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Research on the Correlation between National Economic Growth and Income Distribution Indicators (Gini Coefficient)

Guo Zhiqiang[a,*], Liu Junyao[b]

Beijing Wuzi University, Beijing, 100000, China
[a]bwuguozq@163.com, [b]liujunyaoa@163.com
[*]Corresponding author

Abstract: *The issue of economic growth is the oldest topic in economics, and it is also a worldwide topic.Throughout the history of economic growth in various countries around the world, growth is often associated with income distribution, and differences in economic growth among countries have led to unequal distribution of income levels.At the same time, the disparity of income distribution also affects the economic growth of various countries.This paper firstly selects relevant statistical data from 1971 to 2018, establishes appropriate econometric models, and verifies and revises the models through various statistical testing methods.Then the relationship between economic growth and its related economic index (Gini coefficient) is quantitatively analyzed.Finally, through the analysis of the final regression model in economic significance, the relevant policy recommendations are put forward.*

Keywords: *Economic growth; Income distribution; Gini coefficient; Econometric model; Statistical test*

1. Research background and significance

The relationship between economic growth and income distribution was linked as early as in the era represented by the theories of Smith, Ricardo, and Marx.It has been the focus of many development economists since World War II.In 1955, American economist Kuznets proposed the famous "inverted U hypothesis" of income distribution difference in his speech to the American Economic Association:Income disparities widen rapidly in the early stages of economic growth during the transition from pre-industrial civilization to industrial civilization, stabilize briefly, and then shrink gradually in the later stages of growth.Since then, the debate over the inverted U hypothesis has unfolded.Until the mid-1980s, most of the studies on the relationship between economic growth and income distribution centered on the "inverted U hypothesis" to explore the long-term trend of income distribution in the process of economic growth, that is, the degree of influence of economic growth on income distribution[1].However, the effect of income distribution on economic growth has been less explored upon.

In 1986, in his famous paper "Increasing Returns and Long-Run Growth" published in the Journal of Political Economy, Romer first regarded technological progress as the endogenous variable of economy and the result of knowledge accumulation. This paper puts forward a growth model of increasing returns which is different from the traditional growth model of diminishing returns and emphasizes that human capital is the main factor of economic growth.Since then, the theory of endogenous growth has been applied and studied of economic growth issues.Later, Lucas (1988) analyzed the mechanism of endogenous growth. Grossman(1991) et al. endogenized R&D activities, and Yang Xiaokai (1991) introduced the idea of combining the evolution of division of labor and transaction costs into the growth model, so as to develop the endogenous growth thought of Romer and Lucas in this respect, forming the most active and hot field of economics at present, namely the new economic growth theory.With the development of endogenous economic growth theory, the influence of income distribution on economic growth is linked together through endogenous factors.Recently, Western scholars have expanded the endogenous economic growth theory established by Romer et al., studying how income distribution affects the improvement of growth mode, focusing on such issues as "fairness, efficiency and growth", "whether unfair income distribution is unfavorable to economic growth", and "which income distribution principles are more conducive to economic growth"[2].

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2. Variable selection, data source and preliminary model construction

2.1 Selection variable

First of all, we select "Annual Growth Rate of National Income" as the explained variable Y; then, we select "Gini coefficient" as the explanatory variable X_1 and "Per capita GDP" as the explanatory variable X_2.

2.1.1 Annualized growth rate of national income (Y)

It refers to how much a country's national income has increased from the previous year. Annualized growth rate = current year's national income data - last year's national income data/last year's national income data *100%. This paper uses this index to measure the level of economic growth.

2.1.2 Gini coefficient (X_1)

Gini coefficient is a famous Italian economist Gini, on the basis of Lorenz curve, put forward in 1912, used to judge whether the distribution of income is fair. The Gini coefficient is a proportional number that ranges from 0 to 1, with closer to 0 indicating more equal income distribution and closer to 1 indicating more unequal income distribution.

In this paper, only the post-tax Gini coefficient is selected, and the pre-tax Gini coefficient is abandoned. The impact of tax on the growth of national income is not studied.

