CHAPTER IV
RESULTS AND DATA ANALYSIS

4.1 Descriptive Analysis

All the data used in this analysis are secondary data time series with annual data of Indonesia started from 1981 until 2013. The data included in this research are poverty, Gross Domestic Product (GDP), inflation, Foreign Direct Investment (FDI), and Gini ratio. This research used Error Correction Model method (ECM) with two steps of Engle granger. This research aims to know the causality relationship between one variable to another variable. In this case, one variable is as independent variables and another one as the dependent variable.

4.2 Results and Analysis

4.2.1 Stationarity Test

The first step used is stationary testing or somehow it is called a Unit Root Test. The purpose of this test is to know whether the variable has a unit root or not or whether the data is stationary or not. To use Error Correction Model method, the researcher should make sure that the data is not stationary at level. This research used a unit root developed by Dickey-Fuller. The unit root that the researcher used was without constant and intercept, or none.

To know whether the data is stationary or not in the unit root test, if the value of DF absolute statistics is higher than the critical value, in this case the researcher used 5%, the Null hypothesis is rejected and the data showed stationary. In contrast, if the value of DF absolute statistics is smaller than the critical value (5%) so that the Null hypothesis is accepted and it means that the data is not stationary.

4.2.2 Unit Root Test

Each variable will be tested by using the unit root test in this research using Augmented Dickey-Fuller (ADF). Maximum lag can be decided by Akaike Info Criterion (AIC) or Schwartz Info Criterion (SIC) criteria or we can use rule of thumb formula $N^{1/3,}$ where N is number of observation. So the maximum lag from $32^{1/3}$ is 4.

Table 4.1

Unit root testing using ADF at none

Variable	absolute statistic value	Critical value α = 5%
GDP	2.7160	0.0082
Inflation	1.8082	0.0676
FDI	0.6919	0.4080
Gini Ratio	1.0879	0.9240
Poverty	1.4875	0.1258

Processed using E-views (appendix)

The table 4.1 shows the ADF testing using none (without intercept and constant). Each variable shows the value of absolute statistics and the critical value at 5% level in the MacKinnon table. All the variables are not stationary, except GDP variable, but it can be assumed that GDP variable is not stationary like the other variable. It can be seen from the table that the absolute statistics of GDP is 2.7160 and the critical value is 0.082. It means H_0 is rejected, where the hypothesis has a unit root or the data is stationary. Inflation absolute statistics is 1.8082 and the critical value is 0.0676 meaning that H_0 is accepted, where the hypothesis has a unit root or the data is not stationary. It also happens to the rest of FDI data, Gini ratio, and poverty. It can be seen on the table that the absolute

statistics value is smaller than the critical value at 5% level. Thus, the data variables of FDI, Gini ratio, and poverty are not stationary.

4.2.3 Integration Degree Test

Because all the data were not stationary so that the next step was the integration degree test to make all the data are stationary at the same level. In this case,the researcher tested each variable at 1st difference degree level.

Table 4.2

Unit root testing using ADF at none (1st difference level)

Variable	Absolute statistic value	The critical value at α = 5%
GDP	6.0050	0.0000
Inflation	9.5146	0.0000
FDI	4.1634	0.0002
Gini Ratio	6.8821	0.0000
Poverty	2.9095	0.0051

Processed using E-views (appendix)

The table 4.2 shows the results of unit root testing using ADF at 1st difference level. It can be seen that the entire variable is stationary at the 1st degree. GDP absolute statistics value which is 6.0050 is higher than the critical value of 0.0000. This means that $H_0$is rejected. It can be said that the hypothesis has a unit root test that there is no unit root in the data so that the data are stationary. Inflation absolute statistic value of 9.5146 is larger than 0.0000, showing the data arestationary. The same as GDP and Inflation, the rest data of FDI, Gini ratio, and Poverty were also proven stationary because the absolute statistic values are higher than the critical value at 5% level at the 1st difference degree.

4.2.4 Co integration Test

Because all the data have been stationary at the 1st difference degree, the co integration test was conducted. Co integration test is aimed to know whether the independent variable and dependent variable have a long run relationship. One of the conditions that should be passed before doing the co integration test is when the data are integrated at the same degree. As what the researcher has done before, all the data were integrated at the same degree so that it can be continued to the co integration test.

Before doing the co integration test for the entire variables, the researcher conducted a test to the residual whether it is stationary or not. It can be assumed in this research that the residual is Res. It can be seen in the table below.

Table 4.3

Unit root test of residual

Null hypothesis: RES has unit root
Exogenous: None
Lag length: 0 (Automatic – based on AIC, maxlag=4)

		T – Statistic	prob*
Augmented Dickey-Fuller test statistic		-5.808292	0.0000
Test Critical values:	1% level	-2.639210	
	2% level	-1.951687	
	10% level	-1.610579	

Processed using E-views (appendix)

As it can be seen from the table above that the absolute statistic value is 5.8082 and the critical value at 5% level is 0.0000.It shows that the absolute statistic value is higher than the critical value. Thus, $H_0$is rejected because there

was no unit root or the residual of the data is stationary. Because the residual is stationary so that it can be continued to do the co integration test to know the long run relationship between the independent variables and the dependent variable. It can be seen from the results below.

