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# The Major Obstacle to Economic Growth for EU Countries: Unequal Income Distribution

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ABSTRACT

Price stability contributes to financial stability because it eliminates the market distortions and uncertainties which may occur at the markets' level as a result of the price instability. Price stability can reduce the level of risk premiums in interest rates because it lowers the degree of uncertainty that is associated with future inflation.



## 1. Introduction

People have been forming various communities since the first existence of humans. Communities turned into societies in time and in order to satisfy the needs that cannot be satisfied by only one person such as defense, justice, health and education, governments were established. As the societies grow in time, the governments tended to realize activities about other areas especially like economy along with basic services.

There are two important aims of a government which it should realize and balance; these are, providing distribution of income with justice and realizing a balanced economic growth. However, today it seems hard to achieve this because of the globalization of governments. Since the globalization, which makes countries become closer to each other in term of culture and trade and in terms of many different angles, makes countries behave as if they have only one market by means of adding markets to each other in the economic sense.

The single market sense which is brought by globalization caused changes in policies of international associations. In order to expand its boundaries for single market, European Union (EU) and Organization for Economic Co-operation and Development incorporated many countries. Therefore, it is discussed that most of the EU and OECD member countries are the same. Today, OECD has 35 members and EU has 28 members. The number of common members of these two associations is 21. So it is natural that they are affected by each other in terms of policies because of the high number of common members. And so, distribution of income which is the center of interest of all the governments of the world and the policies which are developed for the economic growth are among the areas where EU and OECD affect each other.

However, since the 1990s, almost all the developed and developing countries of the world has been in a race via the policies that they have applied in order to increase the economic growth and they neglected providing justice in distribution of income for the sake of economic growth. It is unquestionable that the increase of inequality in distribution of income, which came to light with the abovementioned situations, has become a serious problem for many countries. It is possible that these misapplications are at the top of list of financial difficulties met pre and post 2008 crisis by especially EU member countries inside OECD countries.

2. Theoretical Framework of Income Inequality – Economic Growth Interaction

In the literature, distribution of income is formalized geometrically with Lorenz curve which was found by Max Otto Lorenz in 1905. Lorenz curve aims to show the distribution of income of a country in different time periods or the distribution of income of different countries at the same time period (Lorenz, 1905: 209).

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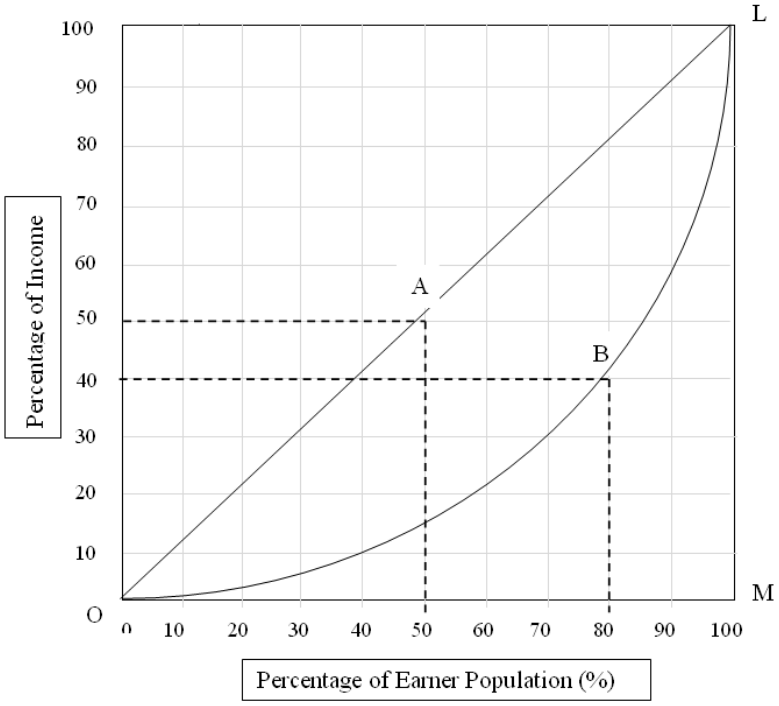


**Figure 1. Lorenz Curve**

As it can be seen from the Figure 1, Lorenz curve is in the shape of closed box diagram. OL straight line which goes through the origin states that there is parity in the shares which they get from the income for the earners. However, the subject diagram cannot make a numerical description.