2.1.3 Per capita GDP (X_2)

It refers to a country's gross domestic product realized during the accounting period (usually one year) compared with the country's resident population (or registered population) calculation, to get the per capita GDP, is a measure of the standard of living of people in various countries.

Solow growth model shows that the higher the level of per capita GDP, the lower the growth rate of national income. A poor economy (with lower GDP per head) grows faster than a rich one[3].

2.2 Data source

Finding the raw data at Harvard University, this paper selects continuous data from 1971 to 2018 for 18 countries (10 developed countries and 8 developing countries).

Simpson's paradox illustrates that grouped data and aggregate data can lead to completely opposite conclusions. In order to obtain the correct causal relationship and eliminate the interference of confounding factors on the relationship between Gini coefficient and national income growth rate, the data should be divided into developed countries and developing countries for research. However, since the classical econometrics models of linear panel data include fixed effects variable intercept model, fixed effects variable coefficient model, random effects variable intercept model, random effects variable coefficient model, mixed model and other five categories[4], a model suitable for the whole can be found to overcome Simpson's paradox through various statistical tests and econometric tests. Therefore, this paper still uses aggregate data rather than grouped data to build models to study the problem of Gini coefficient and national income growth.

2.3 Preliminary construction model

In order to estimate the mathematical form of the model correctly, the scatter plot of the annual growth rate of national income and the Gini coefficient is drawn first. Figure 1 shows the results.

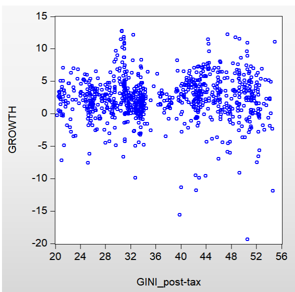

Figure 1: Gini coefficient and the annual growth rate of national income.

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According to Figure 1, it is an inverted U shape, so the model is preliminarily set as:

$$Y_{it} = \beta_0 + \beta_1 X_{it1} + \beta_2 X_{it1}^2 + \beta_3 X_{it2} + u_{it};\ i = 1, \ldots, 10, t = 1971, \ldots, 2018 \quad (1)$$

The mean of u_{it} is 0, the variance is σ_u^2, and Assuming X and Y are not related.

3. Model construction

3.1 Model verification

3.1.1 Unit root test

Check whether unit root exists in panel data, so as to check the stationarity of data, avoid false regression or false regression, and ensure the effectiveness of estimation. Since the time length of the data in this paper is 48, larger than 15, unit root test is required for the panel data[5].

The unit root test results of the annual growth rate of national income are shown in Figure 2.

Pool unit root test: Summary
Series: GROWTH_1, GROWTH_2, GROWTH_3, GROWTH_4, GROWTH_5, GROWTH_6, GROWTH_7, GROWTH_8, GROWTH_9, GROWTH_10, GROWTH_11, GROWTH_12, GROWTH_13, GROWTH_14, GROWTH_15, GROWTH_16, GROWTH_17, GROWTH_18
Date: 06/07/21 Time: 20:04
Sample: 1971 2018
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 3
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-18.1449	0.0000	18	839
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-15.9914	0.0000	18	839
ADF - Fisher Chi-square	302.811	0.0000	18	839
PP - Fisher Chi-square	297.990	0.0000	18	846

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Figure 2: The unit root test of the annualized growth rate of national income.

The P-values of Fisher-ADF in the same root unit root test LLC and different root unit root tests are all less than 0.05. Therefore, the null hypothesis of the existence of unit root is rejected, and this sequence can be considered to be stable[6].

The unit root test results of Gini coefficient are shown in Figure 3.

Group unit root test: Summary
Series: GINI_1, GINI_2, GINI_3, GINI_4, GINI_5, GINI_6, GINI_7, GINI_8, GINI_9, GINI_10, GINI_11, GINI_12, GINI_13, GINI_14, GINI_15, GINI_16, GINI_17, GINI_18
Date: 06/07/21 Time: 20:23
Sample: 1971 2018
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 3
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	0.25030	0.5988	18	829
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	2.23833	0.9874	18	829
ADF - Fisher Chi-square	29.5346	0.7683	18	829
PP - Fisher Chi-square	18.0235	0.9946	18	846

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Figure 3: Unit root test of Gini coefficient.

