Factors Affecting the Increase in Crime Index in West Sumatra With Path Analysis Method

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\textbf{ARTICLE INFO}

\textbf{Article history:}
Received: 05 July 2022
Revised: 06 August 2022
Accepted: 29 September 2022
Available online: 30 September 2022

E-ISSN: 2656-1514
P-ISSN: -

\textbf{ABSTRACT}
Crime or criminality in Indonesia is rampant in both print and television media. We can see news about crime almost every day. Basically, every individual will be influenced by several factors, both internal and internal, external causes of a person committing a crime, including population, education, morality, poverty and unemployment. In this case, a statistical analysis will be studied that can detect the magnitude of these factors, both directly and indirectly, on the crime rate. One of the statistical analyzes that can be used to analyze causal relationships between variables is path analysis, which is a direct development of the multiple regression form with the aim of providing estimates of the level of importance (magnitude) and significance (significance) in a variable set of causal relationships. Hypothetical consequences. From the research results for West Sumatra Province, it was concluded that there was no large influence of variable X on Y.

\textbf{Keyword:} Path Analysis, Poverty, Crime, Education, Unemployment

\textbf{1. Introduction}
Based on the official website (Kompas.com), West Sumatra province is one of the provinces with the highest crime rate in Indonesia, namely in 10th place with a crime rate of 7,992 in 2022 and 1st place goes to North Sumatra Province. Crime is an action that violates written law and existing laws and norms, this crime also harms people or threatens the safety of the environment in society. Economic factors and the increasing unemployment rate can cause the crime index to increase and make people whose basic daily needs such as clothing, food and shelter cannot be met with an income that is considered mediocre or insufficient. Meanwhile, family needs are increasing day by day, and the number of family dependents is not small. Therefore, the only way to increase the economy is that they are willing to commit criminal acts such as robbery. Robbery and committing acts of theft/breaking into the house [1], [2]. Education is very important for everyone, because education is a very strong provision for everyone to get a decent life and everyone avoids various social problems that occur in society. However, judging from the facts, currently there are many social problems occurring in society, some of which are poverty, crime, and so on. These problems are still
unresolved, especially regarding crime. We often hear about various criminal cases that occur in various regions in Indonesia. This causes anxiety for the wider community, because if crimes occur, the welfare of the community will be threatened. The cause of criminal acts in society is due to the lack or low level of education obtained by the perpetrators of criminal acts themselves. [3]

2. Research Methods

2.1 Correlation Analysis

Correlation analysis is an analytical technique used to measure the strength and weakness of the relationship between two variables. This variable consists of independent and dependent variables. The magnitude of the relationship ranges between 0 - 1. If it is close to 1, it means the relationship between the two variables is getting stronger, and vice versa, if it is close to 0, it means the relationship between the two variables is getting weaker. [4]

To draw conclusions about the relationship between two variables, it is necessary to fulfil the following criteria, if:

<table>
<thead>
<tr>
<th>Coefficient Interval</th>
<th>Relationship Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00 – 0.199</td>
<td>Very low</td>
</tr>
<tr>
<td>0.20 – 0.399</td>
<td>Low</td>
</tr>
<tr>
<td>0.40 – 0.599</td>
<td>Currently</td>
</tr>
<tr>
<td>0.60 – 0.799</td>
<td>Strong</td>
</tr>
<tr>
<td>0.80 – 1.000</td>
<td>Very Strong</td>
</tr>
</tbody>
</table>

2.2 Path Coefficient Testing

2.2.1 T Test

The t test is used to determine the significance of the influence of independent variables partially or individually on the dependent variable. [5–7]

\[
t_{count} = r \frac{\sqrt{n - 2}}{\sqrt{1 - r^2}}
\]  

Information:

\(t_{count}\) = Correlation Test Statistics

\(n\) = Number of Samples

\(r\) = Partial correlation value

2.2.2 F Test

Hypothesis testing using a simultaneous test with the F-test aims to determine the joint influence of the independent variables on the dependent variable. [5–7]

\[F = \frac{r^2}{\frac{k}{1 - r^2} \frac{1}{n - k - 1}}\]  