As a result, the first significant work related to distribution of income is accepted as the one made by Italian economist CorrardoGini in 1912 which is Gini coefficient. It was aimed to show the measurement of how the domestic income of a country in a certain period was divided among the citizens of that country. Gini coefficient is graded with the numbers between 0 and 1. 0 represents the perfect income equality in a society and 100 or 1 represents the maximum income inequality (Luebker, 2010:6).

Gini coefficient is the ratio of OL –exact equality straight line- , which makes and angle of 45° to the subject closed box diagram which was geometrically formed by Lorenz, and the area of OML of Lorenz curve to the area of the triangle under the OL straight line (OECD, 1998: 84). In the state of parity where Lorenz curve coincides with the parity straight line, Gini coefficient is 0 and in the state of complete inequality, it is 1. It is not possible to see the countries in which Gini is 0 or 1 in our world since the primary purpose is to make the economy be as close as 0. Because it is clear that the price of moving away from 0 will be paid both by the consumers and by the producers with market shrinkage and subsequently with recession.

Economic growth which means the increase in the amount of product and service production in a certain period (Sullivan, Sheffrin, Perez, 2003: 11) is determined by the producers in other words by the supply group in terms of macroeconomics as it is about producing goods and services. Besides, governments have the policies such as increasing savings and investments, continuation of education, supporting health practices, protecting property, maintaining political stability, allowing free trading, and trying to develop new technologies related to the supply of goods and services in the market (Mankiw, 2012: 240-256). In that case, if governments apply subject policies in order to work in a right way for each sector of economy, it will be beneficial.

Only when the other variables are fixed, it is possible to realize economic growth which is the most important macroeconomic variable of present day by having an increase in production of goods and services. As a result, economic growth can vary because of technological developments in the country, public investments, population growth, and labor force savings as well as inflation and interest rate; and savings and capital accumulation. However, there is a factor which can affect the economic growth immediately; and that is the inequality in distribution of income.

It is widely known that inequality in distribution of income which emerges from misapplication of the policies related to distribution of income in a country can affect the growth in the subject economy negatively. As a result of transfer of gross national product collected in the end of the year to the sources inside country again, inequality in distribution of income emerges and therefore the gross national product which is not sent back to domestic production may be transferred to foreign sources and so economy in the country may shrink day by day.

Providing distribution of income with justice has become very important as the difference among brackets due to the rapidly developing industries and technologies in worldwide; and it is approached by

many economists as study subject. For example; W. Arthur Lewis, who accepts he problem of distribution of income as a requirement of development process, studied distribution of income in a model which is formed by two sectors –industry and agriculture. According to Lewis, the capitalists transfer workforce from agricultural sector to industrial sector in a stable wage limit and turn the profit obtained from production into investment. Because there is an infinite flexible labor supply from agriculture to industry, the capitalist can make the labor work on a stable wage limit. The profit of capitalist increases thanks to the stable wage limit. As the economic growth and development depends on the profit obtained by the capitalist, the injustice of income between the capitalist and laborer increases (Lewis, 1954:139-191).

As it can be seen, Lewis associates the injustice of distribution of income with development and growth. Although there are economists who associated distribution of income with many variables except for Lewis, there are economists who studied only changes in distribution of income.

**3. Related Literature**

The relation between distribution of income and economic growth has been approached by many economists in the economic literature as a research subject. By making research on this subject, Simone Kuznet developed his hypothesis on this subject in 1955. According to Kuznet, distribution of income is less in the developing countries in which the income level is low than the industrial countries in which the income level is high. Although inequality of income increases at first in the industrial countries while the economic growth increases, in the coming stages of growth, the inequality in distribution of income will become narrow (Kuznet, 1955: 1-28). In economic literature, Kuznet's hypothesis showing the relation between distribution of income and income level is named as "reverse u curve".

According to Hirschman and Rothschild (1973) who think that justice of distribution of income can be sacrificed for economic growth, economic growth's being one step ahead of justice of distribution of income brings acceleration of capital accumulation in its wake. In the third world countries, the problem is not only the lack of growth sources but also the lack of enacting for getting these sources together. So the third world countries do not know how to use their sources economically and they have to grow unbalanced in order to clear the hurdle (Hirschman, Rothschild, 1973: 544-566).