The P values of LLC and Fisher-ADF were all greater than 0.05, which suggested that the sequence was unstable. So the unit root test comes after the first difference. The result is shown in Figure 4.

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Group unit root test: Summary
Series: GINI_1, GINI_2, GINI_3, GINI_4, GINI_5, GINI_6, GINI_7, GINI_8, GINI_9, GINI_10, GINI_11, GINI_12, GINI_13, GINI_14, GINI_15, GINI_16, GINI_17, GINI_18
Date: 06/07/21 Time: 20:29
Sample: 1971 2018
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 2
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-6.33605	0.0000	18	822
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-7.40377	0.0000	18	822
ADF - Fisher Chi-square	132.870	0.0000	18	822
PP - Fisher Chi-square	148.895	0.0000	18	828

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Figure 4: Unit root test of Gini Coefficient (after first difference).

The P-values of both LLC and Fisher-ADF were observed to be less than 0.05, indicating that the sequence was stable.

The unit root test results of the square term of Gini coefficient are shown in Figure 5.

Group unit root test: Summary
Series: GINI2_1, GINI2_2, GINI2_3, GINI2_4, GINI2_5, GINI2_6, GINI2_7, GINI2_8, GINI2_9, GINI2_10, GINI2_11, GINI2_12, GINI2_13, GINI2_14, GINI2_15, GINI2_16, GINI2_17, GINI2_18
Date: 06/07/21 Time: 20:33
Sample: 1971 2018
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 2
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-6.41582	0.0000	18	822
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-7.53198	0.0000	18	822
ADF - Fisher Chi-square	135.187	0.0000	18	822
PP - Fisher Chi-square	150.849	0.0000	18	828

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Figure 5: Unit root test for the square term of Gini coefficient.

The P-values of both LLC and Fisher-ADF were observed to be less than 0.05, indicating that the sequence was stable.

The unit root test results of per capita GDP are shown in Figure 6.

Group unit root test: Summary
Series: GDP_1, GDP_2, GDP_3, GDP_4, GDP_5, GDP_6, GDP_7, GDP_8, GDP_9, GDP_10, GDP_11, GDP_12, GDP_13, GDP_14, GDP_15, GDP_16, GDP_17, GDP_18
Date: 06/07/21 Time: 20:39
Sample: 1971 2018
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-17.2129	0.0000	18	827
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-16.0379	0.0000	18	827
ADF - Fisher Chi-square	300.429	0.0000	18	827
PP - Fisher Chi-square	308.359	0.0000	18	828

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Figure 6: Unit root test of per capita GDP.

The P-values of both LLC and Fisher-ADF were observed to be less than 0.05, indicating that the sequence was stable.

3.1.2 Cointegration test

The best cointegration test is the test of economic theory itself.The inverted U hypothesis of Kuznets and the economic growth theory of Solow model can prove that the model in this paper can pass the cointegration test.

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3.1.3 Hausmann test

The fixed effects model allows for a correlation between unobserved individual heterogeneity and explanatory variables, while the random effects model assumes no correlation between the two. So which model is more appropriate for this paper?

Hausman test provides statistical basis for distinguishing the two models and is a common panel data test method. Of course, qualitative analysis can also be used to determine which model to build. This paper mainly through statistical test.

The original assumption of Hausman test is that the unobserved individual heterogeneity is not correlated with explanatory variables (i.e. the assumption of random effects model), so Eviews software is first used to do random effects model regression[7]. The results of individual random effects model are shown in Figure 7.