Information:

\(r^2\) = Multiple correlation coefficient
\( k \) = Number of independent variables (independent) \( N \) = Number of sample members

\( F \) = \( F \) count which is then compared with \( F \) table

2.3 Path Analysis Diagram

The path diagram in the figure above consists of three structural equations, where \( X_1 \), \( X_2 \), and \( X_3 \) are exogenous variables, while \( Y_1 \) and \( Y_2 \) are endogenous variables. Therefore, the structural equation is: [4]

\[
Y_1 = P_{Y_1X_1} + P_{Y_1X_2} + P_{Y_1X_3} + \varepsilon_1 \quad \text{(as substructure equation 1)}
\]

\[
Y_2 = P_{Y_2X_1} + P_{Y_2X_2} + P_{Y_2X_3} + P_{Y_2Y_1} + \varepsilon_2 \quad \text{(as substructure equation 2)}
\]

3. Results and Discussion

The data taken is secondary data obtained through the official websites www.bps.go.id, www.Sumbarprov.go.id and www.sumbar.polri.go.id valid data with primary data obtained through direct field observation. Next, data collection is carried out in accordance with predetermined criteria, namely data from various factors based on the years 2004 – 2022.

3.1 Descriptive Analysis Results

1. Crime

<table>
<thead>
<tr>
<th>Table 2. Descriptive Value of Crime</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Descriptive Statistics</strong></td>
</tr>
<tr>
<td><strong>N</strong></td>
</tr>
<tr>
<td>Crime</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
</tr>
</tbody>
</table>

Based on the table above, it is known that the value of the crime rate ranges between 5387 - 16277 with an average value of 11027.58 and a Std.Deviation figure of 3204.538. It can be concluded that the figure is still high for the province of West Sumatra, especially in the city of Padang, which has a higher value than other districts.
2. Education

Table 3. Descriptive Value of Education

<table>
<thead>
<tr>
<th>Descriptive Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUCATION</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>7.94</td>
</tr>
</tbody>
</table>

Valid N (listwise) 19

Based on the table above, it is known that the value of the level of education in the province of West Sumatra is around 7.94% - 9.18% with an average value of 8.53% and a Std Deviation of 0.36%. This figure includes half of the population aged 15 and over who are also not in school.

3. Population

Table 4. Descriptive Value of Population

<table>
<thead>
<tr>
<th>Descriptive Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>POPULATION</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>4523815</td>
</tr>
</tbody>
</table>

Valid N (listwise) 19

Based on the table above, it is known that the value of the population in West Sumatra ranges from 4523815 people - 5640629 people with an average value of 5080751.16 people and Std. difficult to compete for jobs.

4. Poverty

Table 5. Descriptive Value of Poverty

<table>
<thead>
<tr>
<th>Descriptive Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>POVERTY</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>3796</td>
</tr>
</tbody>
</table>

Valid N (listwise) 19

Based on the table above, it is known that the poverty value in West Sumatra is around 3796 people - 37155 people with an average value of 17626.68 and a Std Deviation of 15755.668. This figure is considered safe, but if the percentage increases over time, the weaker the province will be if poverty is high.

5. Unemployment

Table 6. Descriptive Value of Unemployment

<table>
<thead>
<tr>
<th>Descriptive Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unemployment (%)</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>5.09</td>
</tr>
</tbody>
</table>

Valid N (listwise) 19

Based on the table above, it is known that the unemployment rate in West Sumatra province is around 5.09% - 12.74% with an average figure of 7.47% and a Std.Deviation of 2.04%. This figure is included in the unsafe category because the unemployment rate is increasing due to fewer job opportunities and also There are widespread termination of employment contracts or mass layoffs.
carried out by companies.