Table 4.4

Long-run relationship between variables

Variable	probability	coefficient	t-statistic	conclusion
C	0.0066	0.264874	2.937403	Siginificant
GDP	0.9231	-0.000254	-0.097344	Not significant
INFLATION	0.3220	0.000782	1.008154	Not significant
FDI	0.2057	-0.008097	-1.295612	Not significant
GINI RATIO	0.2843	-0.285883	-1.091525	Not significant

Processed using E-views (appendix)

From the table above, it can be seen that all the variables' result is higher than 0.05 meaning that there is no correlation between GDP, inflation, FDI, Gini ratio towards the poverty in the long-run relationship. The hypothesis of GDP has a negative relationship with the poverty rate, meaning that when GDP increases, the poverty must decrease, but the result showed that there is no significant correlation between GDP and poverty. This result just followed the theory mentioned before, when trying to lower the poverty, it will slow the rate. The explanation means if the poverty decreases, it means that the rich people increase and it can be seen that rich people's life style tends to use import goods and services. That is why the growth indirectly will decrease. The hypothesis of the

inflation rate positively affects the poverty, meaning that when the inflation increases it will increase the poverty as well. However, the test showed that there is no correlation between inflation and poverty. The hypothesis of FDI is that FDI has a negative impact towards the poverty which means that when FDI increases, the poverty rate must decrease. In this test result there is no significant correlation between FDI and poverty. The reason why there is no correlation between FDI and poverty because FDI is also a part of economic growth so that there must be a relationship between both variables. The hypothesis of Gini ratio negatively affects the poverty rate means that when the poverty rate is reduced, Gini ratio must decrease as well. However, the result showed that there is no significant correlation between Gini ratio and poverty rate. The data also showed that the decrease in the poverty rate will keep the Gini ratio increasing as well.

4.2.5 Error Correction Model test

Table 4.5

Short run relationship between variables

variables	Probability	Coefficient	t-statistic	conclusion
C	0.3777	-0.003765	-0.897475	Not significant
D(GDP)	0.3324	0.001536	0.987657	Not significant
D(INFLATION)	0.0186	0.0011045	2.510279	significant
D(FDI)	0.0852	-0.009134	-1.789689	significant
D(GINI RATIO)	0.6993	0.073128	0.390530	Not significant

RES (-1)	0.0003	-0.706126	- 4.179956	significant

Processed using E-views (appendix)

In this test, the researcher checked the probability of F-statistic whether it is smaller or larger than 0.05. If the probability of F-Statistics was smaller than 0.05, the next step would be to check the significance of each variable. Because the table above showed that the probability F-statistic is 0.0002 which is smaller than 0.05 so that it can be continued to check the probability. As it can be seen from the data above that the value of GDP probability is 0.3324, meaning that it is higher than 0.05.Thus, there is no correlation between GDP and poverty in the short run relationship. The value of FDI and Gini ratio is higher than 0.05 so that there is no correlation between these three variables. However, the inflation probability value is 0.0186 which means that the value is smaller than 0.05. Therefore, it can be concluded that there is a positive correlation between inflation and poverty in the short run.

From the above it can be seen that only inflation that has 0.0186 probabilities, means that, as increase the inflation 1% it will increase poverty 0.0186. And also there is also significant correlation between FDI and poverty reduction, so the probability show 0.0852. it does mean that as increase FDI 10% it will reduce the poverty 0.0852. And the Residual value is 0.0003. It does mean that ECM model can be accepted because it is smaller than 5%.

4.2.6 Diagnostic Test

4.2.6.1 A Normality Test

Table 4.6

Series: Residuals sample 1982-2013 observations 32	
Mean	-7.59e- 19
Median	-0.004324
Maximum	--0.041573
Minimum	-0.050138
Std. Dev.	0.021502
Skewness	0.132149
Kurtosis	2.722430
Jarque-Bera	0.195865
Probability	0.906710

Processed using E-views (appendix)

A complement of standard descriptive statistics is displayed along with the histogram. All of the statistics are calculated by using the observations in the current sample.

- Mean is the average value of the series, obtained by adding up the series and divided by the number of observations.
- Median is the middle value of the series when the values are ordered from the smallest to the largest. The median is a robust measure of the center of the distribution that is less sensitive to outliers than the mean.