On the other hand Robinson (1976) calculated employment as well as economic growth and distribution of income. According to Robinson, agricultural sector constitutes a great part in the economy. The fundamental feature of agricultural sector which takes place in the countryside is that per capita income is low and that the inequality in distribution of income is narrow in the sector. On the contrary; in the industrial zone of the city, per capita income is high and there is a high income inequality. Along with economic growth, employment shifts from agricultural sector to industrial sector. Thus; while per capital income raises, the inequality in distribution of income rises, as well. However, the income of agricultural workers increases because of the migration from countryside to city along with growth and progress. Similar developments are valid for the workers in the industrial sector. As a consequence, while the total income increases, convergence between incomes emerges (Robinson, 1976: 437-440).

There are economists who claim that inequality of distribution of income affect economic growth negatively and this is caused by the political instability. According to Bourguignon (1981); equality of distribution of income decreases the dependency on socio-politic instability and this way investments and economic growth rouses up (Bourguignon, 1981: 1469-1475).

The thesis, which states that political stability makes the relationship between economic growth and distribution of income related, takes place in the studies of Alesina, Perotti (1996) and Alesina, Rodrik (1994). According to this thesis, inequality of distribution of income is a phenome that emerges as a result of political instability. In equality of distribution of income constitutes the fundamental reasons of social unrest and causes impoverishment in different parts of society. And impoverishment decreases the demand for goods and services and affects the level of investment negatively. When the level of investments have negative indicator, it causes decrease in economic growth (Alesina, Rodrik, 1994: 465-490 and Alesina, Perotti, 1996: 1203-1228). Also, Alesina, Perotti (1994) have another study related to this thesis. However, in this study, there are political rights, democracy and savings. Persson and Tabellini (1994) argued that inequality of distribution of income affect economic growth negatively and the reason for that is political instability.

While Barro (2000) studied the relation between distribution of income and economic growth on Latin American countries and on Sub-Saharan Africa, Barro divided the countries into two as rich and poor. Whereas the inequality in distribution of income increases in poor countries, the economic growth decreases. And whereas the inequality in distribution of income increases in rich countries, the economic growth increases, as well (Barro, 2000: 5-32).

Rosser and Ahmed (2003) had another approach to the relation between growth and distribution of income, and stated that subterranean economy increases inequality in distribution of income. Also, it is stated that unreported activities causes subterranean economy and so the taxes of those activities are not paid and this results in the decrease in tax revenues in the subject study. The policies about increasing taxes on formal sectors in order to compensate the loss in tax revenues, result in the deepening of subterranean economy.

The elements caused by subterranean economy such as solidarism and erosion of trust feeds the increases of the inequality in distribution of income. In the subject study, the macroeconomic indicators, in which there is economic growth, of the countries where subterranean economic activities are less are shown, as well (Rosser J. B., Rosser M., Ahmed, 2003: 425-447).

Galor and Moav (2004), stated that inequality in distribution of income increases in the first phases of economic growth because of the riches that have a higher marginal saving rate which is canalized to the investments in real capital, and that economic growth increases, as well. However, while inequality in distribution of income increases because of the absence in credit markets, human capital and real capital; finally, economic growth decreases (Galor and Maov, 2004: 1001-1026).

According to Herzer and Vollmer (2012), the long term effect of inequality in distribution of income on growth is negative. I.e.; while inequality in distribution of income increases, economic growth decreases. Also Herzer and Vollmer state that unlike Barro, dividing countries as rich and poor is not important for the differences of effects on inequality in distribution of income (Herzer, Vollmer, 2012: 501).

## 4. Research Methodology

Before analyzing causal relationship between variables, order of stationarity of the series must be determined. In the studies made with non-stationary time series, spurious regression may occur. Although high $R^2$ and significant t statistics may come into question in spurious regressions, parameter estimations are economically of no significance. Using non-stationary time series may result in obtaining a relationship which does not actually exist between variables taking place in the model that will be estimated. In order to avoid spurious regression in the studies made with time series analysis, the stationarity of time series must be tested (Ümit, 2007: 160).