Dependent Variable: GROWTH?
Method: Pooled EGLS (Cross-section random effects)
Date: 06/08/21 Time: 20:18
Sample: 1971 2018
Included observations: 48
Cross-sections included: 18
Total pool (balanced) observations: 864
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.273918	3.096453	0.088462	0.9295
GDP?	-0.057690	0.013079	-4.410761	0.0000
GINI?	0.232730	0.172483	1.349287	0.1776
GINI2?	-0.003678	0.002308	-1.593494	0.1114
Random Effects (Cross)				
_1--C	-0.010760			
_2--C	-0.106565			
_3--C	-0.114083			
_4--C	-0.125723			
_5--C	-0.811726			
_6--C	0.366523			
_7--C	0.002707			
_8--C	-0.512547			
_9--C	2.056748			
_10--C	0.643772			
_11--C	-0.865534			
_12--C	0.272464			
_13--C	-0.926259			
_14--C	-0.633804			
_15--C	0.264468			
_16--C	0.548918			
_17--C	-0.207376			
_18--C	0.158777			

Figure 7: Regression results of individual random effects model.

Next, Eviews software is used to test whether the individual random effects model can pass the Hausman test, and the results are respectively shown in Figure 8.

Correlated Random Effects - Hausman Test
Pool: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	11.249524	3	0.0105

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
GDP?	-0.101507	-0.057690	0.000377	0.0240
GINI?	0.734212	0.232730	0.060572	0.0416
GINI2?	-0.007866	-0.003678	0.000009	0.1560

Figure 8: Hausman test results for individual random effects.

It can be seen from the upper part of the test output that the value of Hausman statistic is 11.25, and the corresponding probability is $0.0105<0.05$, that is, the null hypothesis is rejected, and the individual fixed effect model should be established[8].

3.1.4 F test of model setting

In the face of the obtained panel data, when setting the model, it is necessary to consider the differences between individuals of the sample data (heterogeneity), the changes in time (time-variability), and the effect changes (coefficient variability) of each observable influencing factor (namely each explanatory variable). As far as linear regression models are concerned, they are generally divided into two categories theoretically:A class of models with the same slope, namely the constant coefficient model; The other is the variable coefficient model[9]. The invariant coefficient

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model also checks whether the intercepts are the same.

This paper uses covariance analysis test, which mainly tests the following two hypotheses:

Hypothesis 1: The slopes are the same at different cross-sectional sample points and times, but the intercepts are different.

Hypothesis 2: The intercept and slope are the same at different cross-sectional sample points and times.

Clearly, if hypothesis 2 is accepted, no further testing is necessary. If you reject hypothesis 2, you should accept hypothesis 1 and see if the slopes are equal. If hypothesis 1 is rejected, the variable coefficient model should be adopted.(It is of little significance to discuss whether the intercepts are equal when the slopes are not equal, because if the slopes of the cross-sectional individuals are different, then the model intercepts must generally be different.)

According to the parameter constraint testing principle of the multiple linear regression model, the F statistic of testing hypothesis 2 is obtained:

$$F_2 = \frac{(S_3-S_1)/[(n-1)(K+1)]}{S_1/[nT-n(K+1)]} \sim \mathrm{F}[(\mathrm{n}-1)(\mathrm{K}+1), \mathrm{n}(\mathrm{T}-\mathrm{K}-1)] \tag{2}$$

F-statistic for testing Hypothesis 1:

$$F_1 = \frac{(S_2-S_1)/[(n-1)K]}{S_1/[nT-n(K+1)]} \sim F[(n-1)K, n(T-K-1)] \tag{3}$$

The fixed effect variable coefficient model, fixed effect variable intercept model and invariant intercept coefficient model were estimated respectively, and thenS_1, S_2 and S_3 were calculated.

The estimated results of the fixed effect variable coefficient model are shown in Figure 9:

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.217040	Mean dependent var	2.360903
Adjusted R-squared	0.146851	S.D. dependent var	3.406152
S.E. of regression	3.146129	Akaike info criterion	5.209878
Sum squared resid	7839.318	Schwarz criterion	5.606676
Log likelihood	-2178.667	Hannan-Quinn criter.	5.361754
F-statistic	3.092204	Durbin-Watson stat	1.612947
Prob(F-statistic)	0.000000		

Figure 9: Fixed effect variable coefficient model.