- Max and min are the maximum and the minimum values of the series in the current sample.
- Standard deviation is a measure of dispersion or spread in the series.
- Skewness is a measure of asymmetry of the distribution of the series around its mean. The Skewness of a symmetric distribution, such as the normal distribution, is zero. Positive Skewness means that the distribution has a long right tail and negative Skewness implies that the distribution has a long left tail. Based on the above that the Skewness result is 0.13. It means that the result is positive so that it has a long right tale.
- Kurtosis measures the flatness of the distribution of the series. The kurtosis of the normal distribution is 3. If the kurtosis exceeds 3, the distribution is peaked relative to the normal; if the Kurtoss is less than 3, the distribution is flat relative to the normal. As we see from above data that the result of kurtosis is 2.722. It less than 3 so the distribution is flat relative to normal.
- Jarque-Bera is a test statistic for testing whether the series is normally distributed. The statistical test measures the difference of the Skewness and kurtosis of the series with those from normal distribution. Under the Null hypothesis of a normal distribution, the Jarque-Bera statistics is distributed as X^2 with 2 degrees of freedom. The reported probablity is the probablity that a Jarque-Bera statistics exceeds (in absolute value) the observed value under the Null hypothesis—a small

probability value leads to the rejection of the Null hypothesis of normal distribution at the 5% level but not at 1% significance level. In the table above it showed that the probability is 0.9006 which is larger than 5%. Thus,it can accept the Null hypothesis of the normal distribution.

From the above explanation and analysis,it can be concluded that in a normality test, ECM has normally distributed.

4.2.6.2 Heteroscedasticity

Table 4.7

Heteroscedasticity test	
Prob. F	0.0005
Prob. Chi-Square	0.0697

Processed using E-views (appendix)

- Considering the *P*-value for the F-statistics
- The Null hypothesis for the white test is homoscedasticity
- If fail to reject the Null hypothesis , the it has homoscedasticity
- If reject the Null hypothesis then it has heteroscedasticity
- Significance level of 5% is commonly used for this test
- Reject H_0 if *p*-value $\leq \alpha$ and do not reject H_0 if *p*-value $\geq \alpha$
- Because the probability is $0.0005 < 0.05$ so H_0 is rejected meaning that it has heteroscedasticity in Error Correction Model.

4.2.6.3 A serial correlation

Table 4.8

Breusch-Godfrey Serial Correlation LM Test:	
Prob. F	0.3441
Prob. Chi	0.2241

Processed using E-views (appendix)

The probability above showed that it is larger than the α significance level 0.3441 > α (at 5% level) and 0.2241 > α (at 5% level). Therefore, the Null hypothesis cannot be rejected. This means there is no serial correlation. The lag used in that serial correlation LM test is 4 as what Ljung and Box suggested that lag equal $T^{1/3}$ in which T is the number of observations.

4.2 Economic Interpretation

From the ECM equation$Poverty_t = \alpha_0 + \alpha_1 GDP_t + \alpha_2 Inflation_t + \alpha_3 FDI + \alpha_4$ Gini ratio+ e_t it can be formulated as:

$Poverty_t = 0.2648 - 0.0002GDP_t + 0.0007Inflation - 0.0080FDI_t - 0.2858$ Gini $ratio_t$

From the result of the formulation above, it can be derived the explanation as follows:

1. Changes in GDP 1% will change the poverty -0.0002. It shows that there is no significant change or significant correlation between changes in GDP and the poverty.
2. Changes in inflation 1% will change the poverty 0.0007. It shows that there is no correlation between inflation and poverty.
3. Changes in FDI 1% will change the poverty -0.0080. It can be seen that there is no correlation between FDI and the poverty in the long run.

4. Changes in Gini ratio 1% will change the poverty -0.2858. It means that there is no correlation between Gini ratio and the poverty in the long run.

From the data above, it can be concluded that there is no significant correlation between GDP, inflation, FDI, and Gini ratio towards the poverty in the long run. The results of the short run are explained below, whether in the short run there are significant correlations between the variable and independent variable or not.

From this ECM equation $\Delta Poverty_t = \alpha_0 + \alpha_1 \Delta GDP_t + \alpha_2 \Delta Inflation_t + \alpha_3 \Delta FDI_t + \alpha_4 \Delta gini\ Ratio_t + RES_{t-1}$it can be formulates as follows:

$\Delta Poverty_t = -0.0037 + 0.0015\Delta GDP_t + 0.0010\Delta Inflation_t - 0.0091\Delta FDI_t + 0.0731\Delta Gini\ ratio_t - 0.7061RES_{t-1}$

From the results of the formulation above it can derived as follows:

1. Changes in GDP 1% will change the poverty 0.0015
2. Changes in inflation 1% can change the poverty 0.0010. As analyzed before that there is a correlation between inflation towards poverty because the probability of inflation is smaller than $\alpha = 5\%$ in the short run.
3. Changes in FDI 1% will change the poverty -0.0091
4. Changes in Gini ratio 1% will change the poverty 0.0731

From the data above, it can be concluded that there is no significant correlation between GDP, FDI, and Gini ratio towards the poverty in the short run. But instead it has a significant correlation between inflation towards the poverty.