### 4.1 Unit Root Test

$$X_t = c_o + j.X_{t-1} + e_t \qquad (1)$$

In the equation (1), if $|j|<l$, $X_t$ series is stationary; if $|j| =1$, $X_t$is non-stationary. For many economical time series, autoregressive coefficient j must be 1 or less than 1. In the situation where $j>l$ is not rational economically. In the autoregressive equation (1), $j=1$ is known as "the period whose differences are stationary" and most of the economic time series are seen as the period whose differences are stationary. In such a period when $j=l$, $X_t$series is integrated in the first rank (Utkulu, 1993: 309). In the equation (1), Dickey and Fuller (1987) suggested easy and proper method of integration rate test of $X_t$ and it is known as Dickey Fuller (DF) Test. In short, this test is testing $j=l$ in (1) against $j<l$ hypothesis. The following equation is estimated from equation (1).

$$\Delta X_t = c_1 + \lambda X_{t-1} + e_t \qquad (2)$$

Equation (2) can be explained as follows:

$$X_t = c_o + (1+\lambda)X_{t-1} + e_t \qquad (3)$$

$(1+\lambda)$ in the equation above is the same with j in the equation (1). If the equation is negative as it is $\lambda$ in the equation (2), equation becomes $j<l$ as it is in the equation (1). Thus, DF test includes negativity test of $\lambda$ in the equation (2) regression. Rejecting Ho hypothesis and accepting alternative hypothesis ($\lambda=0$) states that $j=l$ and $X_t$is non-stationary in the matrix value. In that case, for equation (2), t and F distributions are not appropriate; t statistic's distribution cannot be known certainly.

Ho: $\lambda<0$ ($j<1$) =>Series are stationary.

Ha: $\lambda=0$ ($j=l$) => Series are non-stationary.

If Ho hypothesis is rejected, there are two alternatives in this case; integration rate of $X_t$is bigger than 0 or there are not integrations in all of them. Naturally, the next step is to test if integration rate is 1 or not. DF equation becomes as follows:

$$\Delta\Delta X_t = c_2 + \lambda\Delta X_{t-1} + e_t \qquad (4)$$

Again, in equation (4), we are interested in the negativity test of $\lambda$. Until we set an integration rate for $X_t$ for the process, or $X_t$ is made stationary by taking differences of $X_t$ series, we can continue.

Although DF test is an important step for calculating integration rate, it doesn't take autocorrelation in the error terms into account. If the error term $e_t$ is with autocorrelation, DF (Dickey-Fuller) test will be invalid. As a solution for this situation, Dickey Fuller suggested that depended variable's deferred value must be added to the model as explanatory variable and so autocorrelation will disappear. This test is named as Augmented Dickey-Fuller Test (ADF), and it is qualified as the most effective test to be used in order to determine integration rate and is used widely in practice. ADF test goes as follows:

$$\Delta X_t = c_3 + \lambda X_{t-1} + \sum_{i=1}^{k} \lambda_1 \Delta X_{t-1} + u_t \qquad (5)$$

In ADF test, critical values table which is used in DF is used (Charemza, Deadmen, 1999: 103-104).

In order to make up for some part of Dickey-Fuller Test, various methods have been developed. One of them is another alternative unit root test Phillips Perron (PP) test. Dickey Fuller ignores the effect of structural fractions on autoregressive process (AR). In order to eliminate this problem, Perron developed his own test in 1989 and aimed to prevent DF test from accepting the wrong hypothesis which depends on fractions. Along with this, hypothesis of Dickey and Fuller which states that error terms are statistically independent and that they have constant variance was expanded by Phillips-Perron and the effects of difference of standard error of error term were included in the process. With this aim, a non-parametric unit root test was developed. As a result, this test includes obligation of not having autocorrelation between error terms (Kır, 2011: 64).

Phillip-Perron test is a unit root test which is used for time series that are nonparametric and that have moving average (MA) process (Önel, 2004: 77). This unit root test has softened the hypothesis about error term of Dickey Fuller test. Error term is assumed to be statistically independent and to be distributed homogenously in Dickey-Fuller Test. Augmented Dickey Fuller test corrected the autocorrelation problem of Dickey-Fuller test by adding augmented values to the model. On the other hand Phillips-Perron test, allows error term to be dependent in a poor degree and to be distributed heterogeneously. Thus, no autocorrelation problem emerges.

