.042</td>
<td>0.044</td>
</tr>
<tr>
<td>R²</td>
<td>0.219</td>
<td>0.269</td>
<td>0.229</td>
</tr>
<tr>
<td>n</td>
<td>56</td>
<td>56</td>
<td>56</td>
</tr>
</tbody>
</table>

* Significant at \(\alpha = .05\)
** Significant at \(\alpha = .01\)
**** Significant at \(\alpha = .001\)
Based on the results provided above, discuss the following in an essay with an introduction and conclusion.

1. What is the generic conceptual framework underlying each analysis? (Provide a graphic representation of the conceptual framework)
2. What is the generic statistical model of each analysis? (Provide a symbolic representation of the statistical model)
3. What are the null and alternative statistical hypotheses associated with each predictor, if any? (Provide a symbolic representation of the hypotheses, if appropriate)
4. What are the statistical assumptions underlying each analysis, if any?
5. How much confidence can you put on the researcher’s study and findings?
6. What are the implications suggested by the results with respect to property and violent crimes committed, if any? (Discuss significant and non-significant results, if appropriate)
The county executive of Nassau County, NY, and his senior staff are interested in developing a predictive model of financial waste. They want to identify exogenous and endogenous variables that are statistically associated with non-emergency county agency expenditures that exceed the adopted agency budgets by 25 percent and above. They also want to know whether the exogenous and endogenous variables are able to correctly classify each county agency with respect to falling below or above the 25 percent threshold.

The deputy county executive for finance maintains that actual agency expenditures are mediated by programmatic staff adhering to existing financial policies and the strength of internal controls. Additionally, the deputy county executive maintains that each agency’s actual expenditures are influenced by the quality and experience of their employees.

Because the county executive of Nassau County and his senior staff lack the expertise and skills to undertake the statistical analysis necessary to develop a reliable and valid predictive model of financial waste, the deputy county executive for finance contracted you to assist in identifying exogenous and endogenous predictors of financial waste. In so doing, you were asked to propose a reliable and valid statistical model for predicting non-emergency agency expenditures exceeding 25 percent of the adopted agency budgets.

Based on the assertions of the deputy county of finance and your understanding of the needs of the county executive of Nassau County as described above, address the following items in an essay with an introduction and conclusion:

7. What is the research or policy question that the county executive and his senior staff want to address, if any?

8. What are the employee characteristics which are likely to impact an agency’s expenditures, if any?
   A. Are these exogenous or endogenous variables?

9. What are the organizational characteristics which are likely to impact an agency’s ability to fall within 25 percent threshold or exceed it, if any?
   A. Are these exogenous or endogenous variables?

10. As stated by the county staff, what is the dependent variable in this study, if any?
    A. If appropriate, what is its level of measurement?
    B. If appropriate, how is it operationalized?

11. Based on items 1 – 3 above, what is the theoretical framework that would guide your study and statistical analysis, if any?
If appropriate, provide a graphic representation of your theoretical framework. Draw arrows from the exogenous variables to the endogenous variables and to the dependent variable. Discuss the positive or negative relationships among the exogenous and endogenous variables as well as their relationship with the dependent variable. If there are any relationships among the variables, indicate the nature of each relationship by placing a + (positive) or – (negative) above each arrow.

If appropriate, discuss direct and indirect relationships among the variables with the dependent variable.

12. Based on items 1 – 4 above, if appropriate, what is the most appropriate statistical procedure to use based on how the issue is described and defined by the county staff?
A. If appropriate, what is the statistical model associated with your theoretical framework and dependent variable?

If appropriate, provide a generic symbolic representation of your statistical model.

13. What are the null and alternative hypotheses associated with the exogenous and endogenous variables, if any?

14. Based on items 1 – 7 above, what would you expect to find with respect to the statistical results, if any?

If appropriate, discuss both significant and non-significant results.

15. Based on item 8 above, what are some of the policy implications that may be derived from your empirical analysis, if any?