The estimated results of fixed effect variable intercept model are shown in Figure 10:

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.129799	Mean dependent var	2.360903
Adjusted R-squared	0.109154	S.D. dependent var	3.406152
S.E. of regression	3.214885	Akaike info criterion	5.197466
Sum squared resid	8712.817	Schwarz criterion	5.313199
Log likelihood	-2224.305	Hannan-Quinn criter.	5.241763
F-statistic	6.287080	Durbin-Watson stat	1.477445
Prob(F-statistic)	0.000000		

Figure 10: Fixed effect variable intercept model.

The estimated results of the model with constant intercept coefficient are shown in Figure 11.

Dependent Variable: GROWTH?
Method: Pooled Least Squares
Date: 06/07/21 Time: 23:16
Sample: 1971 2018
Included observations: 48
Cross-sections included: 18
Total pool (balanced) observations: 864

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.616419	2.120738	1.233730	0.2176
GDP?	-0.067586	0.010004	-6.755866	0.0000
GINI?	0.144236	0.112203	1.285484	0.1990
GINI2?	-0.002896	0.001471	-1.968332	0.0494

R-squared	0.054794	Mean dependent var	2.360903
Adjusted R-squared	0.051497	S.D. dependent var	3.406152
S.E. of regression	3.317290	Akaike info criterion	5.240792
Sum squared resid	9463.796	Schwarz criterion	5.262837
Log likelihood	-2260.022	Hannan-Quinn criter.	5.249230
F-statistic	16.61823	Durbin-Watson stat	1.356798
Prob(F-statistic)	0.000000		

Figure 11: Intercept coefficient invariant model.

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From the above figure, it can be seen that : S_1=7839.318, S_2=8712.817, S_3=9463.796.

Substituting S_1, S_2 and S_3 into the formula, we can get:

$$F_2 = \frac{(S_3-S_1)/[(n-1)(K+1)]}{S_1/[nT-n(K+1)]} = \frac{(9464-7839)/68}{7839/792} = 2.4144 \tag{4}$$

$$F_1 = \frac{(S_2-S_1)/[(n-1)K]}{S_1/[nT-n(K+1)]} = \frac{(8713-7839)/51}{7839/792} = 1.7314 \tag{5}$$

By looking at the F distribution table, we get $F_{0.01}(68{,}792) = 1.50$, $F_{0.01}(51{,}792) = 1.75$.

Because of $F_2 > F_{0.01}(68{,}792)$, so the panel data problem rejects the intercept coefficient invariant model at the significance level of 1%. At the same time, because of $F_1 < F_{0.01}(51{,}792)$, so the panel data problem does not reject the variable intercept model at a significance level of 1%.Generally, the fixed effect variable intercept model is preferred.

3.2 Model construction

According to the above unit root test, Hausman test and F test, in order to better estimate the relationship between national income growth and Gini coefficient, this paper collected the data of 18 countries for 48 years, that is, the time T > 30. Meanwhile, in order to obtain the long-term effect of national income growth and Gini coefficient, Therefore, dynamic panel data model with variable coefficient and variable intercept $(\mathrm{ARDL}(p, q, q, q))$ is adopted in this paper, that is:

$$y_{it} = \sum_{j=1}^{p} \lambda_{ij}\, y_{i,t-j} + \sum_{j=0}^{q} \delta_{ij}' x_{i,t-j} + u_i + \varepsilon_{it} \tag{6}$$

Among them, x_{it} is the explanatory variable, u_i is the fixed effect, λ_{ij} is the coefficient of the lagged explained variable, and δ_{ij} is the coefficient of the lagged explained variable. The regression results of Eviews software are shown in Figure 12.