The regressions used in Phillips-Perron unit root test are as follows (Enders, 1998: 239);

$$Y_t = \beta_0 + \beta_1 Y_{t-1} + \mu_t \qquad (6)$$

$$Y_t = \beta_0 + \beta_1 Y_{t-1} + \beta_2 \left(T - \frac{N}{2}\right) + \mu_t \qquad (7)$$

In the equation (7), "N" is the number of observations and "μ" is the error term. In this test, "$\beta_1 = 0$" hypothesis is tested. In order to accept or reject these hypotheses, the test statistics of Phillips-Perron unit root test are compared with critical table values that are used for Augmented Dickey-Fuller (ADF) unit root test according to the result 0 hypothesis are accepted or rejected. Hereunder, the series are decided to be stationary or non-stationary.

Unlike ADF test, the dependent value is not found augmented in PP test. Because PP test, which doesn't give any place to limiting hypotheses about error term and was developed in order to check the high rate correlation, is a subsidiary unit root test of ADF. The augmented values of enough dependent variable to make up for autocorrelation are not added to the model in PP test, instead of that, it is adapted with Newey-West estimator (Altunç, 2008:118).

In this study, Augmented Dickey Fuller Test (ADF) and Phillips-Perron test (PP) are used in order to determine the stationarity of the series.

### 4.2. Causality Analysis

In order to reveal the direction of the causality among the analyzed variables, Granger suggests a causality analysis that is widely used in economic literature. Granger puts forward causality and externality terms. Hereunder, if adding information about variable X to the model provides benefits to the variable Y's estimation, variable X is the cause of variable Y. Granger causality analysis requires a regression estimation which is set on each internal variable's itself and other variables (Granger, 1969: 553-560).

In this study, Granger Causality Analysis is used while searching the causality relation between growth rate and GINI coefficient. This analysis is made by using the following equation;

$$Y_t = \alpha_0 + \sum_{i=1}^{k1} \alpha_i Y_{t-i} + \sum_{i=1}^{k2} \beta_i X_{t-i} + u_t \qquad (8)$$

$$X_t = X_0 + \sum_{i=1}^{k3} \chi_i X_{t-i} + \sum_{i=1}^{k4} \delta_i Y_{t-i} + v_t \qquad (9)$$

Granger causality analysis is made through testing if the coefficients of augmented values of independent variable, which takes place in front of the error term in the model above, equals to 0 as a group or not. In the equation (8), if the $\beta_i$ coefficients are found different than 0 in a certain significance level, the result is that X is the cause of Y. Similarly, if $\delta_i$coefficients are different than 0 in a certain significance level in the equation (9), the result is that Y is the cause of X. In that case, there is a mutual causality relation between X and Y. If the $\beta_i$ coefficients in the equation (8) are only different than 0, there is a one way causality from X to Y, and if the $\delta_i$coefficients in the equation (9) areonly different than 0, there is a one way causality from X to Y. If both $\beta_i$ coefficients and $\delta_i$coefficients are not different from 0, this situation shows that there is no causality relation between these variables. In the original Granger causality test, $k_1$, $k_2$, $k_3$, $k_4$ shows length of delay and $u_t$and $v_t$shows error terms (Isıgıcok, 1994: 93).

### 4.3. Regression and Correlation Analysis

While studying the relation between two or more variables, regression and correlation methods are used. The regression analyses are divided as basic regression analysis, which is for the relation between two variables, and multiple regression analysis, which is for the relation among more than two variables. The base of the regression and correlation analysis, generally, is founded on determining and calculating shape, direction and rate of the relations between/among two or more than two variables. While the shape of the relation between variables is determined numerically, the rate of the relation is shown by correlation.

The linear relation between two variables can be formulated –as one dependent and one independent variable- as follows:

$$Y = \alpha + \beta X + \varepsilon \qquad (10)$$

In the equation (10), Y is dependent, X is independent and ε is error term. In order to decide which observation will represent dependent variable and which one will represent independent variable, we must decide which one affects the other. And this requires knowledge about the observations. The method generally used in order to get regression equation is Least Squares Method (LSM). LSM is based on the minimum value of the sum of the squares of deviation from regression linear of Y. In this sense, LSM regression linear, and arithmetic average define the same thing (Çakıcıet.al., 2003:139-167).