6. Path Diagram Model

Figure 2. Path Diagram Model

3.2 Determining the Correlation Matrix

Table 7. Correlation values come from the specified variables

<table>
<thead>
<tr>
<th></th>
<th>Education</th>
<th>Total Population</th>
<th>Poverty</th>
<th>Unemployment</th>
<th>Crime</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Education</strong></td>
<td>Pearson Correlation</td>
<td>1</td>
<td></td>
<td>.334**</td>
<td>.669**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.002</td>
<td>.000</td>
<td>.978</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td><strong>Total Population</strong></td>
<td>Pearson Correlation</td>
<td>.934**</td>
<td>1</td>
<td>.822**</td>
<td>-.786**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.653</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td><strong>Poverty</strong></td>
<td>Pearson Correlation</td>
<td>.669**</td>
<td>.822**</td>
<td>1</td>
<td>-.531**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.002</td>
<td>.000</td>
<td>.004</td>
<td>.999</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td><strong>Unemployment</strong></td>
<td>Pearson Correlation</td>
<td>-.727**</td>
<td>-.786**</td>
<td>-.631**</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.000</td>
<td>.004</td>
<td>.013</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td><strong>Crime</strong></td>
<td>Pearson Correlation</td>
<td>-.007</td>
<td>.110</td>
<td>.000</td>
<td>-.556*</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.978</td>
<td>.853</td>
<td>.999</td>
<td>.013</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
</tr>
</tbody>
</table>

3.3 Path Coefficient
Based on the table above, it can be concluded that the structural equation is as. Based on the diagram above, it can be concluded that the structural equation is as following:

1) Substructure 1: \( Y_1 = -0.674X1 + 0.166X2 + 0.317X3 + 0.613 \)

Table 8. Results of the Fcount Hypothesis

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>46.969</td>
<td>3</td>
<td>15.663</td>
<td>8.313</td>
<td>.002*</td>
</tr>
<tr>
<td>Residual</td>
<td>28.262</td>
<td>15</td>
<td>1.884</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>75.251</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on table 4.8 above, it can be concluded that if the sig value < 0.05 or Fcount > Ftable then there is a simultaneous influence of variable X (the influence caused by the independent variables when combined on the dependent variable) on the variable Y. in \( F_{table} = F(k ; n - k) = F(3 ; 16) = 3.24 \). It is concluded that the sig value is 0.002 < 0.05 and F count is 8.313 > 3.06, so it can be seen that there is a simultaneous influence of variables 1,2,3 on variable 1.

Table 9. T Calculated Hypothesis Results

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>30.341</td>
<td>10.423</td>
<td>2.911</td>
<td>.011</td>
</tr>
<tr>
<td>Education</td>
<td>.896</td>
<td>2.699</td>
<td>156</td>
<td>.306</td>
</tr>
<tr>
<td>Total Population</td>
<td>-6.03E-6</td>
<td>.000</td>
<td>-1.017</td>
<td>-1.526</td>
</tr>
<tr>
<td>Poverty</td>
<td>1.315E-5</td>
<td>.000</td>
<td>101</td>
<td>.317</td>
</tr>
</tbody>
</table>

Based on table 4.9, it can be concluded that if the sig value < 0.05 or t count > t table then there is an influence of It is known that the significance value for the influence of the Education variable is 0.764 > 0.05 and the calculated t value is 0.306 < 2.131, there is no influence of the Education variable 1 on 1, the influence of the Number of Population variable 2 is 0.148 > 0.05 and the calculated t value is - 1.526 < 2.131 There is no influence of 2 on variable 1, the influence poverty variable 3 0.755 > 0.05 and calculated t value 0.317 < 2.131 There is no influence.

2) Substructure 2: \( Y_2 = -1.249X1 + 0.844X2 - 0.603X3 - 1.179Y1 + 0.492 \)

Table 10. Results of the Fcount Hypothesis

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>139949589.947</td>
<td>4</td>
<td>34987357.487</td>
<td>10.911</td>
<td>.000*</td>
</tr>
<tr>
<td>Residual</td>
<td>44893318.684</td>
<td>13</td>
<td>3206797.906</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>184843108.632</td>
<td>17</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From the table above, it can be concluded that if the sig value < 0.05 or calculated F > F table then there is a simultaneous influence of variable – k ) = F (4 ; 15) = 3.06. It can be concluded that the sig value is 0.000 < 0.05 and F count is 10.911 > 3.06, so it can be seen that there is a simultaneous influence of variable X on variable Y.
Table 11. Results of the Tcount Hypothesis