Dependent Variable: D(GROWTH)
Method: ARDL
Date: 06/17/21 Time: 13:08
Sample: 1973 2018
Included observations: 828
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): GINI GINI2 GDP
Fixed regressors: C
Number of models evalulated: 16
Selected Model: ARDL(2, 2, 2, 2)
Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Long Run Equation				
GINI	0.333140	0.105936	3.144738	0.0017
GINI2	-0.003627	0.001460	-2.484097	0.0132
GDP	-0.058358	0.007459	-7.823973	0.0000
Short Run Equation				
COINTEQ01	-0.927461	0.067649	-13.71000	0.0000
D(GROWTH(-1))	0.052462	0.016390	3.200895	0.0014
D(GINI)	38.17434	26.77356	1.425822	0.1544
D(GINI(-1))	11.08006	12.70122	0.872362	0.3833
D(GINI2)	-0.447828	0.308834	-1.450062	0.1475
D(GINI2(-1))	-0.131440	0.153649	-0.855459	0.3926
D(GDP)	11.56803	2.936066	3.939977	0.0001
D(GDP(-1))	-1.383161	1.325264	-1.043687	0.2970
C	-4.910871	0.598585	-8.204133	0.0000

Mean dependent var	-0.061832	S.D. dependent var	3.869744
S.E. of regression	1.378014	Akaike info criterion	3.038881
Sum squared resid	1327.346	Schwarz criterion	3.948209
Log likelihood	-1147.797	Hannan-Quinn criter.	3.386930

*Note: p-values and any subsequent tests do not account for model selection.

Figure 12: ARDL model regression results.

Akaike information criterion is a standard to measure the good fit of statistical model. It is based on the concept of entropy, which can balance the complexity of the estimated model with the goodness of the model fitting data.The regression results of individual fixed effect variable intercept model obtained by applying Eviews software are shown in Figure 13.

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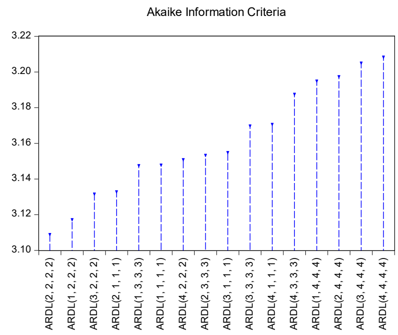

Figure 13: Regression results of individual fixed effect variable intercept model.

Figure 13 shows that the coefficient of per capita GDP is $-0.058358 < 0$, that is, the higher the level of per capita GDP, the lower the growth rate of national income, which conforms to the conclusion of Solow growth model. The coefficient of GINI is $0.333140 > 0$, and the coefficient of GINI2 (the square of GINI) is $-0.003627 < 0$, which conforms to the scatter plot form in Figure 1, and all corresponding P values are less than 0.05, that is, all pass the t test. In addition, the coefficients of GDP, GINI and GINI2 are all long-term effect coefficients, that is, the long-term equilibrium relationship is examined. The error correction effect (adjustment effect) $\mathrm{COINTEQ01} = -0.927461 < 1$, indicating that the model is correct.

Observing Figure 13, we can see that $\mathrm{ARDL}(2,2,2)$ is the smallest, which implies that $\mathrm{ARDL}(2,2,2)$ has the best fit.

4. Conclusions and policy recommendations

From the general law of the 18 countries studied, with the development of economy, the income distribution disparity will present an "inverted U pattern", which first rises and then falls: At the beginning of the economic development process, especially when the national income rises from the lowest level to the middle level, the income distribution situation first tends to deteriorate, and then gradually improves with the economic development, and finally reaches a relatively fair income distribution situation, which is in the shape of an inverted U.

Through the above analysis, we can see that, with the development of economy, the gap of residents' income distribution will continue to expand at the beginning, which is the result of various factors. Meanwhile, the widening of income distribution disparity also hinders economic growth. In order to achieve the purpose of promoting the growth of national income and improving income distribution, starting from the analysis results of this paper, the following policy suggestions can be obtained: to strengthen redistribution policies, so that redistribution can truly achieve the purpose of adjusting income distribution, such as the establishment of the most appropriate income tax system and reasonable transfer payment system, so that redistribution policies can adjust the income distribution gap to the maximum extent and better promote the growth of national income[10].

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