On the other hand, correlation coefficient is the mean that shows the degree of relation between variables. When it is among 0 and 1, there is positive correlation; and when it is among 0 and -1, there is negative correlation. If the correlation coefficient is 0, it means that there isn't any relation between variables; and if it is 1 or -1, it means that there is a complete correlation. If the correlation coefficient is between 0 and 0.49, the relation is poor; if it is between 0.5 and 0.74, the relation is medium; and if it is between 0.75 and 1, the relation is strong. The symbol of correlation coefficient depends on the β coefficients symbol in the regression equation. If β is positive, the correlation is positive and if it is negative, the correlation is negative (Akkaya and Pazarlıoğlu, 1998: 85-86).

## 5. Results

In this study, in order to study the relation between annually average GINI coefficient and annually average economic growth rate in EU member countries between the years 1995-2015 (the year 2015 has not been finished, yet since the study started. So the values belonging 2015 are expected values), time series are used for application and the numerical results which were found have been interpreted. First of all, in order to ignore small floatation that time series may show, logarithms of values are taken in the study. Later, in order to determine if the values of two variables are stationary or not, Augment Dickey-Fuller test (ADF) and Phillips-Perron (PP) test were applied. Next, in order to determine the causality relation between variables, Granger Causality test was used and at last, in order to direction and the degree of the relation were determined by Regression and Correlation Analysis.

In the study, the average of annually economic growth and average of annually GINI coefficients which include EU member countries between 1995 and 2015 was used. All the EU member countries were involved in the application and average values are obtained through using data of all countries. The economic growth rates are taken from OECD (Organization for Economic Co-operation and Development) database and GINI coefficients are taken from Eurostat website's database.

In the figure 2, the change of data in time can be seen. EG and GINI which are used in the analysis are the abbreviations of Economic Growth and GINI coefficient.

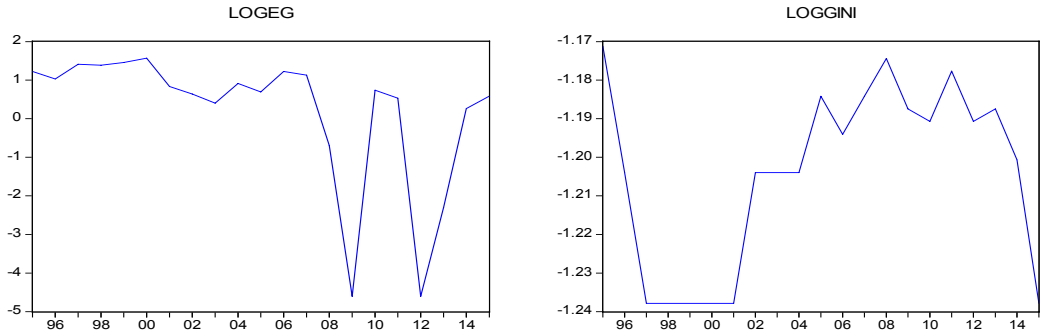


**Figure 2. Economic Growth and GINI Coefficients Series Graphics**

The results obtained when the series showing the data of growth 1995-2015 and GINI coefficient are studied are as follows: while growth data were almost similar and high from 1995 until 2007, they got the lowest level between 2009 and 2012; however, they began to rise in 2012. When we look at the graphic showing GINI coefficient, they got the lowest level between 1997 and 2001, and in the following years, there are rises from time to time and there declines from time to time. And since 2013, there has been a decline.

### 5.1. Unit Root Test Results

The time series used in the model must be tested in order to see if they are stationary or not. As Granger and Newbold (1974) shows, in case we work with the non-stationary time series, we can face with the spurious regression problem. In this case, the result obtained by regression analysis does not reflect the real relation (Gujarati, 1995).

**Table 1. ADF Unit Root Test Results**

| | | ADF–tStatistics | |
|---|---|---|---|
| **Variables** | **MacKinnonCritical Values** | **Level Values** | **First Difference** |
| GROWTH | %1=- 3.85739<br>%5= -3.04039<br>%10= -2.66055 | -1.31004 (2) | -6.93725 (1)*** |
| GINI | %1= -3.80855<br>%5= -3.02069<br>%10= -2.65041 | -1.73442 (0) | -3.30019 (0)** |
| ***PS:***the values in brackets give the chosen delay length according to SCI criteria. Critical values for ADF were obtained by MacKinnon in 1996 ***p<.01, **p<.05, *p<.1. | | | |