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficientsa</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Constant)</td>
<td></td>
<td>62044.441</td>
<td>17916.684</td>
<td>4.823</td>
<td>.000</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td>-11126.474</td>
<td>3793.671</td>
<td>-1.249</td>
<td>-2.933</td>
</tr>
<tr>
<td>Total Population</td>
<td></td>
<td>0.06</td>
<td>0.06</td>
<td>0.844</td>
<td>1.415</td>
</tr>
<tr>
<td>Poverty</td>
<td></td>
<td>-123</td>
<td>0.54</td>
<td>-8.033</td>
<td>-2.259</td>
</tr>
<tr>
<td>Unemployment</td>
<td></td>
<td>-1847.458</td>
<td>336.841</td>
<td>-1.179</td>
<td>-5.485</td>
</tr>
</tbody>
</table>

From the table above it can be concluded that if the significant value is <0.05, or t count > t table then there is an influence of x on y. For t table = t (0.05/2 ; 19-4-1) = t (0.025 : 14) = 2.14479. Known sig value. For the influence of education variable 1 0.011 < 0.05 and the calculated t value is -2.933, there is influence 1 on variable 2, Population 20.179 > 0.05 and the calculated t value is 1.415, there is no influence of 2 on variable 2, the poverty variable 3 is 0.040 < 0.05 and the calculated t value is -2.259 which means there is an influence of 3 on 2, but for the sig value of the unemployment variable 1 there is no influence of 0.000 < 0.05 and the calculated t value is -5.485, which means that there is an influence on variable 2 but it is negative.

Table 12. Total influence of variable x on y

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.790a</td>
<td>.624</td>
<td>.545</td>
<td>1.3724</td>
</tr>
</tbody>
</table>

It is known that the R Square value is 0.388, which means that the contribution of the unemployment variable, Population Number variable, education variable and poverty variable to crime is 62.4%. Meanwhile, the value of e1 = \( \sqrt{1 - 0.624} = 0.613 \)

Table 13. Total influence of x1.x2.x3 on x4

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.870a</td>
<td>.757</td>
<td>.688</td>
<td>1.790.720</td>
</tr>
</tbody>
</table>

It is known that the R square value is 0.597, which means that the contribution of the influence of the variables Education X1, Population X2, and Poverty X3 to the Unemployment variable X4 is 59.7% while the value of e2 = \( \sqrt{1 - 0.624} = 0.492 \)

4. Conclusion
Equations and formulae should be typed in Math type, and numbered consecutively with Arabic numerals in parentheses on the right-hand side of the page (if referred to explicitly in the text). They should also be separated from the surrounding text by one space. Structural Equation of path diagrams. \( Y_1 = -0.674X_1 + 0.166X_2 + 0.317X_3 + 0.613 \) and \( Y_2 = -1.249X_1 + 0.844X_2 - 0.603X_3 - 1.179Y_1 + 0.492 \). In Structure, in the f test, calculate if the sig value < 0.05 or Fcount > Ftable. It can be concluded that the sig value is 0.002 < 0.05 and F count is 8.313 > 3.06, so it can be seen that there is a simultaneous influence of variables 1.2.3 on variable 1, so H0 is rejected. It can be seen that there is a simultaneous influence of variables 1.2.3 to variable 1. And t test, it is concluded that if the sig value < 0.05 or t calculated > t table then there is an influence of 2.13145. It is known that the significance value for the influence of the Education variable is 0.764 > 0.05 and the calculated t value is 0.306 < 2.131, there is no influence of the Education variable 1 on 1, the influence of the Economic Inflation variable 2 is 0.148 > 0.05 and the calculated t value is -1.526 < 2.131 There is no
influence on the variable1, the influence of the poverty variable 3 $0.755 > 0.05$ and the calculated t value $0.317 < 2.131$ There is no influence. The total influence of education variables (1) on crime (2) indirectly through poverty (3) and unemployment (1) is 1,853%. The relationship between these variables is in the opposite direction, meaning that the lower the education, the higher the crime.

References