**Table 2. PP Unit Root Test Results**

| | | PP–tStatistics | |
|---|---|---|---|
| **Variables** | **MacKinnonCritical Values** | **Level Values** | **First Difference** |
| GROWTH | %1= -3.80855<br>%5= -3.02069<br>%10= -2.65042 | -1.10919 (6) | -7.75288 (9)*** |
| GINI | %1= -3.80855<br>%5= -3.02069<br>%10= -2.65041 | -2.01405 (2) | -3.11134 (2)** |
| ***PS:*** the values in brackets give the chosen delay length according to SCI criteria. Critical values for PP were obtained by MacKinnon in 1996 ***p<.01, **p<.05, *p<.1. | | | |

The series' having unit root indicates that it is non-stationary. When the fixed data of ADF and PP test statistics are analyzed, for growth rate and GINI coefficient series, we can say as follows: it does not have a stationary level in the level, and it does not show a distribution around a certain average. When the first differences are taken, it is seen that the test statistics are bigger than the critical values –as absolute value- obtained by MacKinnon. As a result, it can be said that when the first differences of growth rate and GINI coefficient are taken; that is, I(1); it ensures the stationarity hypothesis (see. Table 1 and Table 2).The stationary series whose first differences are taken are given in the graphic in the Figure 3.

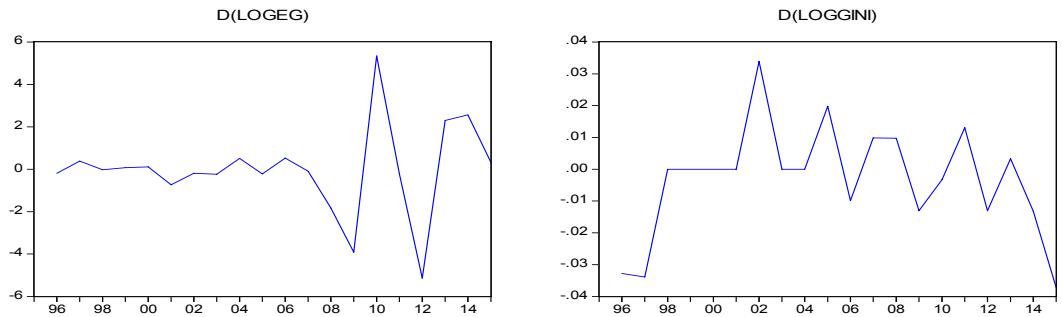


**Figure 3. Difference Taken Economic Growth and GINI coefficient Series Graphic**

### 5.2. Granger Causality Test Results

In order to test if a variable causes the other in a model which is formed in order to estimate a variable (Akkaya&Pazarlıoğlu, 1998) or not, "Granger Causality Test" was developed by Granger. With this test, the causality relation between variables is explained. The delay length in causality analysis is determined by using Akaike Information Criterion and delay length is determined as 2. The results are shown in Table 3.

**Table 3. Granger Causality Test Results**

| Hypotheses | F-statistics | Probability |
|---|---|---|
| Growth is not the cause of GINI | 0.1189 | 0.8887 |
| GINI is not the cause of growth | 4.0661 | 0.0405 |

According to Granger causality test results; "growth is not the Granger cause of GINI" Ho hypothesis was accepted (with 0.8887). "GINI coefficient is not the Granger cause of growth" Ho hypothesis was rejected (with 0.0405) with 5% importance level. Thus, we can see that the causality relation between growth and GINI is from GINI coefficient to growth, that is, there is a one way relation between them. So, the changes in GINI coefficient affect growth.

### 5.3 Correlation and Regression Analysis Results

Before regression analysis, the causality relation between GINI coefficient and growth must be determined. If there is not any causality relation between these two series, even if the results of regression analysis are statistically significant, they are not significant economically. Also, in the model which will be formed for regression analysis, causality's direction must be established in order to decide which series will be dependent variable (result) and which series will be independent variable (cause). As the causality relation is from GINI coefficient to growth in the study, growth will be result and GINI coefficient will be cause in the regression analysis.

For the sample period below, the regression analysis between these two variables is shown considering equation (10).

**Table 4. Regression Analysis Results (Dependent Variable=GROWTH)**

| VAR | COEFFICIE |
|---|---|
| F<br>I | -34.65385<br>(-1.7891)* |
| GINI | - 28.93213<br>(-1.7988)* |
| R | 0.7205 |
| D | 2.0389 |
| F | 0.07795 |

**The numbers in brackets are t statistics. The Symbol * represents 10% level significance.*

By using equation (10) in the Table 4, the regression analysis results are provided. When the regression analysis obtained from the results of equation (10) are evaluated, as the probability value of the coefficients is smaller than 10% $H_0$: rejected and $H_1$: accepted and the coefficients are significant. For the total significance of the model, we consider the F probability and, as it is smaller than 10%, $H_0$: rejected and $H_1$ is accepted and it can be said that the model is significant. It can be seen that "t" value belonging to GINI coefficient is statistically significant closer to 10% level and that the relation is in the direction of negativity.

Also, the determination coefficient of the model ($R^2$) found an almost high rate as 0.72. On the other hand, the D.W. (Durbin-Watson) statistic's value (2.03) obtained from regression analyses indicate that there is no autoregressive problem between error terms of the model.

**Table 5. Correlation Analysis Results**

| Variables | GROWTH | GINI |
|---|---|---|
| **GROWTH** | 1.000000 | -0.552290 |
| **GINI** | -0.552290 | 1.000000 |

When the results of regression analysis are economically evaluated, it is understood that the relation between GINI coefficient and growth has the negative direction in EU member countries. The symbol of GINI variable's coefficients' being negative proves that. 1% increase of GINI coefficient in 1995-2015 period is expected to create a 28.93% decrease in economic growth. Also, while GINI coefficient is fixed, the economic growth is expected to be -34.

We can see the negative relation between variables that are obtained from regression analysis (see. Table 5.). Correlation analysis is applied in order to determine the direction and strength of the relation between two variables. Correlation coefficient takes values among 1 and -1 and as a matter of fact, when we consider the data in Table 5, it can be said that the correlation between GINI coefficient and growth is negative (-0.55) and that it is a medium level relation.

## 6. Conclusion

Increasing the rate of economic growth is the aim of almost every country in the world. However, while they want to increase the growth rate, they shouldn't neglect how the distribution of income is made. As it is known, the inequality in distribution of income, which emerges from misapplication policies related to distribution of income in a country, can affect the subject economic growth in a negative way. Inequality in distribution of income occur as a result of not transferring the gross national income which is gathered at the end of a year to the domestic sources; and therefore, the gross national income which is not transferred to domestic sources may move to the foreign sources and so an economic shrinkage may occur inside the country.

This may be the main reason of the economic difficulties that EU member countries encountered before and after 2008 crisis. The data related to analysis of time series in our study confirms this hypothesis. Hence, as the Granger Causality Test shows; economic growth is not the cause of GINI coefficient –that is; inequality in distribution of income- with 88,87 % rate. On the contrary, the inequality in distribution of income in EU member countries, which emerges from misapplication policies related to distribution of income, creates a proved relation with 5% significance on economic growth. Forasmuch as, this reality allows us to make an interpretation such as in the last 20 years, in EU member countries, 1% increase in GINI coefficient cause 3 or 4 point shrinkage in the economies of subject countries. However; another observation, which we got from the data of post 1995, the inequality in distribution of income in the EU member countries began to increase after 2006 with the effect of Euro zone. Even, when the subject increase tendency seen in inequality in distribution of income in the Euro zone surpasses the increase pace in EU member countries in general, it became leading role of 2008 crisis by ruining the image of the union which had already been in debt crisis. In other words, this failure in distribution of income was the announcement of the inevitable before 2008 crisis. Just as, the positive values were achieved before 2006 with the policies related to keeping GINI coefficient low and ensuring the distribution realistically; in the period after 2006 and before 2008 crisis, the negative course of events of GINI coefficient effected the economic growth negatively. Since it should be known that it is not the economic growth that creates inequality in distribution of income; the ones who create inequality in that economy are the ones who are the decision making bodies and the people who have some say in these bodies. This situation happened this way in 2008 crisis and it happened the same way in 2012 and 2013. So EU member countries and especially Euro zone must accept the truth that the misapplication of distribution of income in the name of introducing the benefits of union will give birth to new crisis in the future. In that case, the union must realize that it is beneficial to have right applications related to GINI coefficient in order to fight with inequality in distribution of income and it will contribute to economic growth.

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